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CONTRACTIONS OF TITLES.

*The following is a list of the contractions and the corresponding full titles of Journals most frequently used in "The Month." The titles prefixed by a * are those of official Journals.*

Amer. Drug. = American Druggist. New York. Monthly.

* *Amer. Journ. Pharm.* = American Journal of Pharmacy. Philadelphia. Monthly.

Annalen = Justus Liebig's Annalen der Chemie. Liepzig. Monthly.

* *Apot.-Zeit.* = Apotheker-Zeitung. Organ of the Deutsche Apotheker-Verein. Berlin. Twice a week.

* *Apot. Zeit. Rep.* = Repertorium der Pharmacie. Supplement to the Apotheker-Zeitung.

* *Archiv* = Archiv der Pharmacie. Berlin: J. Greiss. Twice a month.

* *Berichte* = Berichte der deutschen chemischen Gesellschaft. Berlin. Once or twice a month.

* *Brit. Med. Journ.* = British Medical Journal, London. Weekly.

Bull. Com. = Bulletin Commercial. Supplement to L'Union Pharmaceutique. Paris: Pharmacie Centrale de France. Monthly.

* *Can. Pharm. Journ.* = Canadian Pharmaceutical Journal. Toronto. Monthly.

Chem. Zeit. = Chemiker Zeitung. Cöthen. Twice a week.

Chem. Zeit., Rep. = Chemisches Repertorium. Supplement to the Chemiker Zeitung.

* *Compt. Rend.* = Comptes Rendus des Séances de l'Académie des Sciences. Paris: Gauthier-Villars. Weekly.

Deut.-Am. Apot.-Zeit. = Deutsch-Amerikanische Apotheker Zeitung. New York. Twice a month.

Deut. Med. Woch. = Deutsche medicinische Wochenschrift, Berlin. Weekly.

Drug. Circ. = Druggists' Circular. New York. Monthly.

Glas. Med. Journ. = Glasgow Medical Journal. Glasgow: A. Macdougall. Monthly.

L'Union Pharm. = L'Union Pharmaceutique. Paris: Pharmacie Centrale de France. Monthly.

Med. Bull. = Medical Bulletin. Philadelphia. Monthly.

Med. Chron. = Medical Chronicle. Manchester: Heywood. Monthly.

Med. Pr. Circ. = Medical Press and Circular. London: A. A. Tindall. Weekly.

* *Monatshefte* = Monatshefte für Chemie. Vienna. Monthly.

Mon. Scient. = Moniteur Scientifique. Paris. Monthly.

Münch. med. Woch. = Münchener medicinische Wochenschrift. Munich. Weekly.

* *Ned. Tijdsch. Pharm.* = Nederlandsch Tijdschrift voor Pharmacie, Chemie en Toxicologie. The Hague. Monthly.

Nouv. Rém. = Les Nouveaux Rémèdes. Paris. Twice a month.

Pharm. Centralh. = Pharmaceutishe Centralhalle. Dresden. Weekly.

Pharm. Post = Pharmaceutische Post. Vienna. Weekly.

Pharm. Rec. = Pharmaceutical Record. New York. Twice a month.

Pharm. Runds. = Pharmaceutische Rundschau. New York. Monthly.

Pharm. Zeit. = Pharmaceutische Zeitung. Berlin: J. Springer. Twice a week.

* *Pharm. Zeit. Russl.* = Pharmaceutische Zeitschrift für Russland. St. Petersburg. Monthly.

Répertoire. = Répertoire de Pharmacie et Archives de Pharmacie reunis. Paris. Monthly.

Scient. Amer. = Scientific American. New York. Weekly.

West. Drug. = Western Druggist. Chicago. Monthly.

* *Zeit. öst. Apot.-Ver.* = Zeitschrift des allgemeinen österreichischen Apotheker-Vereines. Vienna. Weekly.

Zeit. phys. Chemie = Zeitschrift für physiologische Chemie. Strasburg: J. Trübner. Monthly.

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VOL. XXI.—JULY 5, 1890.

NOTE ON THE FRUIT OF ERYTHROXYLON COCA.

FIRST NOTICE.

BY C. J. H. WARDEN.

The fruit of the *E. Coca* used for the examination described in this note were collected from plants about two years old, grown in my garden at Alipore, near Calcutta, and originally received from the Agri-Horticultural Society of India. The fresh ripe fruit weighed, on an average, ·158 gram each, were bright scarlet in colour, and possessed a distinctly sweetish taste; but though masticated at various times, no physiological action on the mucous membrane of the mouth was observed. By exposure to even a moderate degree of heat the bright red hue of the fresh ripe fruit was changed to dark brown; with partially ripe fruit the alteration in colour by heat was much less marked. Dried in vacuo over sulphuric acid the original tint was only slightly deepened, and this method of desiccation was employed in preparing the fruit for analysis, on account of the possible action of heat causing partial decomposition of any alkaloidal principle, such as cocaine, which might be present.

For the following description of the microscopic structure of the fruit I am indebted to Dr. Dymock, of Bombay. The fruit from without inwards presents first a single row of brick-shaped cells forming the epidermis; within them is a single row of very large cells containing a mass of starch granules and scarlet colouring matter. Next comes the pulp, composed of parenchymatous cells containing starch and granular matter. Then the shell, composed of an outer layer of stony cells like bone cells, which are of considerable length; within this layer is a row of scalariform vessels, and then several rows of pitted vessels. Then the almond, the cells of which are full of starch.

The proximate analysis of the fruit, dried in the manner already mentioned, and reduced to fine powder, was conducted according to the scheme described in Dragendorff's 'Plant Analysis.'

The petroleum ether solution was of a deep rich yellowish red colour, and left on spontaneous evaporation a deep reddish semi-solid residue, which on microscopic examination was found to contain lamellæ and needles of a claret colour. In order to ascertain whether an alkaloid had been extracted or not by the petroleum ether, the extract was redissolved and agitated with dilute hydrochloric acid; the acid removed a trace of colouring matter, but no alkaloidal principle could be detected. The petroleum ether extract had a melting point of 34-35° C. in a capillary tube, and formed a deep red transparent liquid, becoming opaque on cooling. A portion of the extract was digested on the water-bath in a closed vessel with colourless alcoholic potash, the alcohol drained off, water added, and the contents of the flask boiled. The resulting soap solution was turbid from the presence of orange-coloured flocks. When cold the turbid solution was agitated with ether; the ethereal solution left on spontaneous evaporation a bulky residue, partly orange-coloured and partly white while still moist with ether. After drying at 100° C. this extract amounted to 1·519 per cent., calculated on the fruit containing 5·423 per cent. of moisture. At 189-191° C. the extract melted to a clear yellow liquid, which cooled to a brittle transparent mass; on heating more strongly an odour of burning indiarubber was noticed. Placed between watch-glasses and exposed for several days to a temperature near its melting point, very slender, long colourless needles formed on the surface of the mass, while a trace of a white sublimate was deposited on the upper glass. This sublimate was insoluble in water, but readily soluble in chloroform and alcohol; with concentrated sulphuric acid it gave an immediate blood red coloration; dissolved in chloroform and the solution well agitated with an equal volume of concentrated sulphuric acid, the acid became blood red, while the chloroform was practically *uncoloured*; and after standing for some hours, with the exception of a very slight green fluorescence in the *sulphuric acid layer*, no colour changes were observed either in the chloroform or acid. The amount of material was far too minute to admit of a melting point determination, or the application of other tests, in order to establish the identity of this compound with phytosterin or analogous cholesterin-like principles. It may be remarked, however, that as phytosterin has been detected in the fat from the leaves of *E. hyperificifolium* (Heckel and Schlagdenhauffen, *Compt. Rendus*, 102, 1037), its presence in the fat of the fruit of *E. Coca* is not improbable. The high melting point and colour of the extract from which this principle was obtained by sublimation, indicate that it was a mixture of a colouring matter associated with other principle or principles, possessing a higher melting point than ordinary cholesterin-like bodies. All attempts to separate these associated bodies by the aid of solvents failed.

The aqueous soap solution, after separation of ether, was acidified with dilute sulphuric acid, when yellowish flocks separated; the mixture was then agitated with light petroleum ether, when a portion of the precipitate failed to dissolve. The petroleum ether extract consisted of fatty acids which had a melting point of 53°-54° C. The aqueous acid solution contained no volatile fat acids, and was very faintly yellowish in colour. The insoluble flocks were filtered off, washed and dried, and had a melting point of 188°-189° C. On being strongly heated an odour of burning india-rubber was noticed. On being heated for some time to the melting, while contained between watch-glasses, a faint sublimate formed, which gave a slight reddish coloration with concentrated sulphuric acid.

The powdered fruit, after treatment with petroleum ether, was exhausted with ether. The ethereal extract was yellowish and non-crystalline; by treatment with petroleum ether a certain portion dissolved consisting chiefly of fat. The insoluble residue was then treated with cold water, when a portion dissolved, and the aqueous solution gave a marked reaction with alkaloidal reagents. Applied to the tongue, a slight numbing sensation was experienced, and the alkaloid would consequently appear to be cocaine; but the amount was only a trace, and I have no evidence to offer regarding its ultimate composition, or that of its gold or platinum salts. The residue insoluble in water was finally treated with absolute alcohol; the extract was whitish, partly soluble in alkalies, and reprecipitated by acids in white flasks.

After exhaustion of the powdered fruit with ether, it was dried, and then treated with absolute alcohol. On spontaneous evaporation of the alcohol solution, yellowish cauliflower-like masses separated, which on microscopic examination consisted of masses of needle-shaped crystals, and which possessed all the properties of the principle described as cocatannic acid in a former issue of this Journal ([3], xviii., 985). After separation of the alcohol, the alcoholic extract was treated with cold, and filtered from insoluble matter; on the addition of a few drops of dilute acid to the clear filtrate a turbidity was occasioned, due possibly to the decomposition of a salt of cocatannic acid with an alkaloid, and precipitation of the acid. After filtration the clear filtrate was neutralized with sodic carbonate and agitated with ether. The ethereal solution left a trace of residue on evaporation, which afforded reactions with all alkaloidal reagents, but I cannot positively affirm that it produced any physiological action when applied to the tongue.

The powdered fruit, after treatment with alcohol, was again dried and digested with cold distilled water. The aqueous solution gave with ferric salts a brownish-green coloration, changing to reddish-brown on the addition of ammonia. Lime water in excess gave a yellow coloration. Ferrocyanide of potassium and acetic acid afforded a very slight turbidity on standing. The solution readily reduced an alkaline copper solution on boiling.

Moisture was determined at 100° C., in the fruit partly desiccated over sulphuric acid, so as to admit of pulverization. The fresh fruit lost 76·087 per cent. when dried at 100° C. There was nothing special to note regarding the composition of the ash.

The percentage composition of the fruit as deduced from the partial examination detailed in this note may be arranged as follows:—

	Per cent.
Moisture lost at 100° C. after partial desiccation over sulphuric acid	5·423
Ash	4·271
Petroleum ether extract, containing 3·021 per cent. of glycerides of fatty acids, and 1·519 per cent. of impure phytosterin (?), with colouring matter, etc.	4·540
Ether extract, soluble in petroleum ether ·232 per cent., soluble in water and containing cocaine ·110 per cent., soluble in absolute alcohol ·069 per cent., soluble in ether, but insoluble in petroleum ether, alcohol or water ·029 per cent.	·440
Absolute alcohol extract containing cocatannic acid and a trace of an alkaloid	3·820
Aqueous extract	23·440

The examination described in this note is a preliminary one; no investigation has been made regarding the nature of the colouring matter to which the fruit owes its brilliant hue; and the composition of the petroleum ether extract has been but very imperfectly examined. Though the *E. Coca* fruits freely here, yet owing to the high moisture content, a relatively large amount of the fresh material yields but a small amount of dried residue. The amount of desiccated fruit at my disposal for this investigation did not exceed 14 grams.

THE DERMATOLOGICAL VALUE OF SULPHOLEATE OF SODIUM.*

Ointments and liniments have been applied to the skin since the earliest days of medicine, and it seems strange that an experience of so many centuries should have produced no change in their composition, for, until quite recently, the base has remained the same, —namely, some animal or vegetable oil or fat. In recent years other bases, such as glycerite of starch, vaseline and lanolin, have been recommended, and to a certain extent adopted, as substitutes for the time-honoured lard, but their advantages have been either slight or offset by some objectionable quality.

Some years ago Dr. George Henry Fox called attention to sulpholeate of sodium, which, while not wholly free from objections, possesses certain properties which render it of great service in the local treatment of skin diseases, and in the *Journal of Cutaneous and Genito-Urinary Diseases* for May, 1890, he contributes a paper, which is the result of his long-continued experience with this substance.

When sulphuric acid is added slowly to any fixed oil or fat, care being taken to keep the temperature of the mixture below a certain point, a chemical combination is formed, the oleic acid being transformed into what has been called sulpholeic acid.

If sulphuric acid and castor oil, *e.g.*, be mixed in the manner above stated, the result is a thick, viscid, brownish mass, with a strongly acid reaction. The chemical change must take place slowly, and to this end the mixture is kept cool and frequently stirred for about twenty-four hours, or until it is perfectly homogeneous and miscible with water. When the sulpholeic acid thus obtained is combined with an alkaline base, we have a clear, thick, yellowish, semifluid mass of the nature of a liquid soap. Of the various alkalies, soda has been found to be the most serviceable in combination with the acid, and the preparation of sulpholeate of sodium is, in brief, as follows: To the viscid mass formed by combination of the acid and oil a solution of carbonate of sodium is slowly added under constant stirring and the sulpholeate of sodium is formed. This mixture is allowed to stand for twenty-four hours in a funnel, with stop-cock attached, during which time two distinct layers are gradually formed, the upper one being the sulpholeate of sodium, which is at first held in suspension in the liquid, like cream in cow's milk. This substance has an acrid, bitter taste, and a nearly neutral reaction. Applied to the healthy skin, it has a bland oily or slightly sticky feeling. It contains about 30 per cent. of water, which can be readily separated by evaporation, and the mass then resembles vaseline in appearance and consistency, and makes an excellent basis for ointments.

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* From the *Therapeutic Gazette*, June 16.

The value of sulpholeate of sodium, according to Dr. Fox, in the treatment of skin diseases, depends upon the following qualities:—1, its miscibility with water; 2, its rapid absorption by the skin; 3, its remarkable solvent power.

The ease with which anhydrous sulpholeate of sodium can be mixed with water, gives it an advantage over the fatty substances commonly used for application to the skin. It makes, in fact, a soluble ointment,—one which can be washed from the skin as readily as it can be smeared upon it. In cases where it is not desirable to keep an ointment upon the skin both day and night, those made with lard, vaseline, or lanolin as a base are objectionable, since the effort to remove the greasy substance often requires the use of soap and friction, and thereby tends to aggravate an inflammatory eruption. With sulpholeate of sodium as a base, the ointment can be removed from the skin with the greatest of ease by means of a little water or even a moistened rag. In this respect the sulpholeate ointments are unlike any which have been in use, save those made with glycerite of starch as a base.

It is this affinity for water which enables sulpholeate of sodium to sink into the skin more readily than vaseline or fatty substances. In regard to the best basis for ointments, there has been considerable discussion, but, in determining this question, the object to be attained by the use of the ointment must be borne in mind. When a simple protective dressing is required for the surfaces of the skin, as, *e.g.*, in a case of acute eczema of an infant's face, vaseline or its equivalent, the petrolatum of the U. S. Pharmacopœia will prove of excellent service. But when it is desired to act upon the deeper parts of the skin, or to convey medicinal substances into the blood by means of cutaneous inunction, vaseline is far inferior to lard, lanolin, oleic acid, or the sulpholeate of sodium. The latter substance is largely used in the arts as a solvent and vehicle for dye-stuffs. In the process of wool-dyeing it has been found to be of the greatest service on account of its power of penetrating the keratinic tissues. It is this same property which enables it to sink readily into the epidermis, and renders it of value in the treatment of various chronic skin diseases.

But the chief recommendation of sulpholeate of sodium is its remarkable power of dissolving certain substances for which we have heretofore had no available solvent. Sulphur, chrysarobin, and other drugs of great value in dermatology, have heretofore been applied to the skin in a finely-triturated but undissolved condition. Such drugs have, therefore, exerted their action solely upon the surface of the skin, except when friction has forced them mechanically into the follicles, where perhaps a certain amount of absorption has taken place. The beneficial effects of these drugs thus applied cannot be disputed, but when we consider that sulpholeate of sodium will dissolve at least 2 per cent. of sulphur or of chrysarobin, their increased efficacy can readily be imagined. Other substances commonly used for application to the skin are readily dissolved in any desirable quantity.

There are three forms in which sulpholeate of sodium may be advantageously used in the local treatment of skin-disease:—1, as an unguent; 2, as a liniment or liquid application; 3, as a plaster.

As a basis for ointments, the watery element must be removed by evaporation until a suitable consistence is attained. As this process necessarily involves time and trouble, the ointment thus prepared will be more expensive than those made with lard or petroleum as a basis, and in most cases will possess no corresponding advantage.

As a liniment, employed for the purpose of conveying various medicaments into or through the skin, the hydrated sulpholeate of sodium has proved in Dr. Fox's experience superior to any substance which we now possess. While it sinks into and softens the skin like glycerin, by virtue of its hygroscopic property it has the additional and important advantage, already mentioned, of dissolving and carrying various substances with it.

Mixed with gelatine in proper proportions and spread thinly upon muslin, sulpholeate of sodium makes a plaster which adheres readily to the skin when moistened, and is superior in many respects to any heretofore used.

Theoretically, the sulpholeate of sodium is a substance of neutral reaction, and perfectly bland when applied to the skin. Practically, it will be found, especially when carelessly made, to contain a little free acid, and may thus produce a slight amount of irritation when applied to a delicate or acutely inflamed skin. Dr. Fox admits that in the treatment of acute infantile eczema, where one might hope for the best results from the use of soluble ointment, he has only met with disappointment, but in the use of all stimulating applications he has found sulpholeate of sodium to be a vehicle of the greatest service.

OTTO OF ROSE.*

The most important centre of the production of otto of rose is in the region of the Balkan mountains, and includes about 150 villages situated in the two valleys of Toundja and Strema, affluents of the river Maritza. These two valleys run from west to east and lie between the Great Balkan chain on the north and the Svedna Gora mountains on the south, the extreme points where rose culture is carried on being Koprivchitza on the west and Twarditza on the east. The best otto is obtained on the southern slope of the Balkans. Here the climate is temperate, but the variations in temperature are sudden and frequent. The ground is sandy and porous, as a rule; where this is not the case, and water accumulates, roses are killed by the frost, or by fungi which attack the roots. Although the rose cultivation extends over a large tract of country, it is nowhere conducted on a large scale by any one individual, but is divided into a large number of small plots belonging to small proprietors. The dealers live in the towns, and although they sometimes buy the flowers and distil the oil, they rarely cultivate the roses, and then only to a small extent.

The roses are grown in long borders or plots 100 or 200 metres long, the plants attaining the height of a man. Between the plots a space of 1½ to 2 metres is left, so as to allow of a cart passing along between them.

Two roses are usually cultivated, a red and a white one, specimens of which, received from M. Christoff, and gathered in the Kejanlik plantations, have been identified by Dr. Blondel. The red one proves to be a branching form of *Rosa damascena* and the white one *Rosa alba*. One other rose, known as the Constantinople rose, is sometimes met with near Kejanlik. It grows more quickly but is less hardy, and cannot be made a special cultivation. It has larger and more coriaceous leaflets and the flower is smaller than that of *R. damascena*, and of a dark, nearly violet colour, like *R. Gallica*; it probably belongs to the same group as the latter, but has not yet been identified.

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* Abstract from *Les produits Odorants des Rosières*, Dr. R. Blondel. Paris. 1889. Octave Doin.

The *Rosa alba* is employed to form a dividing line between the different plantations, and is also grown at the end of each plot, so as to present only roses of less value to the peasant, who would otherwise steal the more valuable red rose; it is not used, as a rule, for distillation. Dishonest cultivators, however, take advantage of the fact that when distilled it yields a product rich in stearoptene (although of poor fragrance), to mix it with the red rose, and thus obtain an otto which will bear dilution with Turkish oil of geranium (oil of *Andropogon Schœnanthus*, L.).

The plantations are renewed where required in October or November by making trenches about ½ foot deep and 1 wide, and laying side by side in them suckers with a portion of the underground stem attached. About four or five are placed in a row, the leaves and all being covered with a layer of earth and then with a thin layer of manure. The young shoots make their appearance in five or six months. In April and June the furrows containing the young plants are weeded. In November the remainder of the earth is returned to the trenches and the trenches are ultimately formed into ridges to better protect the roots of the plants.

In May of the second year the rose trees are about 2 feet high and yield sufficient flowers to pay the expense of their cultivation up to that date. The next year they are in full bearing, and the maximum product is obtained when they are five years old, although the plants will live more than twenty years. At ten years of age they are, however, usually cut level with the ground, new branches, and even flowers, appearing the next year. The flowers commence to expand between May 20 and 28, and they are collected daily till June 15 and 20. The collection commences every day at dawn, for an opening flower-bud left till next day will then have lost its fragrance and its colour. The flowers are collected by women, and although the small proprietors usually collect their own, the larger growers pay about 2 centimes per kilo for collecting the flowers. The blossoms are placed in a basket carried on the left arm or in the apron. The fingers become gradually hardened to the spines so that the pricking ceases to be felt, but the fingers become covered with a blackish resinous substance which has a terebinthinous odour, and which at the end of the day is scraped off, rolled into little balls, and kept for smoking in cigarettes, inserted in the tobacco, to which it is said to give a delicious odour. The contents of the baskets are weighed in the field, paid for and emptied into sacks, which are carried at once to the distillery. If the white roses are present in too large proportion they are paid for separately at a lower price. The stills are usually placed in sheds near the river, for the convenience of obtaining a good supply of water, and in some cases are let by the proprietors at the rate of 4 francs per still. The stills are of copper, and are made to contain 75 litres of water and 10 kilos of flowers. The latter are introduced by means of an osier basket, and the stills are heated with long logs of wood lighted at one end, placed under the still. After a time if steam comes out of the refrigerating tube the fire is moderated, and when 10 kilos (two flasks) of rose water have distilled over, the fire is removed by withdrawing the burning logs. The still when cool is opened, the contents strained through the osier basket, and the water remaining in the stills saved for the next distillation. If the operation is continued until 15 kilos of rose-water is obtained the otto is of inferior quality, and contains more stearoptene.

The rose water is then submitted to distillation a second time, 40 litres being distilled at a time, and only 5 litres collected. The vessels in which it is received have the shape of a long necked flask, and the water is at first milky, like an emulsion, the oil floating after a time in the neck of the flask. It is removed by inserting a conical tin funnel about two centimetres long, furnished with a slender handle, and having a capillary orifice. It is dipped below the surface of the otto, and when a drop of oil on raising the funnel appears at the orifice it is emptied quickly into a special flask.

About 3000 kilos of flowers are calculated to yield a kilo of otto, and this quantity of flowers is the usual yield per hectare, so that it may be considered that a hectare of roses yields a kilo of otto. The adulteration of the otto takes place chiefly by the addition of oil of rose geranium (*Andropogon Schœnanthus*), whereby the congealing point is lowered from 15° or 16° Reaumur to 14°, 13° or 12°, and even lower. The purchaser of otto generally brings with him a basin and thermometer, and having obtained the desired temperature by mixing warm and cold water, and testing the temperature with the thermometer, inserts a flask containing 15 grams of the essence to be tested. In about three minutes crystalline needles appear, and in ten minutes the otto is solid enough for the uncorked flask to be reversed without spilling a drop. The price varies according to the degree or congealing point, that below 12° R. being openly sold at a special rate. The average production of otto of rose in Bulgaria is about 3000 kilos in good years, and 1500 kilos in bad ones.

The peasants are paid according to the season at the rate of ·22 to ·23 franc per gram for otto of standard purity. The flattened circular metal bottles in which it is exported contain 400 grams, 1 kilo, or 2½ kilos, and the price of the pure essence is 800 to 900 francs per kilo, according to the season. The bottles are generally enveloped in felt. When the essence is freshly distilled it has a slight empyreumatic odour, possibly due to the fact that the water in the stills at the end of the day, having served for several distillations, has dissolved vegetable salts and boils at a temperature distinctly above the boiling point of pure distilled water. Otto of rose is also said to be produced in notable quantities in Asia Minor, at Broussa, Bourgas, and elsewhere by emigrants from Roumelia.

In Provence the cultivation of the roses is at the present time a flourishing industry, and the otto prepared in that district is considered superior to the Bulgarian product. It is obtained from *Rosa centifolia* (a specimen of the plant used from Grasse having been determined by Dr. Blondel). This rose flowers there in April and May. Rose water is sometimes distilled from the yellowish tea rose known as Safrano, which flowers in autumn and winter, but the water is very inferior, and the otto obtained from it is still more so, and unfit to mix with that of *R. centifolia*.

The cultivation of *Rosa centifolia* is carried on chiefly around Grasse, Cannes, Nice, and Valois, by peasant proprietors, who sell the flowers to the distillers in the towns. The roses are grown in little hedges of 0·75 in. high, separated by paths 1 to 1¼ metre wide. The flowers are gathered at the end of April, or about twenty days earlier than in Bulgaria, and the collection lasts twenty to thirty days. The collection commences at dawn, and the collectors, both men and women, are paid at the rate of ·45 franc per kilogram, the price in bad seasons rising even to 1¾ francs. The chief use of the roses is for making rose pomade, only a small quantity, comparatively speaking, being distilled for the otto. The flowers are distilled in large stills, such as are generally used for spirit, some holding as much as 150 kilos of flowers. Often one refrigerator receives the condensing pipes of several stills.

Usually 50 kilos of flowers and 300 litres of water are placed in the still at one time, and 100 litres are distilled over, the first 25 being the richest in oil, and known as eau double de rose; the next 30 are of medium, and the remaining 45 of inferior quality. The oil which floats is collected by means of a florentine receiver. The yield of otto is small, 100,000 kilos of flowers giving only a kilo of otto, and the price is about 1000 francs per litre; the average price of the rose water is 2·60 francs per litre.

In Germany roses have been distilled for about five years in the neighbourhood of Leipzic, about six hectares being at present under cultivation. The species employed is *Rosa centifolia*, and the amount produced in 1887 was 3000 litres of rose water and 2 kilos of otto. The latter congeals at 20° C., and contains 32½ to 34 per cent. of stearoptene, which is in excess of that in Bulgarian otto. Indeed the proportion of stearoptene present in otto of rose is always greater in cold countries.

Formerly otto of rose used to be adulterated by mixing it direct with oil of ginger grass, but now the flowers are sprinkled with the oil when placed in the retort. The odours under these circumstances amalgamate better, and during the distillation the proportion of waxy (cireuse) matter that passes over is larger, so that otto thus obtained may solidify at 14°, even when containing 25 per cent. of oil of ginger grass. In this case, however, the otto appears muddy, and does not present the sparkling crystals characteristic of pure otto. The odour also is easily detected by an expert. Bromine turns pure otto of rose of a green colour, but is itself decolorized by oil of ginger grass, and if a few drops of liquor potassæ are subsequently added, an apple-green precipitate in viscous clots is formed in a colourless liquid, and the odour of roses is not altered; but if adulterated with ginger grass oil a yellow milky precipitate is obtained in a reddish liquid, and a disagreeable odour is given off. This test, however, is qualitative rather than quantitative.

The presence of spermaceti or paraffin in otto is detected in Bulgaria by rubbing the small test bottle of otto between the hands, containing about 15 grams, when the essence rapidly liquefies, since a temperature of 18° C. suffices, whereas paraffin does not melt till 32°-50° and spermaceti at 46° C., and these remain undissolved at the bottom of the bottle.

Experiments made by Dr. Blondel show that pure otto of rose has some physiological effect. In the dose of five or even of two drops it produced cramp of the stomach in the absence of food. Taken after a meal it seemed to stimulate the digestive functions at first, but doses of ten or twelve drops appeared to have an opposite action, and caused marked flatulence. The only general effect noticed was a marked tendency to sleep. A guinea pig into which a cubic centimetre of otto was subcutaneously injected died in four days after a state of profound torpor lasting forty-eight hours. The only effect noticed in a *post-mortem* examination was a slight congestion of the meninges. In some persons the odour of the rose produces headache, and in rare cases severe symptoms, which are probably due to idiosyncrasy. The oil of *Andropogon Schœnanthus*, or Turkish oil of geranium, used to adulterate oil of roses, produces similar symptoms, but in a higher degree.

With regard to the portion of the flower in which the otto is formed, observations made under the microscope by Dr. Blondel indicate that it is secreted by the epidermal cells. If a section through a petal is immersed in a ½ per cent. solution of osmic acid for about twenty seconds, and then washed in distilled water and mounted in glycerine, the upper and lower epidermis are seen to be the parts distinctly blackened. Other experiments show that these cells also contain fixed fatty matter, since when the petals are distilled until wholly deprived of odour, these epidermal cells are still blackened by osmic acid, and yield to ether a fixed fatty substance. But the fresh petals treated directly with ether, and thus deprived both of fixed oil and essential oil, still show the blackened epidermal cells when treated with osmic acid, but with a bluer tint in them. This is due to tannin, as may be proved on a section of the fresh petal by the use of acetate of iron. When the petals are deprived of their essential oil by distillation, of their tannin by boiling water, and their oil by ether, the epidermal cells no longer become blackened by osmic acid. There is, therefore, every reason to suppose that the chemical changes by which the otto is produced take place in the epidermal cells, or in other words that they are not special receptacles of secretion but secreting cells. The epidermis of the anther does not contain otto, but it is contained in small quantity in that of the filament and on the stigmatic surface and groove, though not in that of the ovary or style.

GOLD AS A THERAPEUTIC AGENT.

BY C. J. S. THOMPSON.

The use of gold as a medicinal agent is of considerable antiquity, dating back to a very early period, and like mercury, whose action it much resembles, it was accounted of great value by the alchemists of old.

Centuries ago, both precious metals and stones were credited with wonderful healing properties; and the diamond, the sapphire, ruby, and amethyst, were supposed to have marvellous virtues. The apothecaries of the seventeenth century used it largely as a stimulant, also in the treatment of epilepsy, and it entered as an ingredient into many of their compound elixirs and other preparations.

Culpeper, in his 'Physician,' says, "Gold is temperate in gravity. It wonderfully strengthens the heart and vital spirits. In cordials it resists melancholy, faintings and swoonings, also fevers and falling sickness, and all such like infirmities, incident either to the vital or animal spirit."

An ancient poet quaintly remarks:—

> "For Gold is cordial, and that's the reason
> Your raking misers live so long a season."

Down to the very early part of this century it was included in most of the pharmacopœias of Europe, and was prescribed largely for syphilis; but like musk and other expensive remedies once frequently employed in medical practice, the internal administration of the precious metal has almost entirely dropped out of use.

The physiological action of the salts of gold may easily be tested, and it is also stated to have diaphoretic properties. It was frequently used by medical men fifty years ago in the treatment of syphilis, many of whom believed it superior to mercury in severe cases.

One of the oldest preparations of gold was known as Crocus Solis, and prepared in several ways. The Crocus Solis of Germany was directed to be made by first making an amalgam, composed of one part of gold and six parts of mercury, and triturating it with twice its weight of sulphur. It was then heated in a crucible till the mercury and sulphur became dissipated, and the gold remained in the form of a brown powder. Another method of preparation, also, was by precipitation, as follows:—

℞ Divided gold . . . . q.s.
Acid. nitro-hydrochlor. . . . . . . q.s.

To dissolve the metal, dilute the acid solution with twelve parts of water, then add a solution of potash to excess. Wash and dry the precipitate thrown down.

A frequent old-fashioned method of administering a preparation of gold, was by rubbing it into the gums or over the tongue.

Crocus Solis formed the base of several preparations, such as Kornmann's Panacea, in which it was combined with hydrargyrum sulphuret and oil of cinnamon; also golden hartshorn, that had great reputation as a cordial and sudorific, and was composed of crocus solis and prepared hartshorn.

The stannate of gold, well known as the purple of Cassius, was formerly prescribed internally, to be taken in progressive doses of $\frac{1}{10}$ to 1 grain, from $\frac{1}{2}$ to 1 grain being also recommended to be rubbed over the tongue. The metal itself was used in the form known as divided gold, made by forming an amalgam of mercury and gold leaf, in parts of one to six, the mercury being taken up by hot nitric acid, then dried, and the residuum pulverized.

Divided gold was administered in doses of $\frac{1}{2}$ to 5 grains daily, by rubbing on the gums. It was used also to make the syrup of gold, a preparation recommended in lotions for application to syphylitic ulcers. The formula is given as follows:—

℞ Divided gold	24 grains.
Simple or gum syrup	℥j.

Mix intimately.

The chloride of gold was once frequently ordered in medicine, and usually given in doses of $\frac{1}{10}$ to a $\frac{1}{4}$ of a grain daily, and was also used in making the pills. Combined with starch it formed the powder of chloride of gold. The tinctura auri was a somewhat expensive preparation, and made in the following manner:—

℞ Pure gold	ʒj.
Acid. nitro-hydrochloric	℥j.
Dissolve and add	
Ol. rosmar	℥ij.

Set aside until the colour of the acid disappears, then add

Rectified spirit	℥viij.

The dose of this tincture was from 5 to 10 drops. Another form was aurate of ammonia, known as aurum fulminaris. It was made by precipitating divided gold from solution in nitro-hydrochloric acid with ammonia, and was prescribed as a diaphoretic, in doses of from 3 to 6 grains. It was used in the preparation of the balsam of gold made by dissolving 1 part of aurate of ammonia in 4 parts of oil of juniper. A popular remedy largely used in continental countries was known as General La Motte's drops, and consisted of aurate of ammonia dissolved in nitric acid, and diluted with rectified spirit. It was regarded as a sovereign remedy in more senses than one.

The bromide of gold has been recently prescribed by several medical men in cases of epilepsy with success. It is given in doses of $\frac{1}{30}$ to $\frac{1}{10}$ of a grain, so it is quite probable we may see gold again come into use in medicine, and its preparations once more on the shelves of the pharmacy.

THE SECRETION OF CARBONATE OF LIME BY ANIMAL ORGANISMS.

In a paper on "Coral Reefs and other Carbonate of Lime Formations," by Messrs. J. Murray and R. Irvine, read before the Royal Society of Edinburgh and published in *Nature* for June 12, the following account is given of some experiments carried out at the Scottish Marine Station for Scientific Research with the object of throwing light upon the secretion and solution of carbonate of lime by living organisms under varying conditions:—

Experiment 1.—A number of laying hens were shut up in a wooden building, all ordinary sources of lime being withheld. In a few days the eggs, in place of a calcareous shell, had only a membranous covering. Thereafter sulphate, phosphate, nitrate, and silicate of lime were successively added to their otherwise limeless food, and from all these salts they were enabled to form normal shells for their eggs consisting of carbonate of lime.

From the investigations of Irvine and Woodhead it is believed that the lime salts in passing through the blood assume the form of phosphate, which is carried to the point of secretion, where it is decomposed and deposited as carbonate. When magnesium and strontium salts were added to the hens' food the eggs became membranous and shelless.

Experiment 2.—Artificial sea-water was prepared, from which carbonate of lime was rigidly excluded. In this water crabs after ecdysis produced the usual exo-skeleton of carbonate of lime from the lime salts, other than carbonate, present in the water.

Experiment 3.—The artificial sea-water of experiment 2, which was perfectly neutral before the introduction of living crabs, in the course of a short time became distinctly alkaline in character. This was found to be due to the decomposition of their effete nitrogenous products, and the formation of carbonate of ammonia, and ultimately of carbonate of lime.

Experiments 4 *and* 5.—Sea-water was mixed with urine and kept at a temperature ranging from 60° to 80° F. After a time the whole of the lime present in the sea-water was thrown down as carbonate and phosphate.

Experiment 6.—A number of small crabs were placed in two litres of ordinary sea-water, and were fed with mussel flesh. This water was not renewed, the effete matters from the crabs passing into it. After a few days the crabs died; the water being then in a putrid condition was set aside at a temperature of from 70° to 80°F., when it was found that practically the whole calcium in the sea-water had been thrown down as carbonate of lime.

Experiment 7.—We obtained absolutely fresh "liquor" from a number of living oysters, and examined it before decomposition had begun. It appeared to be a mixture of lymph with unchanged sea-water. The specific gravity was 1·023, indicating a considerable admixture of fresh or river water. This liquor contained 0·1889 grams per litre of total lime in excess of that present in sea-water of the same specific gravity, and its alkalinity was equal to 0·2581 grams per litre in excess of sea-water of the same specific gravity.

Thus we had in this liquid an accumulation of total lime (in excess of that present in sea-water) amounting to 0·1889 grams per litre, the greater part of which was in the form of carbonate in solution, presumably in an amorphous or hydrated condition. Apparently this is due to the direct secretion of carbonate of ammonia by the cells of the living animals, which, reacting on the sulphate of lime in the sea-water, is capable of throwing out nine-tenths of the soluble calcium salts present, in the insoluble condition of carbonate. The oyster liquor was found to contain saline ammoniacal salts in enormous excess over that which is present in ordinary sea-water.

Experiment 8.—A similar experiment was made with the liquor taken from living mussels. The results coincided with those obtained in experiment 7.

Theoretically urea plus two molecules of water will give carbonate of ammonia. If therefore this substance be a stage in the formation of urea, it is not unnatural to suppose that in shell-forming animals the shell-formation may take place at this stage without the formation of urea at all. In these experiments the usual method for the estimation of saline and albuminoid ammonia could not be followed, and we made use of the following simple adaptation by which we obtained concordant results.

Absolutely pure potash was added to a measured and carefully filtered portion of the sea-water under examination, and the precipitate formed removed by filtration. The clear filtrate was then Nesslerized in the usual manner. We had thus an accurate means of determining between the actual ammoniacal salts and the albuminoid matter, both of which are, as a rule, present in sea-water according to the amount it carries of living and dead organisms. To satisfy ourselves that the addition of pure potash to a fluid containing albuminoids alone does not give rise (immediately) to the production of saline ammonia, we treated pure albumen taken from a newly laid egg in this manner, as also urea, without obtaining any trace of ammoniacal reaction.

MACROZAMIA[*] (ENCEPHALARTOS) GUM.

(Including a Discussion of the question—What is Bassorin?)

BY J. H. MAIDEN, F.L.S., F.C.S., ETC.

Curator of the Technological Museum, Sydney.

In the *Chemist and Druggist* (with Australian supplement) for May, 1882, p. 100, is an interesting paper by Mr. C. R. Blackett, on the "Occurrence of Bassora Gum in Cycadeæ." I am able to supplement Mr. Blackett's observations to some extent. The gum of cycads is hardly so rare as that gentleman seemed to imagine, as cultivators of such plants know to their cost. All macrozamias and other cycads are liable to be attacked by a small black *Curculio*, which causes them to "gum," and finally destroys them. Masses of gum of all sizes up to that of a hand may thus be obtained. This is often a source of much loss to nurserymen, as the beetle is difficult to eradicate, except by destruction of affected plants by fire. But, although this "gumming" has been known many years, the first allusion to macrozamia gum I can find is "a gum as fine as amber exudes from the stem of a macrozamia in Australia" (*Journ. Soc. Arts*, iv., 18). The specimen alluded to was sent from New South Wales to the Paris Exhibition of 1855.

As regards non-Australian cycads, Dr. (now Sir) George Birdwood remarks that *Cycas circinalis*, Linn., yields a tragacanth-like gum, and Cooke ('Gums and Resins of India') suggests that this is probably the gummy substance exuding from the stem, said to produce rapid suppuration in malignant ulcers. This is founded on a statement by Lindley ('Medical and Œconomical Botany,' p. 66).

Mr. Blackett's experiments were performed on the gums of—(1) *Macrozamia Fraseri*, Miq. ('B. Fl.' vi., 252), Syn. *Encephalartos Fraseri*, Miq. ('Muell. Cens,' p. 110); and (2) *M. Miquelii*, F. v. M. ('B. Fl.,' vi., 253), Syn. *E. tridendatus*, Lehm. ('Cens.').

The gums which are in the Technological Museum, and which I have examined, are from—

(3) *M. Perowskiana*, Miq. ('B. Fl.,' vi., 253). Syn. *E. Denisonii*, F. v. M. ('Cens.'), and (4) *M. spiralis*, Miq. ('B. Fl.,' vi., 251). Syn.: *E. spiralis*, Lehm. ('Cens.').

I have seen small samples of the gums of other species, and they are so much alike that I doubt whether they could be separated if once mixed, so that my material and that of Mr. Blackett's are identical, and my experiments may be considered as a continuation of his.

Macrozamia Perowskiana, Miq.—Found in New South Wales and Queensland.

In flattened pieces, reminding one strongly of "button lac," but much lighter in colour even than the fine button lac of commerce. The flattened shape of the gum is due to the mode of collecting it. Every cone exudes more or less from the peduncle when freshly cut. The present specimen was obtained by cutting off a large cone and allowing it to drain on a plate. The fruit stalk appears to be the part of the plant richest in gum, but only a small quantity flows from each stalk.

This gum breaks readily, has a bright fracture, and feels horny in the mouth. If a piece be placed in cold water it begins to swell immediately, and this absorption of water goes on from two to four days, by the end of which period it has swelled to more than 100 times its original size. It then presents the appearance of an almost colourless, quivering jelly, which is more bulky than that yielded by any other gum known to the writer. When the absorption of water is complete, it is so transparent that it can hardly, if at all, be seen in a beaker of water, and has to be felt for with a glass rod. The jelly assumes a pseudo-crystalline appearance, forming angular masses, coherent for the most part. This result is the consequence of the minute fissures in the dried gum. If the gum be previously heated to 100° C. for a few days, it loses much of its gelatinising property, breaking up into very small fragments in cold water, like starch grains, instead of forming enormous angular pieces of jelly as before.

Analysis.

Arabin	·94
Metarabin	77·22
Sugar	1·02
Water	14·81
Ash	6·66

Macrozamia Spiralis, Miq. Found in New South Wales and Queensland.

In regard to this species, commonly known as "Burrawang," a collector cut off the head of the plant, when in a few days the gum collected in a cup-shaped cavity left in the stem. When gathered it was soft, but firm enough to be picked up by the fingers; it, however, soon got softer in the vessel, something like the consistency of honey, a brisk fermentation commenced and lasted a few days, during which time the gum commenced to clarify itself. On drying, an inferior sample (1) of gum was obtained, which is for the most part in scaly pieces, reminding one strongly of gelatine before it has been bleached and purified. The pure article only (next described) has been experimented upon.

Sample 2.—This sample was obtained on visiting the plants a few days after they had been subjected to the operation already referred to. It is in small pear-shaped masses, the colour of which is much the same as that of *M. Perowskiana*, and, like it, swelling to an enormous extent when placed in water. It is brittle. Specific gravity, 1·524.

Analysis.

Arabin	1·07
Metarabin	71·7
Sugar	1·1
Water	21·71
Ash	4·72

There appears to be no commercial future before macrozamia gum. Even when the insoluble metarabic gums shall have been converted into the soluble arabic gums on a commercial scale, the supply will be obtained from various species of acacia, which yield it in far greater abundance.

Mr. Blackett (*loc. cit.*) has termed the insoluble portion of macrozamia gum bassora gum (bassorin), while I have termed it metarabin. I give a few excerpts from standard modern works on chemistry, showing that there exists a considerable amount of indefiniteness in regard to the relations of metarabin and bassorin, and there are more than doubts even as to the separate existence of the latter substance.

METARABIN (CERASIN).

"Metagummic acid, in combination with lime, forms cerasin, the constituent of cherry, plum, apricot, peach, and almond-tree gum (which is insoluble in water)." Gmelin. "*Gummi Cerasorum* boiled with water leaves a residue of *bassorin jelly* (my italics), whereas *Gummi Persicorum* dissolves almost completely." (Ludwig, in Gmelin.) This "bassorin jelly" is not identical with the "bassorin" in Gmelin (*infra*), and this is the only use I can find of the term in similar context.

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[*] Macrozamia has been suppressed by Baron Von Mueller ('Census,' p. 110).

"Cerasin, a colourless, pellucid, easily friable mass, which swells up in cold water without dissolving." (Wittstein, trans. Mueller.)

"Cherry-tree and bassora gum, and gum tragacanth, which are only partially soluble in water, are apparently mixtures of bodies, either *identical with* (the italics are mine), or very closely allied to, the soluble and insoluble modifications of gum in the so-called arabin and metarabin, but very little is known of their chemical behaviour." (Miller's 'Chemistry,' by Armstrong and Groves, p. 654.) Metarabin is not defined in this work.

. . . . . "This precipitate usually consists of mucilaginous substances (pectin), and albuminoids. The former generally corresponds to Scheibler's metarabic acid." (Dragendorff's 'Plant Analysis,' trans. Greenish, p. 88.)

"If heat were employed . . . other and more serious errors would be introduced. One such source of error is to be found in the presence of carbohydrates, closely allied to soluble mucilage, but differing from it in only swelling (not dissolving) in cold water (metarabic acid, etc.)," p. 209.

"Cerasin is the insoluble part of the gum of the cherry tree and plum tree, and is also found together with arabin in beet-root; it forms with cold water a thick mucilaginous liquid. *A similar substance is gum tragacanth.*" (My italics.) (Schorlemmer's 'Chemistry of the Carbon Compounds,' p. 294.)

Metarabin or cerasin is not defined in Roscoe and Schorlemmer's 'Treatise on Chemistry.'

Metarabin. From the roots of carrot, beet, etc. Insoluble in water. Converted into arabin by treatment with dilute alkali.

"Cerasin. The insoluble part of cherry-tree gum, etc. Said to be metagummate of calcium. By long continued boiling with water it yields arabin." (Allen, 'Commercial and Organic Analysis,' i., 350.) It will be seen that Allen provisionally separates metarabin and cerasin.

BASSORIN.

Gmelin's 'Handbuch der Chemie,' (Watts' trans., vol. xv.) is the authority for most of the statements in regard to bassorin which are to be found in modern chemistry books. He defines it to be "The part of bassora gum, gum tragacanth, and other gums (what others?) which is insoluble in water, and swells up therein."

"Bassorin. Ingredient of bassora gum, tragacanth, and similar gummous exudations of plants (cherry gum, anacardia gum), insoluble in water, and swelling in it. . . . When dry, yellowish white, solid, brittle, transparent; without taste; swells in cold water to a transparent jelly without dissolving, but dissolves by continued boiling to a gummous liquid. . . ." (Wittstein).

The word bassorin is not used in Miller's work.

The existence of bassorin is ignored by Dragendorff ('Plant Analysis'). I attach great importance to this omission.

Watts's 'Dict.' gives no information in regard to the composition of bassorin.

Bassorin is not defined in Roscoe and Schorlemmer's great work.

There is no mention of bassorin in Schorlemmer's work.

"Bassorin or tragacanthin. From gum bassora and gum tragacanth. Insoluble in cold water, but swells up. By prolonged action of boiling water, yields pectin. By boiling with very dilute hydrochloric acid, yields pectic acid; insoluble in cold water." (Allen, *loc. cit.*)

The questions are, What is bassorin? Is it identical with metarabin? If not, in what particulars does it differ? Few modern works mention bassorin at all. Gmelin says it is the portion of tragacanth which swells up in water without dissolving. Tragacanth presents points of difference more or less marked from all other gums.

Giraud (*Compt. Rend.*, lxxx., 477–80; *Journ. Chem. Soc.*, 1876, 62; *Pharm. Journ.*, [3], vol. 766; also a second paper in *Archiv. de Pharm.*, Dec., 1877; *Amer. Journ. Pharm.*, Mar., 1878; *Pharm. Journ.*, [3], viii., 773) is the most modern worker in regard to the constitution of tragacanth. He considers the insoluble portion to be a pectic substance, and finds no "bassorin" (nor, in fact, metarabin).

Wittstein evidently considers cerasin and bassorin identical, as he defines bassorin as the insoluble portion of cherry gum amongst others.

The most definite statement in regard to bassorin is that by Allen, who follows Gmelin in giving that name to the insoluble portion of tragacanth. The experiments of Giraud have already been alluded to.

On the face of it, the existence of bassorin is not proven.

I will give a brief account of my experiments to determine the nature of macrozamia gum. Those acacias which are only partially soluble in cold water yield metarabin or cerasin, which swells largely in water, forming a smooth jelly, in no way differing from the insoluble portion of cherry gum, which is, in fact, the original source of cerasin (metarabin). The gum of the black wattle (*Acacia decurrens*) was taken, and I have compared it and cherry gum in every way known to me, and have come to the conclusion that they are identical in properties and appearance. Further, macrozamia gum behaves like cherry gum, the only difference being that the former makes a bulkier jelly. Otherwise they are evidently the same gum. But tragacanth is a totally different substance. In external appearance, behaviour in water, and chemical deportment it is quite different to macrozamia gum or cherry gum. *The only point of similarity between macrozamia gum and tragacanth consists in their both swelling in cold water.* They both also yield some soluble gum, but of different composition. On long continued boiling in water macrozamia gum and cherry gum go into solution, the swollen portion being converted into arabin, the presence of which may be proved by acidulating with hydrochloric acid, and precipitating with alcohol. This precipitate can be washed with alcohol, dissolved in cold water, again precipitated by alcohol, and thus rendered pure. This is not the case with tragacanth, which, although dissolving on prolonged boiling in water, does not yield any arabin. My experiments in this latter respect simply confirm those of Giraud. There is one point to be remembered in repeating these experiments, and that is, that both macrozamia and cherry gum contain a little arabin, which is dissolved out by cold water. The only way to remove this soluble gum is by prolonged treatment with the filter-pump, as the arabin clings with great pertinacity to the bulky jelly formed at the same time.

To conclude, I can come to no other conclusion but to consider the insoluble (in cold water) portion of macrozamia gum to be *metarabin*, according to the generally accepted meaning of the word, and think it best to avoid the use of the word bassorin at present, either to denote a distinct substance, or a synonym of metarabin.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

The Council meeting last Wednesday was attended by eighteen members, and the elections to the Society comprised six pharmaceutical chemist members, twenty-three associates, and fourteen apprentices or students. Before the routine business was proceeded with the President explained that in his remarks at the previous meeting of the Council in reference to the opportunities for pharmaceutical study offered by the University College, Nottingham, he had omitted to acknowledge so fully as he might have done the credit undoubtedly due to the local association of pharmacists for the loyal support it has given to the education of young men. He also mentioned in this respect the special services that have been rendered by Mr. Fitzhugh, the President of the Association, who is also a member of the Council of the University College, and has been in that position largely instrumental in promoting the arrangements made for meeting the wants of pharmaceutical students at Nottingham.

In presenting the report of the Finance Committee it was mentioned that during the past month an unusually large number of candidates have entered their names for examination. Recommendations of the payment of a sum of four hundred pounds to the contractors for the new buildings and of eighty-five pounds for the Research Laboratory were adopted. The receipts on account of the Benevolent Fund have been but small. On the recommendation of the Committee two grants were made of ten pounds each and another case in which the Committee hopes to be able to make a grant was deferred for further inquiry. A recommendation of the Building Committee was adopted in reference to the removal of furniture and fixtures from the present offices to those in the new building and the requisite completion of the latter. A report from the Assistant Secretary in Edinburgh, giving the result of the election of members of the Executive of the North British Branch, also stated that Mr. William Gilmour and Mr. David Storrar had been respectively elected chairman and vice-chairman of that body, and a recommendation of the expenditure of twenty-five pounds for additional book-shelf accommodation in the Society's library in Edinburgh was agreed to.

Our readers will learn with regret that Mr. Holmes has resigned the office of teacher of materia medica, in consequence of having found that it was impossible for him to continue satisfactorily to discharge the duties of that office in addition to those of Curator of the Society's Museum. The question thus raised as to the future teaching of materia medica in connection with the Society's School was referred to the Library, etc., Committee for consideration. The other members of the teaching staff were re-appointed.

In accordance with the decision already arrived at last January, on the recommendation of the Library, etc., Committee, that the election of Local Secretaries should take place in November or December, and that the voting papers for that purpose should be issued in October, it was proposed by the President that the present Local Secretaries and Superintendents of Written Examinations should be continued in office until the end of November, and a resolution was passed to that effect. In connection with this subject a discussion was raised by Mr. Hampson as to the propriety of inviting the Society's Local Secretaries to attend a Conference with the Council on the work of the Society. He suggested that in view of the benefit that had been experienced from the recent conferences with the Divisional Secretaries of the metropolitan districts, it might be desirable and advantageous to bring about a meeting of the entire body of Local Secretaries at the Society's house, and that the contemplated introduction of an amended Pharmacy Bill into Parliament would present a fitting opportunity for holding such a meeting. The suggestion was supported by Mr. Cross, as being in accordance with a proposal he had already made on the ground that any increased opportunities of bringing the Council into contact with its constituents would be beneficial. Of course there are considerations as to the expenses that would be incurred on the part of the Society which are no less serious than those in regard to the occupation of time and the neglect of their own business which would be thrown upon Local Secretaries attending the proposed meeting. It is not, therefore, surprising that many members of the Council should have been inclined to favour the idea that conferences might be more usefully held in the various places where there is a Local Secretary. That plan would obviate much of the expense and inconvenience inseparable from a meeting in London, and it would afford better opportunity for obtaining an expression of opinions from provincial chemists, whether they be connected with the Society or not. Mr. Harrison's suggestion that on the principle of taking Mahomet to the mountain someone who has a little experience in going about from one division of London to another should go into the country and create an enthusiastic feeling in favour of the Society is one that would no doubt meet with general approval if it could be carried out. But as this suggestion can only be understood as pointing in one direction, it becomes a question whether its adoption would not entail a greater amount of self-sacrifice by the individual than can be expected of modern apostles. However, the subject has been referred to a committee for consideration and report to the Council, and until it has been dealt with in that way we must confine further remarks upon it to the expression of our opinion that there is a great need for activity on the part of local secretaries throughout the country in stirring up their colleagues in business to a sense of the importance of the Society in regard to any legislation that may be desirable and possible for promoting the interests of the trade. It cannot be too often repeated that it is only through the agency of such an organization as the Pharmaceutical Society that there can be any hope of securing what may be reasonably desired, and without more general support from the members of the trade the Society will continue to be, to a great extent, powerless to aid them.

THE meeting of South London chemists held last Thursday evening, of which a brief report is given at page 18, gave evidence of a greater amount of practical interest in pharmaceutical politics than has been manifested at the previous meetings, and the discussions raised by those who took part in it were of a much more useful character. The first point dealt with was the extension of eligibility to membership of the Society to all persons passing the Minor examination, and in the course of discussion as to the desirability of this change being made, the President of the Society pointed out that while the disposition of the Council was distinctly in favour of it, the actual provisions of the fifth clause of the Pharmacy Bill limiting that privilege to persons in business on their own account were adopted solely out of regard for the desire of many to take the position of associates for some time at least after passing the Minor examination. The opinion was expressed by several speakers that it would be desirable to make full membership of the Society compulsory on all who pass the qualifying examination, but eventually a resolution was passed to the effect that they should be enabled by any future Pharmacy Act to take that position if it were wished for. Another motion in reference to the restriction of companies from carrying on the business of a chemist and druggist, afforded an opportunity for the President to point out the difficulties that would attend any attempt to effect this object, and the obstacle which is presented by the section of the present Pharmacy Act, which provides an exemption for widows of chemists or executors. Altogether this meeting may be regarded as having been very successful in eliciting the opinion of members of the trade, and it is satisfactory to be able to say that the general feeling was favourable to the policy of the Council, a resolution being unanimously passed pledging the meeting to support the attempt to obtain an amended Pharmacy Act.

* * *

On Wednesday the consideration of the Pharmacy Acts (Ireland) Bill in committee was resumed. On the motion of Mr. Sexton, a clause providing for an election not later than the 1st day of January, 1891, of seven persons, who shall be registered chemists and druggists, to be additional members of the Council of the Pharmaceutical Society, Ireland, was agreed to, together with other clauses providing that penalties under this Bill shall be recoverable in the same manner as penalties under the principal Act, and that this Bill and the principal Act shall be read together. Mr. Fitzgerald then moved the omission of the words "chemist and" from the phrase "chemist and druggist" in clause 6, remarking that he did not know what claim the persons whom the honourable member for West Belfast had taken under his protection had to be registered as chemists, except that there was an unaccountable craving on the part of a number of persons in Belfast and elsewhere to poison themselves and everybody else. In reply, Mr. Sexton said the Pharmaceutical Society of Ireland had failed to exercise the powers conferred upon it under the Act of 1875, of creating a second class of chemists and druggists, with the result that except in Dublin, Belfast, and Cork, there were no persons who could legally supply farmers and others with domestic medicines and preparations for the treatment of horses, sheep and cattle, at reasonable prices. There were only about three hundred pharmaceutical chemists in the cities mentioned, but outside there had sprung up since 1875 some two or three thousand chemists and druggists. The Attorney-General also supported the Bill, on the ground that the Society had failed to exercise its powers, and eventually the amendment was withdrawn. A subsection, proposed by Mr. Sexton, was then agreed to, enacting that a person who has, prior to the 1st day of January, 1889, served as an apprentice or assistant for seven years to a registered chemist and druggist shall be entitled to register under this Act, without examination. It was then agreed to omit clause 13, relating to subsequent elections of members of Council, and clauses 14 and 15, which would have provided for the payment of an annual fee by registered chemists and druggists and pharmaceutical chemists respectively; and after some other verbal amendments the Bill was ordered to be read a third time on Thursday.

* * *

In commenting upon a communication in which the writer points out what he considers to be some objections to the adoption by medical practitioners of the compressed tablet as a means of administering medicines, the Editor of the Philadelphia *Therapeutic Gazette* says that it is a practice in favour of which little can be said, whilst on several grounds in the majority of cases it is inexcusable. In the first place it introduces the interest of the medical practitioner, when he provides the medicine, in obtaining his supplies at the lowest price, with the consequent unreliability which his training does not fit him to cope with The commercial element, which should always be free from medical practice, is also brought in under another phase. When the cost of a prescription is borne by the patient the practitioner will order the remedy which is most exactly indicated, without in the majority of cases considering the cost or the convenience of the person who has to dispense the prescription. But where he himself supplies the medicine, there will be a "temptation to substitution of drugs even more to be condemned than in the case of pharmacists who substitute one remedy for another prescribed."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

***Wednesday, July* 2, 1890.**

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Schacht, Storrar and Watt.

The minutes of the last meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Cox, Frederick Hudson.
Farnworth, Walter.
Hulme, Harold Edwin.
Johnstone, Edward Strauss.
Lovibond, James Joseph.
Marsden, Frederic Steele.
Wilkinson, William.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Cox, Frederick Hudson	London.
Farnworth, Walter	Blackburn.
Hulme, Harold Edwin	London.
Marsden, Frederic Steele	Withington.
Pisani, Orestes Victoriano	Upper Norwood.
Wilkinson, William	London.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Gay, Valentine Henry	London.
Goddard, Henry Edward	Great Yarmouth.
Hays, Frederick Arthur	Halesowen.
Henley, George	Lyme Regis.

ASSOCIATES.

The following, having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Blayney, William Cowan	London.
Burn, James Robert	Newcastle-on-Tyne.
Clarkson, Richard Bell	Newark.
Coleman, John David	Cardiff.
George, David	Cardigan.
Goss, George	Ipswich.
Hobbs, William Harry	Uxbridge.
Hocking, Francis Almond	London.
Holt, James Hartley	Ormskirk.
Jones, John Rees	Tredegar.
Leighton, Thomas Taylor	West Hartlepool.
Marshall, Frederick Cornforth	Beverley.
Mountain, John Thomas	Woodbridge.
Pattison, Thomas Dowson	West Hartlepool.
Pears, Harry William Kilby	Brighton.
Shaw, Tom	Rochdale.
Simpson, James William	Maidstone.
Sugden, Stephen Hale	St. Anne's-on-Sea.

Modified.

Walters, John	Penarth.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Belcher, Standley	Birmingham.
Christopher, Robert George	London.
Currie, James Charles	Stirling.
Dean, George Saville	Rochdale.
Gibbs, Christopher John	Weymouth.
Goldthorpe, Arthur	Doncaster.
Hutton, Thomas Walter	Dudley.
Jones, William Rhys	Bettws-y-Coed.
Kitching, Arthur Scott	Beckenham.
Linstead, Edward Flatman	London.
Lloyd, James Herbert	Leicester.
Palmer, Charles Nicholas	Stokesley.
Purdy, Amy Elizabeth	York.
Stead, William Wilkinson	Bradford.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

LETTER FROM MR. ROBBINS.

The PRESIDENT read a letter from Mr. Robbins thanking the Council for the resolution passed last month.

THE NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The PRESIDENT also read a letter from the Secretary of the Nottingham and Notts Chemists' Association, Mr. Gill, thanking the Society for the grant of £20 for educational purposes.

The PRESIDENT said that in connection with this subject he wished to add a few words to what he had said last month. He had then made some complimentary observations with reference to the University College, Nottingham, but he omitted to say, as he ought to have done, that the results he had mentioned as being so satisfactory, viz., the success with which so many young men from Nottingham and the district passed the examinations, were due in great measure to the efforts of the local Association. He must apologize for not having given that Association the acknowledgment which it undoubtedly deserved, for in the face of the many difficulties to which he had referred incidentally, whatever views were held by its members as to the policy of the Council with regard to trade matters, the Nottingham Association had always been very loyal in looking after the education of the young men. He should also have said a word or two in acknowledgment of the services of Mr. Fitzhugh, the President of the Association, whom he knew some twenty-five years ago, and remembered receiving very cordial hospitality from him at the time of the Conference meeting, though he had not seen him since. He knew, however, and should have mentioned, that besides being President of the Association, Mr. Fitzhugh was a member of the Council of the University College, and in that position his services and influence had been of the greatest value to the pharmaceutical students. He occupied a position similar to that of Mr. Schacht in connection with the University College at Bristol, and while it was an honour to the Society that its members should be chosen for such honourable positions, it was also due to Mr. Fitzhugh to say that his personal influence had contributed largely to the Council of the College making arrangements for meeting the wants of pharmaceutical students.

Report of the Finance Committee.

The report of this Committee was of the usual character.

The President (as Chairman of the Committee) moved that the report and recommendations be received and adopted. There had been an unusually large number of candidates for examination during the month, so that the chief receipts were derived from that source. As usual at this time of year the receipts from the Benevolent Fund had been but small. The payments included a further sum of £400 to the contractors of the new building on the certificate of the architect, and £85 for the Research Committee.

The motion was unanimously adopted.

Report of the Benevolent Fund Committee.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (age 60) of a member and subscriber to the Fund, who was an unsuccessful candidate at the last election. Applicant has had four previous grants of like amount. (Lincolnshire.)

£10 to a former member and subscriber (age 85) who has been in business for 52 years, but was compelled to give it up in 1886. (Norfolk.)

Another case had been deferred for further inquiries, and one application had been refused.

The Vice-President (as Chairman of the Committee) moved the adoption of the report, and explained the circumstances under which one application had been deferred, the Committee hoping ultimately to be able to make a grant.

The motion was carried unanimously.

Report of the Building Committee.

This Committee recommended that an estimate for removing the office furniture and fixtures from the present to the new offices, and completing them as found necessary, be accepted. Also that certain carpets, blinds, etc., be procured for the new building.

The President in moving the adoption of the report and recommendation, said this was practically authorizing the Committee to have the office furniture removed to the new building, and to supply some additional articles for the complete furnishing of the new offices, lavatory, etc.

In reply to Mr. Richardson, he said some applications had been received with regard to the letting of No. 15, Bloomsbury Square.

The motion was unanimously agreed to,

Report of the Library, Museum, Laboratory and House Committee.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Day . .	516	37	14	20
	Evening .	171	19	1	9

Circulation of books.	Total.	Town.	Country.	Carriage paid.
May	215	111	104	£1 6 6½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Royal College of Surgeons of England, List of Transactions, etc., in the Library, 1890.
From the College.

Royal College of Veterinary Surgeons, Register of Veterinary Surgeons, 1890.
From the College.

U. S. Department of Agriculture, Division of Chemistry, Bulletin, No. 26.
From the Department.

Pomet, History of Drugs, 4th ed., 1748.
From Mr. R. B. Warrick.

Martenson (J.), Die Microscope von Carl Zeiss in Jena; zugleich eine Uebersicht über die 300 jährige Geschichte des Microscopes, 1890.
From the Author.

The Committee recommended that an additional copy of the Calendar of the University of London be purchased for the Library in London.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
May	Morning	449	39	9	18
	Evening	62	9	1	2

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of gum from Nassick, leaves of *Calycopteris floribunda*, Gums of Acacia Senegal, from Jafferabad, of *Pithecolobium dulce*, of *Pithecolobium Saman*, of *Spondias mangifera*, of *Poinciana regia*, of *Swietenia Mahogani*, of *Acacia arabica*, of *Prosopis spicigera*, of *Albizzia Lebbek*, Calcium oxalate in the form of an excretion from *Tamarindus indica*, and fruit of *Luffa echinata*.
From Mr. J. G. Prebble, Bombay.

Specimen of *Devildora* from Demerara.
From Mr. T. Redwood.

Specimen of *Bovista gigantea*.
From Mr. H. E. Allenby.

Specimens of odourless cocoa butter and odourless castor oil.
From Messrs. Petty and Co., Silvertown.

Specimen of Chinese rhubarb, showing an unusual form of growth. From Mr. S. Gale.

To the Herbarium.

Specimens of *Buchanania latifolia*, *Celastrus paniculatus*, *Santalum album*, and *Acacia Lebbek*.

On the motion of the President the report and recommendations were unanimously adopted.

The North British Branch.

A letter was read from Mr. J. R. Hill, Assistant Secretary in Edinburgh, stating that on June 18 the following gentlemen had been elected members of the Executive of the North British Branch for the ensuing year:—

Boa, Peter, 119, George Street, Edinburgh.
Fisher, John Hutchison, 66, High Street, Dunfermline.
Frazer, Daniel, 127, Buchanan Street, Glasgow.
Gibson, Adam, Thistle Street Lane, East, Edinburgh.
Gilmour, William, 11, Elm Row, Edinburgh.
Hardie, James Millar, 68, High Street, Dundee.
Kermath, William Ramsay, 1, North Bell Street, St. Andrews.
Kerr, Charles, 56, Nethergate, Dundee.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Lawrence, Samuel, 101, George Street, Oban.
Maben, Thomas, 5, Oliver Place, Hawick.
M'Adam, Robert, 34, Virginia Street, Glasgow.
Mackenzie, James, 45, Forrest Road, Edinburgh.
Nesbit, John, 162, High Street, Portobello.
Paterson, James, 15, Regent Quay, Aberdeen.
Stephenson, John Bertram, 48, Frederick Street, Edinburgh.

Strachan, Alexander, 138, Rosemount Place, Aberdeen.

Mr. Hill had also reported that at a meeting of the Executive, held on June 25, Mr. William Gilmour had been appointed Chairman and Mr. David Storrar, Vice-chairman. He also sent an extract from the minutes of the General Purposes Committee recommending the expenditure of £25 in providing additional book-shelf accommodation for which the sanction of the Council was desired.

The President said the library was growing very fast in Edinburgh and the accommodation was comparatively limited. He would therefore move that the recommendation be agreed to.

Mr. Harrison seconded the motion, which was agreed to.

The Staff of the Society's School.

The President said a letter had been received from Mr. Holmes, stating that he found it was not possible for him to continue satisfactorily to discharge the duties of teacher of materia medica in addition to those of Curator of the Museum, and he therefore asked the Council to omit his name in appointing the teaching staff for the ensuing year. The duties and reputation of Mr. Holmes in connection with the Museum were very considerable, and he found that the duties of teaching took up so large a portion of time that he could not conveniently continue them. Probably the best plan would be to refer to the Library, etc., Committee instructions to consider the question of teaching materia medica, and report to the next meeting. The other members of the teaching staff might, however, be re-appointed as usual.

Mr. Schacht suggested that the whole of the appointments should be postponed until the Committee had reported, but after some discussion this was not considered desirable, and the following appointments were unanimously made.

Professor Attfield was appointed Professor of Practical Chemistry.

Professor Green was appointed Professor of Botany.

Professor Dunstan was appointed Professor of Chemistry.

Mr. Ince was appointed to give lectures and demonstrations in pharmacy and practical pharmacy.

It was also resolved—

> "That the Library, Museum, Laboratory and House Committee be requested to consider and report on the question of the future teaching of materia medica in the Society's School."

Local Secretaries.

The President reminded the Council that it had already been resolved that the voting papers for the election of local secretaries should be issued in October, and that the election should take place in November or December. Under these circumstances it was desirable to pass a resolution, continuing the present Local Secretaries and Superintendents of Written Examinations in office until the end of November.

Mr. Allen moved a resolution to this effect, which was seconded by Mr. Newsholme.

Mr. Hampson said he should like to take the opinion of the Council with regard to the propriety of inviting all the Local Secretaries to London, to confer with the Council on the work of the Society. It had been found that conferences with the Divisional Secretaries in London had been of considerable benefit and value; and he should like, if possible, to bring about a meeting of the entire body of Local Secretaries at Bloomsbury Square, particularly as there was an amended Pharmacy Bill about to be introduced.

Mr. Cross supported the idea which he had previously suggested, and said he was about to ask the President if it would be in order for a member of the Committee to bring up this subject at Committee without previous instruction from the Council. The more the Council could come in contact with its constituents, the better would its work and policy be understood, and the less nonsense would be written and talked.

Mr. Richardson suggested that before such a meeting was held the Bill should be printed, and the Local Secretaries should have an opportunity of ascertaining the feeling in their respective neighbourhoods.

Mr. Hampson quite agreed that it would be unwise to invite these gentlemen before the Bill was printed. It was their assistance in discussing the Bill that was so much to be desired.

Mr. Richardson thought that it would be well for a notice to be sent out inviting Local Secretaries to obtain the opinion current in their neighbourhood, so that they might come up to discuss the matter with some authority.

Mr. Hampson did not wish to press the suggestion at the moment, but only that the Committee should take the subject into consideration. There would be the question of expense and other details to consider, but he should like to establish a precedent, and that such meetings should be held periodically.

Mr. Harrison suggested that the scope of the proposition might be enlarged. He quite agreed with the idea that everything should be done to bring the whole of the members thoroughly in touch with one another, but Mr. Hampson had already indicated one difficulty which would arise, viz., the financial one, though possibly that might be got over in another way. If the mountain could not come to Mohammed it would be better to take Mohammed to the mountain. If the country members could not come to London, some prominent member of the Council, some one who had had a little experience in going about from one division of London to another, might go into the country and create that enthusiastic feeling in favour of the Society which he seemed so well able to produce in the metropolis. He did not wish to put too much work on the President, but, as far as he could see the more he did the better he seemed to be, and therefore there was no hardship involved in the suggestion that if country members could not come up to have the advantage of his eloquence in London, he should go into the country and let them hear it there.

Mr. Hampson rather took exception to this suggestion. It was not so much with the view of enabling the Local Secretaries to hear the voice of the President as to have them in direct communication with the Council that he made the suggestion. He wanted them to see that building, and the work which was being accomplished there.

Mr. Atkins said if the question were to be considered in Committee it was not necessary to express one's views now, but he might say that, delighted as they would all be to have a conference with these gentlemen in London, he feared the financial side of the question would create very great difficulties. It was not merely the charge on the Society but on those gentlemen themselves; many of them would come long distances, and would have to remain in London a day or two, and unless such visits were confined to occasions when there was an important crisis in affairs, it would become an annual custom. There was nothing now, unless it were the proposed Bill, which suggested a particular crisis such as would necessitate the calling of these gentlemen together, and though he should be delighted to see them every year he feared it would mean a very large outlay, both to the Society and themselves.

Mr. Richardson thought there was no desire to make the meeting annual, but it was desirable to enlist the sympathies, not only of the local secretaries, but of the trade generally in favour of the new Bill.

The motion was then carried unanimously in the following form:—

"That the present Local Secretaries and Superintendents and Deputy-Superintendents of Written Examinations be reappointed until the end of November; and that the Library, Museum, Laboratory and House Committee be instructed to consider and report as to the desirability of having a meeting of Local Secretaries in London in the course of the year."

THE COUNCIL PRIZE EXAMINATIONS.

Messrs. Blunt and Ransom were appointed to conduct the examinations for the Council Prize competition in the ensuing year.

REPORT OF EXAMINATIONS.

June, 1890.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (18th)	4	3	1
„ (19th)	6	4	2
	—10	— 7	— 3
Minor (18th)	24	10	14
„ (19th)	21	8	13
	—45	—18	—27
Modified (19th) . . .	2	1	1
	—	—	—
	57	26	31

Preliminary Examination.

Fifteen certificates were accepted in lieu of the Society's examination.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor, reporting the progress of cases placed in his hands. Three persons had paid penalties.

Some other cases of alleged infringement had been considered by the Committee and proceedings were recommended. An appeal from the decision of the Registrar, refusing to place a name on the Register, had come before the Committee, and after consideration the appeal was recommended to be disallowed. The Committee had considered the communication from the Privy Council reported last month, with reference to the sale of acid poisons, and recommended that a reply be sent to the effect that the Council concurred in the suggestion of the jury that all persons selling such poisons should do so only under the conditions imposed by the Pharmacy Act, 1868. A Sub-Committee had been appointed to prepare a draft of amended bye laws.

The report was as usual read and considered in committee.

On resuming, the report and recommendations were unanimously adopted.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

THE SHAPES OF LEAVES AND COTYLEDONS.*

BY THE RIGHT HON. SIR JOHN LUBBOCK, BART.
M.P., D.C.L., LL.D., F.R.S., M.R.I.

Attempts to explain the forms, colours, and other characteristics of animals and plants, though not new, were until recent years far from successful.

Our Teutonic forefathers had a pretty story which explained certain characteristics of several common plants. Balder, the God of Mirth and Merriment, was, characteristically enough, regarded as deficient in the possession of immortality. The other divinities, fearing to lose him, petitioned Thor to make him immortal, and the prayer was granted on condition that every animal and plant would swear not to injure him. To secure this object, Nanna, Balder's wife, descended upon the earth. Loki, the God of Envy, attended her, disguised as a crow (crows at that time were white), and settled on a little blue flower, hoping to cover it up so that she might overlook it. The flower, however, cried out "forget-me-not, forget-me-not" (and has ever since been known under that name). Loki then flew up into an oak and sat on a mistletoe. Here he was more successful. Nanna carried off the oath of the oak, but overlooked the mistletoe. She thought, however, and the divinities thought, that she had successfully accomplished her mission, and that Balder had received the gift of immortality.

One day, thinking Balder proof, they amused themselves by shooting at him, posting him against a holly. Loki tipped an arrow with a piece of mistletoe, against which Balder was not proof. This, unfortunately, pierced him to the heart, and he fell dead. Some drops of his blood dropped on the holly, which accounts for the redness of the berries; the mistletoe was so grieved that she has ever since borne fruit like tears; and the crow, whose form Loki had taken, and which till then had been white, was turned black.

This pretty myth accounts for several things, but is open to fatal objections. You will judge whether I am more fortunate. In the first place I need hardly observe that the forms of leaves are almost infinitely varied. To quote Ruskin's vivid words, they "take all kinds of strange shapes, as if to invite us to examine them. Star-shaped, heart-shaped, spear-shaped, arrow-shaped, fretted, fringed, cleft, furrowed, serrated, sinuated, in whorls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same from footstalk to blossom, they seem perpetually to tempt our watchfulness, and take delight in outstripping our wonder."

Now, why is this marvellous variety, this inexhaustible treasury of beautiful forms? Does it result from some innate tendency of each species? Is it intentionally designed to delight the eye of man? Or has the form and size and texture some reference to the structure and organization, the habits and requirements, of the whole plant?

The leaf, although so thin, is no mere membrane, but is built up of many layers of cells, and the interior communicates with the external air by millions of little mouths, called stomata, which are generally situated on the under side of the leaf. The structure of leaves varies as much as their forms.

It is, of course, principally in hot and dry countries that leaves require protection from too much evaporation.

The surface is in some cases protected by a covering of varnish, in others by saline or calcareous excretions. In others, again, the same object is attained by increased viscidity of the sap; in some, the leaves assume a vertical position or range themselves one under the other, thus presenting a smaller surface to the rays of the sun. In other cases the leaves become fleshy. Woolly hairs are also a common and effective mode of protection. The plants of deserts are very frequently covered with a thick felt of hair. Some species, again, which are smooth in the north, tend to become woolly in the south. Species of the cool spring again tend to be glabrous. The uses of hairs to plants are indeed very various. They serve, as just mentioned, to check too rapid evaporation. They form a protection for the stomata or breathing holes, and consequently, as these are mainly on the under side of leaves, we find that when one side of the leaf is covered with white felted hairs, as the white poplar, this is always the underside.

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* Read at Weekly Evening Meeting, Friday, April 25.

In other cases the use of hair is to throw off water. In some alpine and marsh plants this is important. If the breathing holes became clogged with moisture—with fog, for instance, or dew—they would be unable to fulfil their functions. The covering of hair, however, throws off the moisture, and thus keeps them dry. Thus these hairs form a protection both against too much drought, and too much moisture.

Another function of hairs, which cannot be omitted, is to serve as shades against too brilliant light and too much heat. Again, hairs serve as a protection against insects, and even against larger animals. The stinging hairs of the common nettle are a familiar example, and coarse woolly hairs are often distasteful to herbivorous quadrupeds.

Deciduous leaves especially characterise the comparatively cool and moist atmosphere of temperate regions. For different reasons evergreen leaves become more numerous in the Alps and in the tropics.

In the Alps it is necessary for plants to make the most of the short summer. Hence, perennial and evergreen species are more numerous in proportion than with us. Everybody must have noticed how our deciduous trees are broken if we have snow early in the season and when they are still in leaf.

Evergreen leaves, such as those of the comparatively tough and leathery oak and olive, are protected against animals by their texture, and often, as in the holly, by spines; they are better able to resist the heat and dryness of the south than the comparatively tender leaves of our deciduous trees, which would part too rapidly with their moisture. It is perhaps an advantage to evergreen leaves to be glossy, because it enables them better to throw off snow. Moreover their stomata are often placed in pits, and protected with hair, which prevents too rapid evaporation. The texture and structure of leaves is indeed a wide and very interesting subject, but to-night I must confine myself to the shape.

It is impossible to classify plants by the form of the leaf, which often differs greatly in very nearly allied species. Thus the common plantain of our lawns (*Plantago major*) has broad leaves, *P. lanceolata* narrow ones. The width or narrowness of leaves depends on various considerations. In herbaceous and stalkless plants, such as the plantain, prostrate leaves tend to be broad, those which are upright to be narrow. Thus, grasses, for instance, have more or less upright narrow leaves.

In other cases the width is determined by the distance between the buds, and in others again by the number of leaves in a whorl.

Cordate and Lobed Leaves.

Among broad leaves we may observe two distinct types, according as they are oval or palmate. Monocotyledonous plants, such as grasses, sedges, lilies, hyacinths, very generally have upright and narrow leaves. When they are wider, as, for instance, in the black bryony, this is mainly at the base, where, consequently, the veins are further apart, coming together again towards the apex. This we are tempted, therefore, to regard as the primitive type of a broad leaf.

There is, however, a totally different one, where the leaf is palmate, like a hand, widening towards the free end. Here the veins pursue a straight, diverging course; and as they not only serve to strengthen the leaf, but also to carry the nourishment, this is doubtless an advantage. Perhaps, however, the primary reason for this arrangement is found in the fact that these leaves are generally folded up like a fan while they are in the bud.

I have elsewhere dwelt on the case of the beech, and perhaps I may briefly refer to it again. The weight of leaves which a branch can carry will of course depend on its position and strength. The mode of growth of the beech and the hornbeam are very similar, but the twigs of the latter are slenderer, and the leaves smaller. If we cut off a beech branch below the sixth leaf we shall find that the superficial leaf area which it carries is about 18 square inches. But in our climate most leaves are glad of as much sunshine as they can secure, and are arranged with reference to it. The width of the beech leaves—about 1¾ inch—is regulated by the average distance between the buds. If the leaves were wider they would overlap. If they were narrower there would be a waste of space. The area on the one hand, and the width on the other, being thus determined, the length is fixed, because, to secure an area of 18 inches, the width being about 1¾ inch, the length must be about 2 inches. This, then, explains the form of the beech leaf.

Let us apply these considerations in other cases. I will take, for instance, the Spanish chestnut and the black poplar. In the Spanish chestnut the stem is much stronger than that of the beech. Consequently it can carry a greater leaf-surface. But the distance between the buds being about the same, the leaves cannot be much wider; hence they are much longer in proportion, and this gives them their peculiar sword-blade-like shape.

Again, if we look at a branch of black poplar, and compare it with one of white poplar, we are struck with two things: in the first place, the branch cannot be laid out on a sheet of paper so that the leaves shall not overlap; the leaves are too numerous and large. Secondly, in the white poplar the upper and under surfaces of the leaf are very different, the lower one being covered with a thick felt of hair, which gives it its white colour; in the black poplar, on the other hand, the two surfaces are nearly similar.

These two characteristics are correlated, for while in the white poplar the leaves are horizontal, in the black poplar, on the contrary, they hang vertically. Hence the two surfaces are under very similar conditions, and consequently present a similar structure; while for the same reason they hang free from one another.

Let us again look for a moment at the great group of conifers. Why, for instance, do some have long leaves and some short ones? This, I believe, depends on the strength of the twigs and the number of years which the leaves last; long leaves dropping after one, two or three years, while species with shorter ones retain them many years—the spruce fir, for instance, eight or ten, *Abies Pinsapo* even as many as eighteen.

Seedlings.

I now come to the second part of my subject—the forms of cotyledons. Anyone who has ever looked at a seedling plant must have been struck by the fact that the first leaves differ entirely from those which follow—not merely from the final form, but even from those which immediately follow. These first leaves are called cotyledons. The forms of many cotyledons have been carefully described, but no reason has been given for the forms assumed, nor any explanation offered why they should differ so much from the subsequent leaves. Klebs, indeed, in his interesting memoir on "Germination," characterizes it as quite an enigma.

Mustard and cress were the delight and wonder of our childhood, but it never then occurred, to me at least, to ask why they were formed as they are. So they grew, and beyond that it did not occur to me, nor I think to most, that it was possible to inquire. I have, however, I think suggested plausible reasons in many cases, some of which I will now submit for your consideration.

Cotyledons differ greatly in form.

Some are narrow, in illustration of which I may mention the fennel and ferula, in the stalk or ferule of which Prometheus is fabled to have brought down fire from heaven.

Some are broad, as in the beech and mustard. Moreover, some species have narrow cotyledons and broad leaves, while others have broad cotyledons and narrow leaves.

Some are emarginate, as in the mustard; lobed, as in the lime; bifid, as in Eschscholtzia; trifid, as in the cress; or with four long lobes, as in Pterocarya.

Some are unequal, as in the mustard; or unsymmetrical, as in the geranium.

Some are sessile, and some are stalked; some are large, some small.

Generally, they are green, leaf-like, and aërial, but sometimes they are thick and fleshy, as in the oak, nut, walnut, peas, beans, and many others, in which they never quit the seed at all.

Let us see, then, whether we can throw any light on these differences, and why they should be so unlike the true leaves.

If we cut open a seed, we find within it the future plant; sometimes, as in the larkspur, a very small oval body; sometimes, as in the ash or the castor-oil, a lovely little miniature plant, with a short stout root and two well-formed leaves, inclosing between them the rudiment of the future stem, the whole lying embedded in food material or perisperm; while sometimes the embryo occupies the whole interior of the seed, the food-material being stored up, not round, but in, the seed-leaves or cotyledons themselves. Peas and beans, almonds, nuts, and walnuts, are familiar cases. In split peas, for instance—who split the peas? If you look at them you will see that it is too regularly and beautifully done for human hands. In fact, the two halves are the two fleshy cotyledons: strictly speaking, they are not split, for they never were united.

Narrow Cotyledons.

Let us now begin with such species as have narrow cotyledons, and see if we can throw any light on this characteristic. The problem is simple enough in such cases as the plane, where we have, on the one hand, narrow cotyledons, and, on the other hand, a long narrow seed containing a straight embryo. Again, in the ash, the cotyledons lie parallel to the longer axis of the seed, which is narrow and elongated. Such cases are, however, comparatively few; and there are a large number of species in which the seeds are broad and even orbicular, while yet the cotyledons are narrow. In these it will generally be found that the cotyledons lie transversely to the seed.

The sycamore has also narrow cotyledons, but the arrangement is very different. The fruit is winged, the seed an oblate spheroid and aperispermic—that is to say, the embryo, instead of lying embedded in food-material, occupies the whole cavity of the seed. Now, if we wished to pack a leaf into a cavity of this form, it would be convenient to choose one of a long, strap-like shape, and then roll it up into a sort of ball. This is, I believe, the reason why this form of cotyledon is most suitable in the case of the sycamore.

Broad Cotyledons.

I now pass to species with broad cotyledons. In the castor-oil plant (*Ricinus*), euonymus, or the apple, for instance, the young plant lies the broad way of the seed, and the cotyledons conform to it. In the genus Coreopsis, *Coreopsis auriculata* has broad cotyledons, and *Coreopsis filifolia* has narrow ones—the first having broad, the second narrow seeds.

Emarginate Cotyledons.

In a great many species the cotyledons are emarginate—that is to say, they are more or less deeply notched at the end. This is due to a variety of causes. One of the simplest cases is that of the oak, where the two fleshy cotyledons fill the seed; and the walls of the seed being somewhat thickened at the end, and projecting slightly into the hollow of the seed, cause a corresponding depression in the cotyledons.

In such cases as the mustard, cabbage, and radish, the emargination is due to a very different cause. The seed is oblong, thick, and slightly narrower at one end than the other. There is no perisperm, so that the embryo occupies the whole seed, and as this is somewhat deep, the cotyledons, in order to occupy the whole space, are folded and arranged one over the other like two sheets of note-paper, the radicle being folded along the edge. To this folding the emargination is due. If a piece of paper be taken, folded on itself, cut into the form of the seed, and then unfolded, the reason for the form of the cotyledon becomes clear at once.

But it may be said that in the wallflower (*Cheiranthus*) the seed has a similar outline, and yet the cotyledons are not emarginate. The reason of this is that in the wallflower, the seed is more compressed than in the mustard and radish, and the cotyledons are not folded; so that the whole, not the half, of each cotyledon, corresponds to the form of the seed.

Lobed Cotyledons.

The great majority of cotyledons are entire, but some are more or less lobed. For instance, those of the mallow are broadly ovate, minutely emarginate, cordate at the base, and three-lobed or angled towards the apex, with three veins, each running into one of the lobes.

The embryo is green, curved, and occupies a great part of the seed. The cotyledons are applied face to face; then, as growth continues, the tip becomes curved and depressed into a median longitudinal furrow, the fold of the one lying in that of the other.

The cotyledons of the lime (*Tilia*) are very peculiar. They are deeply five-lobed, the central lobe being the longest; so that they are roughly shaped like a hand. The seed is an oblate spheroid, resembling an orange in form, and the embryo is embedded in semi-transparent albumen.

The embryo is at first straight; the radicle is stout and obtuse; the cotyledons ovate-obtuse, plano-convex, fleshy, pale green, and applied face to face. They grow, however, considerably, and when they meet the wall of the seed, they curve round it, following the general outline of the seed. If anyone will take a common tea-cup and try to place it in a sheet of paper, the paper will of course be thrown into ridges. If these ridges be removed and so much left as will lie smoothly inside the cup, it will be found that the paper has been cut into lobes more or less resembling those of the cotyledons of the lime. Or if, conversely, a piece of paper be cut into lobes resembling those of the cotyledons, it will be found that the paper will fit the concavity of the cup. The case is almost like that of our own hand, which can be opened and closed conveniently owing to the division of the five fingers.

Unequal Cotyledons.

In most cases the two cotyledons are equal, but there are several cases in which one of them is larger than the other. This had not escaped the attention of Darwin, who attributed the difference to the fact "of a store of nutriment being laid up in some other part, as in this hypocotyl, or one of the cotyledons." I confess that I do not quite see how this affords any explanation of the fact. The suggestion I have thrown out is that the difference is due to the relative position of the two cotyledons in the seed, which in some cases favours one of them at the expense of the other. Thus in the mustard they are unequal, and, as we have already seen, they are folded up, one inside the other. The outer one, therefore, has more space, and becomes larger. In many other crucifers, though the cotyledons are not folded, they are what is called "incumbent"—that is to say, they are folded on the radicle, and the outer one has therefore more room than the other.

Unsymmetrical Cotyledons.

In other cases, as in the geraniums, laburnum, lupines, etc., there is inequality, not between the two cotyledons, but between the two halves of each cotyledon. In the geraniums this is due to the manner in which the cotyledons are folded. In the cabbage and mustard we have seen that one cotyledon is folded inside the other; in the geranium they are convolute, one half of each being folded inside one half of the other, the two inner halves being the smaller, the two outer the larger ones.

In the laburnum, where the arrangement is very similar, the inequality in the two sides of the cotyledon is due to the inequality between the two sides of the seed.

Subterranean Cotyledons.

I have already observed that in some cases the cotyledons occupy the whole of the seed, which in more or less spherical seeds is effected, either by a process of folding and packing, or by the cotyledons becoming themselves more or less thickened, as in peas and beans, nuts and chestnuts. This is the reason why such seeds fall more or less readily into two halves, the radicle or plumule being so small in comparison as generally to escape notice, though, if a horse-chestnut is peeled, the radicle appears as a sort of tail.

In certain beans the cotyledons sometimes emerge from the seed, sometimes remain underground. In others, as also in the oak and horse-chestnut, they never leave the seed, or come above ground; they have lost the function of leaves, and become mere receptacles of nourishment.

Did it ever occur to you to think, when you have been eating walnuts, why their structure is so complex, and why the edible part is thrown into those complicated lobes and folds? The history is very interesting.

In the walnut the cotyledons now never leave the seed, but in an allied genus, Pterocarya, they come above ground as usual, and are very peculiar in form, being deeply four-lobed. The reason of this is very curious. The fruit is originally much larger than the seed, but, as it approaches maturity, the hard woody tissue disintegrates at four places, leaving thus four hollow spaces. Into these spaces the seed sends four projections, and into these four projections each cotyledon sends a lobe. Hence the four lobes.

Now in the walnut a very similar process takes place, only the hollow spaces are much larger, so that, instead of a solid wall, with hollow spaces occupied by the seed, it gives the impression as if the seed was thrown into folds occupied by the wall of the fruit. To occupy these spaces fully, the cotyledons themselves were thrown into folds as we now see them. The fruit of Pterocarya is much smaller than that of the horse-chestnut, which doubtless was itself formerly not so large as it now is. As it increased, the cotyledons became fleshier and fleshier, and found it more and more difficult to make their exit from the seed, until at last they have given up any attempt to do so. Hence these curious folds, with which we are so familiar, are the efforts made by the originally leafy cotyledons to occupy the interior of the nut. If you separate them, you will easily find the little rootlet, and the plumule with from five to seven pairs of minute leaves.

But perhaps you will ask me why I have assumed that in these cases the cotyledons have conformed to the seeds? May it not be that the seed is determined, on the contrary, with reference to the cotyledons? The size, form, etc., of the seeds, however, evidently have relation to the habits, conditions, etc., of the parent plant.

Let me, in illustration, take one case. The cotyledons of the sycamore are long, narrow, and strap-like; those of the beech are short, very broad, and fan-like. Both species are aperispermic, the embryo occupying the whole interior of the seed.

Now, in the sycamore, the seed is more or less an oblate spheroid, and the long ribbon-like cotyledons, being rolled up into a ball, fit it closely, the inner cotyledon being often somewhat shorter than the other. On the other hand, the nuts of the beech are more or less triangular; an arrangement like that of the sycamore would therefore be utterly unsuitable, as it would necessarily leave great gaps. The cotyledons, however, are folded up like a fan, but with more complication, and in such a manner that they fit beautifully into the triangular nut.

Can we, however, carry the argument one stage further? Why should the seed of the sycamore be globular, and that of the beech triangular? Is it clear that the cotyledons are constituted so as to suit the seed? May it not be that it is the seed which is adapted to the cotyledons? In answer to this we must examine the fruit, and we shall find that in both cases the cavity of the fruit is approximately spherical. That of the sycamore, however, is comparatively small, say ⅓-inch in diameter, and contains one seed, which exactly conforms to the cavity in which it lies. In the beech, on the contrary, the fruit is at least twice the size, and contains from two to four seeds, which consequently, in order to occupy the space, are compelled (to give a familiar illustration, like the segments of on orange) to take a more or less triangular form.

Thus, then, in these cases, starting with the form of the fruit, we see that it governs that of the seed, and that of the seed, again, determines that of the cotyledons. But though the cotyledons often follow the form of the seed, this is not invariably the case: other factors must also be taken into consideration; but when this is done, we can, I venture to think, throw much light on the varied forms which seedlings assume.

I have thus attempted to indicate some of the principles on which, as it seems to me, the shapes of leaves and seedlings depend, and to apply them in certain cases; but the study is only in its infancy: the number and variety of leaves is almost infinite, and the whole question offers, I venture to think, a very interesting field for observation and research—one. indeed, of the most fascinating in the whole of natural history.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, June 26, Professor Attfield, F.R.S., President, in the chair. The Secretary read the annual report of the Executive Committee as follows:—

The Executive Committee of the School of Pharmacy Students' Association have held two meetings for the transaction of the business of the session. At a meeting held November 28, 1889, the following members were appointed as a Committee of Reporters on the Science allied to Pharmacy:—Pharmacology, Miss M. E. Buchanan: Practical Pharmacy, Mr. F. C. J. Bird; Botany, Mr. R. H. Norman; Materia Medica, Mr. A. E. Chaston; Physics, Mr. E. J. Eastes; Organic Chemistry, Mr. A. C. Stark; Inorganic Chemistry, Mr. L. W. Hawkins; Analytical Chemistry, Mr. C. G. Willsher.

The question whether it was desirable to insert a clause in the Rules of the Association providing a composition fee for life-membership was also discussed by the meeting and postponed for further consideration.

At a meeting held June 26, 1890, the point was again considered, and it was decided that it was desirable to have a commutation fee of 10*s.* 6*d.* for life membership; the Secretary was therefore instructed to prepare a clause for insertion in the rules to be proposed at the next available ordinary meeting.

At the meeting on June 26 the Secretary reported that the papers and reports of the previous session had been copied in type, bound, and presented to the Library of the Pharmaceutical Society; also that the papers and reports of the session 1884-85, which were being copied in manuscript, had now been finished, bound, and presented to the Library. A grant of 3*s.* 4*d.* from the Research Fund was made to Mr. C. Morley to defray the expenses of his paper on colour, and a grant of 3*s.* 9*d.* to Mr. H. Fairburn for the cost of samples examined in his paper on the iron scale compounds.

The following statement of the Committee of Reporters was read by the Secretary on behalf of the Committee:

"The Committee of Reporters on Science have since their appointment in November, 1889, transacted the following business. At a meeting held November 28, 1889, the order of reports for the ensuing session was arranged; the following reports have been made by the members of the Committee during the session:—Report on Materia Medica, by Mr. A. E. Chaston; Report on Botany, by Mr. R. H. Norman; Report on Inorganic Chemistry, by Mr. L. W. Hawkins; Report on Pharmacology, by Miss M. E. Buchanan; Report on Physics, by Mr. E. J. Eastes; Second Report on Inorganic Chemistry, by Mr. L. W. Hawkins."

This statement was accepted by your Committee and ordered to be incorporated in their report.

The following statistics show the progress of the Association during the session: The number of members on the books is 70, being four more than last session, but the attendance at the meetings has fallen off somewhat; the number of meetings held has been thirteen, including to-night's annual meeting, and the gross attendance 227, making an average of 17½ at each meeting.

The number of communications read has been 23; viz., 6 reports already mentioned and 17 papers; the following is a list of the papers: "Introductory Address," by Professor Green; "Joule and his Work," by Mr. H. W. K. Pears; "Note on Liquor Magnesii Citratis," by Mr. E. Le Cudennec; "Titanium and its Compounds," by Messrs. A. J. Simons and A. O. Scrivener; "Aloes," by Messrs. J. Bainbridge and C. Morrow; "Alkali Manufacture," by Mr. E. B. Sherlock; "Dissociation," by Mr.. C. E. Boucher; "Suppositories," by Messrs. F. A. Hocking and E. Brooke; "Coal Gas," by Mr. I. P. Barnes; "Home-made Electrical Apparatus," by Mr. A. Gunn; "The Steam-Engine," by Mr. T. I. Hayton; "Coal," by Mr. G. H. Lansdown; "How Drugs are Imported," by Mr. J. C. Umney; "Pepsines," by Mr. W. F. Shepheard; "Colour," by Mr. C. Morley; "The Iron Scale Preparations," by Mr. H. Fairburn; "Note on the Estimation of Reduced Iron," by Mr. H. D. Fuge. Six of these papers and four reports have been published in full by the Editor of the *Pharmaceutical Journal*, as well as abstracts of all the others.

The Treasurer's accounts, to be presently audited, show that the receipts from annual subscriptions and interest on invested funds amounted to £9 6*s.*, and the ordinary expenditure to £8 14*s.* 5*d.* In addition, the amount of £1 0*s.* 3*d.* was expended in copying and binding the papers of the session 1884-85 mentioned above, and 7*s.* 1*d.* in grants from the Research Fund, leaving a balance of £19 14*s.* 4½*d.*

Messrs. H. Fairburn and C. Morley were then appointed to audit the Treasurer's accounts, which they reported to be correct.

The adoption of the report was then moved by the Chairman, seconded by Mr. L. W. Hawkins, and unanimously agreed to. The meeting terminated with a vote of thanks to the President, and one to the officers and Executive Committee.

MEETING OF CHEMISTS AT BRIXTON.

A meeting of the chemists and druggists of Brixton, Clapham, Norwood, Kennington and the neighbourhood was held on Thursday night at the Gresham Hall, Angell Town, Brixton. Mr. Robinson, Divisional Secretary for Clapham, took the chair at 9 o'clock, and announced that the proceedings would commence with a discussion and questions, after which the President of the Pharmaceutical Society would speak. It was desired especially to get a definite expression of opinion on certain points which would be brought forward in the shape of resolutions, but the great object of the meeting was to obtain, if possible, unanimity amongst the trade, especially in view of an application to Parliament for further legislation.

Mr. Powell asked if a retail chemist could manufacture liniments as well as sell them, with methylated spirit if he had a licence.

Mr. Bascombe asked if a chemist not having a licence could do so.

Mr. Bate asked if proprietary medicines containing poisons ought to bear a poison label.

Mr. Johnston asked why proceedings were not taken against photographic dealers who sold cyanide of potassium and other poisons in retail quantities.

A letter from Mr. Nettle had been received expressing his approval of the present Council.

Mr. Robinson said he should propose to move—"That in the opinion of this meeting it is desirable for the greater safety of the public to promote a Bill in Parliament giving further power for the advancement of chemistry and pharmacy, to improve the education and protection of those who practice the same, and to enforce stricter regulations for the sale of poisons." If that met with approval he should propose to move that the following were desirable:—

"1. The alteration, amendment, and division of the examinations, and the adoption of a compulsory curriculum.

"2. One qualifying examination carrying full membership and admission of associates to the same.

"3. To secure to qualified chemists the exclusive right to compound and sell the preparations of the B.P. or any combination thereof, the dispensing of medical prescriptions, and to enforce stricter regulations in the sale of poisons and poisonous preparations.

"4. No person or persons or company shall engage in the business of chemists unless every proprietor or partner be duly qualified, except in case of trustees and executors as already provided for." After Mr. Robinson had spoken briefly in support of these resolutions,—

Mr. Johnston said he had prepared a motion to this effect, which was not so general as Mr. Robinson's:—"That this meeting expresses its general approval of the Pharmacy Bill recently drafted by the Council of the Pharmaceutical Society; but hopes that before its introduction into Parliament clause 5 will be so amended that all Minor diplomats of the Society shall become eligible for membership of the Society on the payment of one guinea per annum." He thought all who passed the examination should be eligible to membership without waiting to go into business.

Mr. Gadd seconded the motion.

The President said he agreed with Mr. Johnston and he believed all his colleagues did. The clause was not so drawn simply because it was believed that a large number of young men would prefer to wait a little time before claiming membership. It was simply a question whether it would be wise to make it compulsory on a Minor man to become a member at once.

Mr. Johnston said he only desired to give the option of membership.

Mr. Bowen suggested the draft Pharmacy Bill should be read, which was done by the Chairman, who then read Mr. Johnston's motion.

Mr. Warren supported the motion. He had been rather annoyed at having to become a member when he passed the Major, and would rather have deferred it for a time. If it were optional he saw no objection.

Mr. Ingham thought it would be better if it were compulsory, as it was with medical men; that as soon as they passed the examination they should belong to the Society, quite apart from the payment of the subscription.

The President said this was a very important point. If it were left open you could not work a large body with two classes of men having the same qualification. If the meeting passed a resolution that all men on passing the examination were obliged to join the Society he thought it would be a good thing. There was no use in a man being an associate unless he joined to the full extent in supporting the interests of the Society.

Mr. Johnston would be quite willing to make membership or associateship compulsory, but did not think Parliament would pass such a measure.

Mr. Robinson thought it would be an excellent thing to ask examined men to join the Society at once, if they did not lose members by so doing.

Mr. Gadd was willing to go in for compulsory membership.

The President, in reply to a question, said in the case of the medical profession there was no annual subscription. They did not propose to compel men to join as members, but only that they must join as members or not at all.

Mr. Johnston said he was willing to add words suggested by the President, that those wishing to be associates should be permitted to join and as such remain until they went into business, or until they were twenty-five years of age.

After some further discussion—

The President referred to the agitation now going on in connection with the College of Surgeons, for giving members the same political privileges as fellows.

Mr. Phillips suggested the reduction of the subscription to 10*s.* 6*d.*

Mr. Robinson moved an amendment, which was seconded by Mr. Bate, to omit the rider allowing of associateship.

This was put and carried almost unanimously, and the motion, without the rider, was then agreed to.

Mr. Robinson then moved the resolution he had previously read, No. 3.

Mr. Douglas seconded it, but thought at the same time chemists should give up selling tea.

This was also agreed to.

Mr. Robinson then moved No. 4. This was a high standard, but they should aim high, and if they could not pass it, they must put up with something less.

Mr. Warren seconded. There could be no difference of opinion as to the desirability of such a thing, though he should not withdraw his support from the Council if they thought such a clause would prejudice the Bill.

Mr. Ingham thought this was really the intention of the 1868 Act.

The President pointed out that by asking for too much in the opinion of the Legislature they might lose some privileges they already possessed. There was a very strong feeling in Parliament in favour of joint stock trading and all kinds of so-called co-operation. He explained how this mode of carrying on business had been developed, and what an obstacle it was to any attempt to move in the direction desired. There were many abuses, some of which he described, but on the whole the Limited Liability Acts had been of immense value, and there was a great indisposition to interfere with their operations. The Pharmaceutical Society of Ireland tried three years ago to get such a clause in a Bill, and could not get any member of either House to take it up, and in the present Bill a clause had been inserted legalizing the sale and dispensing of medicines by corporations under certain conditions. Information had been put before the Government as to some of the abuses to which he had referred, but no encouragement was held out that anything such as was desired could be obtained from Parliament. The only thing the Legislature cared about was the safety of the public, and it was contended by many that that was secured by having a qualified assistant in charge. He knew of no M.P. who would take up a Bill containing a clause such as was now suggested. In the course of his address the President gave a history of the Act of 1868, referring particularly to the widows' clause, which was relied on in the House of Lords in the decision which had created all the difficulty, and concluded by dwelling on the supreme importance of personal qualification, both educational and moral.

Mr. Robinson, in reply, said he knew there were practical difficulties, but he did not think any harm would be done by trying. He was willing to say that executors or trustees should be qualified chemists.

Mr. Johnston moved an amendment, "That this meeting is of opinion that limited liability companies should be regulated by compelling the manager of the drug department to have a substantial sum invested in the company and to have the absolute right of managing his department according to his own wishes, and that he be only liable to be deprived of his office for immorality."

Mr. Green protested against the waste of time involved in bringing forward such motions.

The amendment not being seconded, the motion was put and negatived.

Mr. Powell then moved at ten minutes past eleven, "That this meeting considers the Pharmaceutical Society deserves the support of the whole trade and pledges itself to help the Council in its efforts to obtain amended legislation in the interests of chemists and druggists."

Mr. Bascome seconded and it was at once carried unanimously.

The Chairman then moved a vote of thanks to the President, which was seconded by Mr. Bate, and carried unanimously.

The President, in reply, said the question of selling poisons for photographic purposes was not lost sight of, but it was a matter which required to be handled carefully. He also explained the meaning of the phrase "preparations of poisons," and that in his opinion patent medicines containing a toxic quantity of a poison would be held by a court of law to require a poison label. A case of this sort could be tried by anyone, and possibly it would be tried before long. The law did not prevent the use of methylated spirit for any liniment or article for external use. He further explained the operation of the law in this respect. In conclusion he expressed his satisfaction at the character of the meeting, and pointed out the benefits the Pharmaceutical Society had conferred on the trade, especially in connection with the Benevolent Fund. The number of persons now on the Register was less in proportion to the total population than it was at the time the Act was passed. He pressed the importance of not taking uneducated apprentices, who inevitably became in after years illegitimate competitors.

A vote of thanks to the Chairman terminated the proceedings.

Provincial Transactions.

MEETING OF CHEMISTS AT PONTYPRIDD, GLAMORGANSHIRE.

A meeting of the chemists of the mining districts of Glamorganshire was held at Coombe's Restaurant, Pontypridd, on Thursday afternoon, 26th ultimo. Mr. W. Smyth, J.P., Merthyr Tydfil, in the chair. The meeting was convened by Mr. T. Richards, Treherbert. There was a fair attendance of the trade.

The Chairman said that the object of the meeting was to discuss matters of trade interest, and particularly the sale of poisons. He thought that the Pharmaceutical Society could do something in the district that would put a stop to such an illegal state of things as at present existed.

Mr. Richards stated that it was hardly necessary for him to apologize for having called them together, because all present were pleased that such a meeting had been convened, and the few chemists and druggists in the district who were not present had replied regretting their inability to attend. Mr. Richards then read a great number of post cards and correspondence from proprietors of stamped medicines, who gave their opinions bearing on the "Mathias case," and asked what course had they as qualified chemists and druggists better follow.

After a warm discussion on this question, Mr. T. Davies, Porth, proposed, and Mr. R. P. Rees, Dowlais, seconded, and it was carried unanimously, "That the Pharmaceutical Society be urged to obtain the opinion of the High Courts of Justice as to the legality of selling poisonous stamped medicines by unqualified persons, and if such sales be declared illegal, the Pharmaceutical Society be requested to place such preparations on the Schedule, in order to guide chemists as to the regulations necessary to be conformed with when making such sales."

Mr. Vincent A. Wells, of Georgetown, Merthyr Tydfil, spoke at length on the necessity of urging the Society to protect the interests of chemists and druggists, and also for obtaining legislation to monopolize the dispensing of prescriptions.

Mr. W. H. Keay, of Pontypridd, thought that the duty on medicines was very extravagant and unnecessary, and wished to do away with it, but this did not meet with much sympathy, as the majority seemed to be afraid of all sorts of penny articles being sold, and that the 1½*d.* to some extent certainly kept these down. He also thought that the time had now arrived when chemists and druggists should all support the Pharmaceutical Society, in order to obtain some satisfactory legislation.

This view was supported by Mr. Taliesin Cule, of Pontypridd, and a resolution to the effect was carried unanimously.

Mr. Smyth spoke of the necessities referred to by Mr. Wells and proposed that the Pharmaceutical Society be asked to prosecute unqualified persons who sold Easton's syrup and other poisonous preparations. This was seconded by Mr. D. Rees, Ystrad Rhondda, and carried unanimously.

The Chairman moved a vote of thanks to Mr. Richards for the able and business-like manner in which he had called the meeting, etc., upon which they were all agreed.

Mr. Harris, Merthyr, moved a vote of thanks to the Chairman, which was seconded by Mr. M. J. Jones, Aberaman, and carried unanimously.

Obituary.

Notice has been received of the death of the following:—

On the 25th of May, Mr. James Ashworth, Pharmaceutical Chemist, Blackburn Road, Accrington. Aged 51 years.

On the 10th of June, Mr. Joseph Fairburn, Chemist and Druggist, Northallerton. Aged 45 years.

On the 17th of June, Mr. Samuel Pass Bostock, Chemist and Druggist, Market Street, Hyde. Aged 29 years. Mr. Bostock had been an Associate of the Pharmaceutical Society since 1879.

On the 18th of June, Mr. James Barker Galloway, Chemist and Druggist, St. James's Street, Liverpool. Aged 38 years. Mr. Galloway had been an Associate of the Pharmaceutical Society since 1873.

On the 20th of June, Mr. Samuel Perks, Pharmaceutical Chemist, High Street, Hitchin. Aged 61 years. Mr. Perks's name has for many years been associated with the cultivation of lavender and the distillation of lavender water, in the county of Hertford. He became a Member of the Pharmaceutical Society in 1869.

On the 20th of June, Mr. Henry Griffiths Waters, Chemist and Druggist, Church Road, Burgess Hill. Aged 56 years. Mr. Waters became a Member of the Pharmaceutical Society in 1889.

On the 21st of June, Mr. John Tibbits, Chemist and Druggist, Broadholme, Lincoln. Aged 28 years.

On the 21st of June, Mr. James Anderson Ranken, Pharmaceutical Chemist, East High Street, Forfar. Aged 72 years. Mr. Ranken had been a Member of the Pharmaceutical Society since 1853.

On the 24th of June, Mr. Charles Kirk, Chemist and Druggist, Kimberley, Notts. Aged 70 years.

On the 24th of June, Mr. Jabez Waterhouse, Chemist and Druggist, Stamford Street, Ashton-under-Lyne. Aged 71 years.

On the 29th of June, Mr. Charles Oakland, Warser Gate, Nottingham. Aged 61 years.

ANSWERS TO CORRESPONDENTS.

East Anglian.—We are unable to give any indications as to the course of study beyond those contained in the published conditions. In the words of the Calendar, "the object of the examination is to ascertain that the candidate has such an amount of ability, and made such use of it in the acquirement of elementary knowledge, as to justify the expectation of his proving a successful student."

Hercules.—(1) *Scutellaria galericulata.* (2) *Scrophularia aquatica.* (3) *Tamus communis.*

R. H. Maddison.—*Eccremocarpus scaber.*

Epithelium.—(1) Yes. (2) *Polygala vulgaris.*

C. Coulter.—The fruit is probably that of *Acer Pseudoplatanus.*

Q. E. D.—Caulophyllin is a resinoid substance prepared from the fruit of *Caulophyllum thalictroides* or "blue cohosh."

R. B. C.—Withering's 'British Plants' (1863), compiled by W. Macgillivray and published by W. Law, Strand. Probably it could be obtained through a second-hand bookseller.

Dark Steel-Grey Bronze.—A correspondent asks for a reliable formula for a cold transparent "blue-black or dark steel-grey bronze for brass work."

M.—The designation is that used by the author, though he not inappropriately speaks of the prescription as an "ideal" one.

Member.—The erasure is not carried out until after the return through the dead letter office of two registered letters.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Mason, Currie, Lee, Inquirer, Effra, Q. E. D.

REMARKS ON QUININE, CINCHONIDINE AND THEIR ISOMERS.*

BY DR. O. HESSE.

It has recently been suggested that there is need of more accurate determinations of the melting points of anhydrous quinine prepared in different ways, and as the data specially referred to were those obtained by Dr. Hesse he has repeated his previous observations, and in publishing his results has taken the opportunity to add some remarks in reference to the corresponding varieties of cinchonidine.

Dr. Hesse had given two data for the melting point of anhydrous quinine, one relating to precipitated alkaloid that had been dried in an exsiccator the other to anhydrous quinine obtained by direct crystallization. In the latter instance the observed melting point, 177° C., was given, and in the former the corrected temperature 176·8° C. The correction may have amounted to 3 or 4 degrees, so that the observed temperature would have been about 173° C. According to these observations the melting point of the anhydride would be decidedly the higher. The difference may, however, have been due to defects in the thermometers used, and Dr. Hesse has therefore tested the thermometer used in his latest observations by comparing it with a normal instrument in the Physicotechnical Institute at Charlottenburg and in addition has made use of Roth's apparatus to prevent any possible error. Although this apparatus does not give at once the absolute melting point the direct observation is such a close approximation to it that the differences are within the limit of observation, error and correction may therefore be dispensed with.

Of the two preparations previously operated with only the quinine anhydride was available for further examination and that gave in several experiments a melting point of 174·4° to 175° C.

The trihydrate prepared for the other determination was crystallized from dilute alcohol in long silky needles. The anhydrous alkaloid obtained from it by drying in an exsiccator, and finally at a temperature of 120° C., melted at 172° C. The same substance was also obtained in compact needles by crystallization from ether, and after drying it melted at 171·2 to 172° C. The same hydrate prepared by precipitating a dilute water solution of quinine sulphate with caustic soda and also with ammonia gave after drying at 115° C. as the melting point of the dry base 172° and 171°·4 respectively. Lastly, the base obtained by heating the benzene compound $C_{20}H_{24}N_2O_2C_6H_6$ to 120° C., until free from benzene, gave from 171·6° to 172° C.

The melting point of the anhydrous base obtained by direct crystallization is therefore on the average 174°·7 C., and that of the base obtained by heating the trihydrate or the benzene compound is about 171·°8 C. In some recent experiments Lenz found the melting point of the base obtained from the benzene compound to be 171° C., that of pure quinine obtained by precipitation being from 170·4° to 174·4° C., and he suggested that the differences might be due to a mixture of amorphous and crystalline quinine, but it was probably in most instances a mixture of ordinary quinine with the higher melting anhydride that he operated upon. The anhydride is formed when solutions of quinine in certain indifferent solvents, such as dilute alcohol, are exposed for a long time to a temperature of 30° C.; and it is again converted into ordinary quinine when subjected to the continued action of dilute sulphuric acid. When the anhydride is dissolved with moderately warm dilute sulphuric acid in the corresponding molecular proportions, only ordinary quinine sulphate crystallizes on concentrating the solution, so that there is in that case a rapid conversion of the one form of base into the other.

In addition to the former statement of the differences between ordinary quinine and the crystalline anhydride Dr. Hesse adds that, as he then suggested, they are to be regarded as isomeric forms of this base, and in order to distinguish them he proposes to call the higher melting base homoquinine. Although this name has already been applied by Howard and Hodgkin to a substance that afterwards proved to be a compound of quinine with another base its appropriation in that sense has now been done away with.

The relations between cinchonidine and homocinchonidine are similar to those obtaining between quinine and homoquinine. The confusion of those two bases that is still met with in chemical literature makes a brief reference to the history of both substances desirable. In 1877 Dr. Hesse showed the difference between these bases by the behaviour of their neutral sulphates, but assigned to homocinchonidine the formula $C_{19}H_{22}N_2O$, that is now adopted, and to cinchonidine the old formula $C_{20}H_{24}N_2O$, expecting that his further investigations would clear up this point.

Anticipating that result, however, Skraup and Vortmann published a paper on "cinchonidine," in which, contrary to their intention, they dealt with homocinchonidine instead of cinchonidine, and it was not until a later period that Skraup recognized the identity of homocinchonidine with the base to which Dr. Hesse had given that name. The fact that Skraup and Vortmann were working with homocinchonidine, and not as they thought with cinchonidine, is shown by their misinterpretation of a statement as to the solubility of homocinchonidine in ether attributed to Koch by Skraup, but which was never made by Koch. In consequence of this misunderstanding, Skraup and Vortmann got rid of the cinchonidine, and retained the homocinchonidine, which they examined and described as being cinchonidine.

Hence it follows that the existence of homocinchonidine was not placed in doubt, as de Vrij has supposed, by the paper of Skraup and Vortmann, but on the contrary it was proved, and it was really the existence of the base to which Dr. Hesse gave the name of cinchonidine that was disputed. Subsequently, indeed, Skraup endeavoured to prove the non-existence of this latter base by means of preparations obtained from Dr. Hesse. In regard to that attempt it is a sufficient justification of Dr. Hesse's view that two years ago de Vrij unintentionally supported the existence of the base which Dr. Hesse had named cinchonidine by making known a simple method of preparing it.

In reference to this communication of de Vrij's, Dr. Hesse mentions that he had from time to time prepared the tetrasulphate originally described by him, recrystallizing it from dilute sulphuric acid or from alcohol, then neutralizing the water solution, and separating from the sulphate deposited the still adhering homocinchonidine by means of recrystallization from water in the manner that has been described. A pure cinchonidine salt may be obtained even by repeated recrystallization of the tetrasulphate from dilute sulphuric acid or alcohol, as shown by Dr. Hesse more than ten years ago, so that this fact was already known in 1887 when de Vrij supposed it had been discovered by Schäfer. The uncorrected melting point of cinchonidine was found as previously stated by Dr. Hesse to be from 199·7° to 200·5° C. (mean about 200·1° C.), when determined by the method then in use (Clauss gives 201° C., Schäfer 199°), and that of homocinchonidine was found to be from 205° C. to 206° C., or nearly six degrees higher than the melting point of cinchonidine. By the use of Roth's apparatus the melting point of cinchonidine was found to be from 202° C. to 202·8° C., mean 202·4° C., and that of homocinchonidine from 207° to 208·2 C., mean 207·6°. By the same means, Lenz, without attempting a separation of homocinchonidine from cinchonidine found the melting point of the base obtained from once recrystallized tetrasulphate to be from 207° C. to 207·5° C., that of twice recrystallized salt 204·5° to 205° C., and that of the base crystallized from ether 205° C. to 206° C., while that of a sample of cinchonidine obtained from Dr. Hesse was found to be 204·5° C. to 205·2° C., or in all instances higher than that of cinchonidine. Whether these differences were due to the presence of some homocinchonidine or to other circumstances it is impossible to say, but in any case the mean values of 205·1° C. and 207·2° C. (corrected) adopted by Lenz for cinchonidine and quoted in Beilstein's 'Handbook,' are to be rejected as inappropriate.

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* From the *Annalen der Chemie*, vol. cclviii., p. 133.

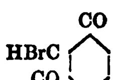
When pure cinchonidine is dissolved in moderately warm sulphuric acid containing 25 per cent. H_2SO_4, in the proportions of 1 gram to 8 c.c., the greater part crystallizes on cooling the solution in the form of tetrasulphate, and on examination of the base obtained from that salt as well as from the mother liquor both will be found to have the same melting point as the original base; under those conditions there is no alteration of the base. When homocinchonidine is treated in the same manner there is a similar though not quite so large a crystallization, but in this case the base separated from the mother liquor has a melting point of about 206° C. and that obtained from the crystals melts at 203° to 204°. By further recrystallization of the salt from dilute sulphuric acid pure cinchonidine tetrasulphate may easily be obtained. When the same treatment is applied to the base obtained from the mother liquor a further quantity of cinchonidine tetrasulphate is obtained. By this means it is not difficult to convert almost entirely into cinchonidine the homocinchonidine remaining in the last mother liquor together with some cinchonidine.

On the other hand, cinchonidine may be easily converted into homocinchonidine. When the above mentioned solution is heated in a closed tube to 140° C. for six or eight hours no crystallization takes place on cooling, and it is easy to ascertain from the melting point of the base in that case and from the behaviour of the neutral sulphate, that homocinchonidine is present. The acid solution will often remain for several days in this condition; after a time crystallization commences and proceeds more or less rapidly, indicating the reconversion of homocinchonidine into cinchonidine. The change may be accelerated by dropping a crystal of cinchonidine tetrasulphate into the solution, and thus it is perfectly easy to prepare homocinchonidine from cinchonidine or the reverse.

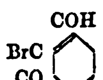
The two bases are distinguishable, apart from other differences, by their melting points being nearly six degrees different; but the statements published as to this particular might still more differ from each other if the melting points are not determined in the same manner. Dr. Hesse's former data of 199°·7 to 200°·5 apply to the uncorrected melting point of cinchonidine determined according to the method then adopted, while Skraup and Vortmann give 210°·5 as the corrected melting point of their cinchonidine that was in fact homocinchonidine. In several handbooks both substances have, in consequence of the statements of Skraup, de Vrij and others, been confused together under the name of cinchonidine, and thus there have naturally been great differences between the statements as to melting point. Dr. Hesse, however, disclaims responsibility for these discrepancies, since he has repeatedly insisted upon the difference between the two bases and their melting points.

The above described conversion of cinchonidine into homocinchonidine calls to mind the β-cinchonidine which Dr. Hesse obtained under similar conditions from cinchonidine by means of hydrochloric acid. It had a melting point from 206° to 207° C., but then became brown, polarized in acid solution rather more strongly than homocinchonidin, and gave a neutral sulphate having great similarity to homocinchonidine sulphate, but much more soluble in water than it is. A small quantity of this base that still remains has meanwhile become yellow-coloured. Both cinchonidine and homocinchonidine prepared at the same period have remained for ten years quite colourless; and it is therefore probable that the discoloration was due to some admixture which was not removed. Lenz also observed that his cinchonidine became somewhat brown on melting, though this is never the case with the pure base. If the above-mentioned β-cinchonidine was, as Dr. Hesse conjectures, chiefly homocinchonidine, it would be possible to reconvert it into cinchonidine as already described, and that was found to be the case, nearly three-fourths of the substance separating in the form of tetrasulphate, which could easily be recognized as a cinchonidine salt. From this observation it must therefore be inferred that by heating cinchonidine with hydrochloric acid of 1·125 sp. gr. to 140° C. the base is at first converted into homocinchonidine, which is then further changed into apocinchonidine. When sulphuric acid of the suitable strength is used this alteration does not proceed beyond the first stage.

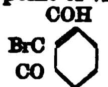
The behaviour of these bases strikingly recalls that of the mutually convertible bromtetraethyl pholoroglucines which Hirzig and Zeisel obtained by the action of bromine upon tetraethyl phloroglucine. These compounds are regarded by them as desmotropic to each other and having the following structural formulæ :—



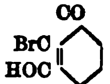
and



Dr. Hesse is disposed to view these substances as identical in structure, but isomeric from a stereochemical point of view as shown below :—



and



in much the same manner that Skraup and Würstl assume quinine, quinidine (conchinine) and quinicine to be. That quinine, as well as cinchonidine, each contains at least one double carbon bond is shown by the occurrence of hydroquinine and hydrocinchonidine; but it remains to be determined whether the above mentioned relations between quinine and homoquinine, as well as cinchonidine and homocinchonidine, would be satisfactorily accounted for by the assumption of a change in the situation of that bond.

NEUTRAL MANGANESE COMPOUNDS.[*]

BY EUGEN DIETERICH.

The use of iron preparations in chlorosis depends upon the assumption that the iron in hæmoglobin enables it to take up and combine oxygen and that this property can be increased by augmenting the quantity of iron. As besides iron, manganese is also contained in the blood, Hannon in the year 1844 advanced the theory that manganese in this case played a similar part and that the action of the iron could be increased by the joint use of the two. He therefore administered prepared manganese as well as manganese sulphate in combination with ferrous sulphate in the pilular form, but the practice has only found a few adherents. This may be due to the more or less styptic properties of manganese salts and the diatetic considerations that would contraindicate them on that account.

Iron has made great advance in this direction, in proportion as methods have been discovered for preparing mild and easily tolerated compounds. As manganese has not made equal progress, it has almost fallen out of use as a remedy against chlorosis, except that the presence of manganese in a chalybeate water has been alleged to increase its action. Very recently the claims of manganese have been revived and attention has been directed to a "peptonate." Ascher has reported upon such a preparation, and has, according to his communication, produced noteworthy results with it.

The manganese treatment having in consequence begun to interest a wider circle, it seemed desirable that manganese should be submitted to a study similar to that already made of iron, with a view of placing its therapeutics, from a chemical point of view, upon a solid foundation. In the natural grouping of the elements manganese stands very near to iron. The attempt has therefore been made to prepare preparations of manganese corresponding to the approved neutral preparations of iron and to make it possible to use both elements in the same indifferent form.

The first experiments were devoted to the preparation of a manganese albuminate, and were based upon the method of preparation worked out in the Helfenberg factory for the analogous iron preparation.[†] Unfortunately favourable results were not obtained and it became requisite to give up the attempt in this direction for a time.

An attempt was also made to prepare a manganese peptonate, following the same method as in the making of the corresponding iron compound. But up to the present it has not been found possible to throw down the manganese peptonate, as in the case of the iron compound, in the form of a flocculent precipitate. All the manganese salts hitherto available, when mixed with peptone, both in solution, gave upon neutralization a precipitate of manganous hydroxide, the peptone remaining in solution. A somewhat better result was obtained by augmenting the proportion of peptone; for instance, when one part of manganous chloride ($MnCl_2 + 4H_2O$) was evaporated with different proportions varying from one to nine parts of peptone. In this way was obtained a smeary, viscous, almost colourless mass, which was highly hygroscopic and dissolved readily and clear in water. In order to ascertain whether this was actually a compound or only a mixture the following experiments were made :—

(*a*) The solution was dialysed, when it was ascertained that both the manganous chloride and the peptone had passed through the membrane. (The corresponding iron preparation gives HCl and only traces of iron, behaving generally like a perfect colloid.)

(*b*) The solution gave the unaltered manganese reaction; with ammonia a white precipitate, becoming quickly brown, of manganous hydroxide; ammonium chloride may hinder this precipitation a long time. Soda solution behaves similarly; but neither it nor ammonia precipitates all the manganese, since the filtrate, after evaporation and incineration, still gives a strong manganese reaction. Peptone also is thrown down with the manganese.

(*c*) Similarly as in the case of iron peptonate the precipitation is hindered by the addition of but a very small quantity of ammonium or sodium citrate. Even after standing a day no precipitate is produced, but only a dark green colour.

It is worthy of mention that manganese chloride, without peptone, behaves similarly. Manganese chloride 5 parts, citric acid 10 parts, and 20 parts of ammonia gave an alkaline solution, but no precipitate. After evaporation there remained a white smeary mass having an acid reaction. This dissolved in water only partially, but completely upon the addition of nitric acid. Upon adding to this mixture 20 parts of peptone a dry gelatinous mass was obtained, showing a similar behaviour and not altered by an addition of ammonium chloride.

In comparing the manganese peptonate with the iron compound, its different behaviour on dialysis is especially noticeable. Further, the iron peptonate is precipitated as such from its aqueous solution by ammonia or caustic soda, whilst in the case of the manganese peptonate solution the precipitate that forms is at first white, but quickly turns brown, behaving therefore like manganous hydrate. As evidence of the existence of a compound there is only the fact that the manganese is not completely precipitated by ammonia or soda solution, and that not only manganese, but also peptone, is thrown down. The possibility that manganese and peptone treated in the manner described enter into organic combination is therefore not excluded, though evidently the combination is only a very loose one.

This result not being considered quite satisfactory, an examination was made of a "liquor ferro-mangani-peptonati" and an "essentia mangano-ferri peptonata" occurring in commerce, both of which were represented to contain 0·6 per cent. of iron and 0·1 per cent. of manganese. Analysis gave however much lower figures, 0·26 per cent. of iron and 0·0072 of manganese in one case, and 0·42 per cent. of iron and 0·036 per cent. of manganese in the other. Neither preparation was neutral, both showing a faintly acid reaction. As in the previously mentioned preparation, when submitted to dialysis, manganese and peptone passed through the membrane. The "essentia" being alleged to be non-precipitable by ammonia, it was suspected that this might be due to an addition of citrate, and the results of analysis pointed to the presence of ammonium citrate.

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[*] Abstract of a communication from the Helfenberg Chemical Manufactory (*Pharmaceutische Centralhalle*, June 5, p. 327).

[†] See *Pharmaceutical Journal*, [3], xviii., 749.

The author therefore gives the following formula:—

Liquor Ferro-Mangani Peptonati.

Acidi citrici . . . . 10·0
Dissolve in
Aquæ destillatæ . . . . 50·0
and neutralize with
Liquoris ammonii causticis, q.s., circa . 20·0
On the other hand, take
Ferri peptonati* . . . . 24·0
and bring it into solution by careful boiling with
Aquæ destillatæ . . . . 150·0
Add to the hot liquid the ammonium citrate solution and then a solution of
Mangani chlorati cryst. pur. ($MnCl_2+4H_2O$) . . . . 8·7
Aquæ destillatæ . . . . 10·0
Then add the following mixture:—
Aquæ distillatæ . . . . 500·0
Cognac . . . . 100·0
Tincturæ aromaticæ, P.G. . . . . . 1·5
Tincturæ cinnamomi Ceylon . . . . 0·75
Tincturæ vanillæ . . . . 0·75
Ætheris acetici . . . . gtt. 2
Finally bring the whole up to 1000 parts by weight, with distilled water.

It is important that in making this preparation the foregoing proportions be strictly adhered to. If for instance the iron peptonate be dissolved in a larger quantity of water there is produced upon the addition of either the ammonium citrate or the manganous chloride solution a precipitate which is only redissolved by further heating.

The liquor so obtained is described as being of a dark red colour, somewhat turbid looking in reflected light, but clear in transmitted light. In taste it is said to be more agreeable than the commercial samples examined, whilst it actually contains 0·6 per cent. of iron and 0·1 per cent. of manganese.

Attention was next directed to the preparation of neutral preparations of alkali and manganese, similar to the iron preparations already in use. The first experiments were made with manganic and manganous hydroxide, which were heated in various proportions with sugar and alkali, and with every known precaution, and the sugar was substituted by dextrin, inulin, mannite and milk sugar, but no soluble preparation could be obtained in this way. A better result however followed the use of manganic hydroxide containing potassium, obtained in the reduction of a solution of potassium permanganate by sugar or alcohol. Premising that in this case also it is necessary to adhere to the proportions empirically determined, the author gives the formulæ for three new preparations, called—

Mangani-Saccharat, Mangani-Mannitat and Mangani-Dextrinat.

Kalii permanganici purissimi . . . . 75·0
Dissolve by heat in—
Aquæ destillatæ . . . . 4500·0
When cool introduce under stirring
Sacchari albi pulv. . . . . 45·0
Or instead of the sugar mix the solution with
Spiritus . . . . 45·0
And allow the mixture to stand twenty-four hours. After this time wash the separated precipitate by decantation with distilled water until the washings when evaporated upon platinum no longer leave a residue. Collect the precipitate on a cloth and press, and then triturate with—
Sacchari albi vel manniti vel dextrini . . 900·0
Add—
Liquoris natrii causticis P.G. (sp. gr. 1·159) . 225·0
Heat the mixture in a covered vessel on a water-bath until a drop taken from it dissolves clear in water and finally evaporate to dryness.

The foregoing proportions are said to yield fully 100 parts of a 3 per cent. preparation. If instead of 900 parts of sugar, mannite or dextrin, only 225 parts be taken, a compound is obtained containing 10 per cent. of manganese.

The *Saccharate* (3 per cent.) is described as a brown powder, which readily dissolves in water to form a dark brown liquid. Concentrated solutions are stable; dilute solutions, on the contrary, throw out after a time some insoluble manganese saccharate, but not in the presence of larger quantities of sugar. Mineral acids precipitate from the solution first insoluble manganese saccharate, but on further addition a breaking up of the compound occurs, with formation of the corresponding inorganic salt, which goes into solution. Ammonium sulphide throws down the flesh-coloured manganous sulphide, ammonia and caustic alkalies produce no change. The passage of a current of carbonic acid for some time causes a precipitate. The reactions resemble those of the iron compound.

The *Mannitate* and *Dextrinate* show the same properties, except that the dextrinate is not precipitated by carbonic acid, and dilute solutions of it are stable without further addition of dextrin being necessary. Manganidextrinate appears therefore to correspond with the iron dextrinate in being the most stable of the compounds containing alkali. A similarity to the iron compounds is also shown by all three of these preparations in their behaviour towards citric acid, by which they can be neutralized without being thrown out of solution or decomposed.

In the oxidation of organic substances with potassium permanganate there is formed in neutral solution a precipitate, the composition of which Schmidt has represented by the formula $KH_3Mn_4O_{10}$, according to which it would contain 17·7 per cent. of manganese. In order to test whether this statement is correct and to determine the composition of the new compounds, the following experiments were made:—

2·5 grams of potassium permanganate having been dissolved in 150 c.c. of water, 1·5 gr. sugar was added; after twenty-four hours the resulting precipitate was filtered off and washed carefully. Excess of water was removed by pressing between blotting-paper, and the moist precipitate was triturated with 30 grams of powdered sugar, the mixture dried and the dried mass reduced to a powder. To determine the Mn and K in this powder, an aliquot was incinerated, the ash warmed with hydrochloric acid, and the dilute solution made alkaline with ammonia, and treated with sulphuretted hydrogen. The separated manganous sulphide was redissolved, and determined in solution as Mn_3O_4, and the potassium in the first filtrate as KCl according to the usual methods. In two determinations the results obtained were—

(1) 4·70 per cent. Mn_3O_4 and 0·54 per cent. KCl (=3·38 Mn; 0·282 K).

(2) 4·68 per cent. Mn_3O_4 and 0·52 per cent. of KCl (=3·37 Mn; 0·272 K).

To 100 parts of manganese, therefore, there were respectively 8·34 and 8·07 parts of potassium, or not quite half the quantity required for the formula given by Schmidt. The composition of the precipitate would probably vary with the kind of reducing agent, its proportion and degree of dilution, as well as with the course of the reduction and the temperature developed.

According to the proportion of the potassium found to the manganese the 3 per cent. preparation would contain 0·246 per cent. K.

The author in conclusion gives the following forms for the administration of manganese alone or combined with iron:—

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* The "ferrum peptonatum" referred to is the Helfenberg brand, information concerning the preparation of which will be found in *Pharm. Journ.*, [3], xviii., 707, 749.

Liquor Ferro-Mangani Saccharati.

(*a*) containing 0·2 per cent. Fe and 0·1 per cent. Mn.	
Ferri saccharati* (10 per cent.)	20·0
Mangani saccharati (10 per cent.)	10·0
Aquæ destillatæ	390·0
Syrupi simplicis	240·0
Spiritus cognac	340·0
(*b*) containing 0·6 per cent. Fe and 0·1 per cent. Mn.	
Ferri saccharati (10 per cent.)	60·0
Mangani saccharati (10 per cent.)	10·0
Aquæ destillatæ	410·0
Syrupi simplicis	180·0
Spiritus cognac	340·0
Aromatize both with	
Tincturæ aurantii corticis	3·0
Tincturæ aromaticæ P.G.	0·75
Tincture cinnamomi Ceylanici	0·75
Tincturæ vanillæ	0·75
Ætheris acetici	gtt. 2

Both liquors are said to be extremely pleasant to the taste; but if a less sweet preparation be desired the syrup may be partially or wholly replaced by water. In that case, however, the 10 per cent. manganese dextrinate should be used in the place of the saccharate, which without excess of sugar would undergo decomposition.

Extractum Malti Manganatum.

Mangani dextrinati (10 per cent.)	1·0
Dissolve with the aid of heat in	
Aquæ destillatæ	4·0
And mix the solution with	
Extracti malti	95·0

Extractum Malti Ferrato-manganatum.

(0·2 per cent. Fe and 0·1 per cent. Mn.)

Ferri dextrinati (10 per cent.)	2·0
Mangani dextrinati (10 per cent.)	1·0
Dissolve with the aid of heat in	
Aquæ destillatæ	7·0
And mix the solution with	
Extracti malti	90·0

Attention is called to the fact that only the dextrinates can be used in these preparations, on account of a small quantity of acid occurring in all malt extracts.

THE SOLUTION AND REDEPOSITION OF CARBONATE OF LIME BY SEA-WATER.

The following paragraphs bearing on this subject are taken from a paper by Messrs. J. Murray and R. Irvine, read before the Royal Society of Edinburgh and published in *Nature* for June 12:—

If we turn our attention to the solution of dead carbonate of lime in shells and coral skeletons by the action of sea-water, it will be found that the rate of this solution varies greatly according to the conditions in which these remains are exposed to the solvent power of the water. A large number of experiments have been conducted with the view of determining the solubility of carbonate of lime under its different conditions. It may be pointed out that the normal amount of carbonate of lime dissolved in sea-water is very small, strikingly so (0·1200 gram per litre) when compared with the vast amount of this substance continually being secreted from the sea by organisms. Sea-water can, however, take up 0·6490 gram per litre of carbonate of lime in an amorphous (or hydrated) condition, forming a clear supersaturated solution, but after a time not only the excess so added is thrown down, but also sometimes a portion of that normally present in the water itself. It would thus appear that it is unable permanently to retain in solution more of this substance than is usually found present in sea-water. This peculiarity of sea-water, after taking up a large amount of amorphous carbonate of lime, and throwing it out in a crystalline form, accounts for the filling up with crystalline carbonate of the interstices of massive corals in coral islands and other calcareous formations, so that all trace may ultimately be lost of their original organic structure. These experiments show a great diversity as to the amount of carbonate of lime which will pass into solution in sea-water from various calcareous structures in a given time. As a rule, the more definitely crystalline the substance is, the less it is soluble. Calcspar is less soluble than massive varieties of coral, and these again less than the more porous varieties. We have already indicated that amorphous or hydrated carbonate of lime is (in that condition) much more soluble than any other form of the substance. The rate of solution is also much greater when the water is constantly renewed, than when the same water remains in contact with carbonate of lime. The water quickly becomes saturated and unable to exert further solvent action. In this connection we found that different samples of sea-water from different localities possessed very different solvent powers. Especially was this the case between summer and winter waters, the former having distinct solvent action on coral skeletons, whilst with the latter there was hardly any. The lower specific gravity of winter waters may be regarded as to some extent reducing their solvent power, but this is more probably to be attributed to the absence of free carbonic acid—that is, carbonic acid in excess of what is required to saturate the free base in the sea-water as normal carbonate. To test this point, carbonic acid was added to one of these winter waters (which had no solvent action on coral), the quantity added not being sufficient to destroy its alkaline character. It was found that in these circumstances an appreciable amount had been dissolved.

This appears to indicate that there is more carbonic acid in summer than in winter waters in our latitudes, due probably to the increased activity of animal life. Mr. Buchanan's observations on board the *Challenger* show that the carbonic acid present in sea-water, over and above that necessary to form normal carbonate of lime, is subject to great variations. It appears that this is a much more effective agent in the removal of carbonate of lime from shells, etc., than the solvent power of sea-water itself (although artificial sea-water quite free from carbonic acid dissolves carbonate of lime). Buchanan's observations have also shown that carbonic acid as a rule is more abundant in bottom than in surface waters; and Reid's experiments show that carbonated sea-water under high pressure takes up more carbonate of lime than that at a normal atmospheric pressure. The fact that carbonic acid is more abundant in deep waters is evidently connected with the respiration, and also the decay, of the animals which live and die on the ocean floor; and also with the decay of those which fall from the surface. The water filling the deeper hollows has also in its passage to the equator passed over thousands of square miles of this floor covered with living animals, and as this water has a very slow motion, and is but slowly renewed, we would expect an accumulation of carbonic acid and deficiency of oxygen in these abysmal depths. When, therefore, carbonate of lime secreting animals die at the surface of the water and their bodies fall to the bottom, the shell is exposed to solution from the action of the sea-water through which it passes, and it may be to that of carbonic acid produced by the decomposition of its own organic matter. If the shell be thin, as in the case of heteropods and pteropods, it may be wholly removed before reaching the bottom, but the thicker shelled varieties tend to accumulate even in depths of 2000 fathoms, where they are soon covered up by other shells; and being surrounded by sea-water already saturated with carbonate of lime, are preserved from solution, and form vast beds of calcareous ooze. It is found that the amount of carbonate of lime present in such ooze is greater or less according to the depth of water through which the shells pass from the surface to the bottom, and also to the slow renewal of the water in contact with these great lime deposits. In the red clay area the carbonate of lime is almost entirely absent. The deeper waters which cover such areas are more active in the removal of carbonate of lime, not only because of the larger amount of carbonic acid they contain, but doubtless to the deoxidation of alkaline sulphates by organic matter, which gives rise to sulphuric acid, etc. At the same time account must be taken of the great pressure at such abysmal depths, and the fact that the substance of the shells being less compressible than sea-water, they would fall more slowly, and hence would be longer exposed to the action of the deeper layer of water than those near the surface.

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* See previous note.

What calcareous remains do reach the ocean floor at such abysmal depths represent the hardest and crystalline varieties of carbonate of lime which resist the solvent action of sea-water to the greatest extent.

In this way we appear to have a perfectly rational explanation of the partial disappearance of carbonate of lime shells from the shallower depths, and their total disappearance from all the greater depths of the ocean. It is to be observed that all those shells in which a considerable quantity of organic tissue is associated with the carbonate of lime disappear in solution more rapidly than the shells of the Foraminifera, which contain little organic matter. (During the whole of the *Challenger* cruise only two bones of fishes, other than the otoliths and the teeth, were dredged from the deposits, and all traces of the cetacean bones were removed, except the dense ear-bones and dense ziphioid beaks.) The remains of crustacean animals were almost wholly absent from deep-sea deposits, with the exception of Ostracode shells and the hard tips of some claws of crabs.

Turning now to the lagoons and lagoon channels of coral islands, it is believed that large quantities of carbonate of lime are in the same way being dissolved from these shallow basins as well as from the deposits of the deep sea, but under somewhat different circumstances. In the case of a shell falling to the bottom of the sea, it is continually brought in contact with new layers of water, which has the same effect as if a continuous stream of water were passing over the shell. In the case of the lagoons this last is what takes place. The water which flows in and out of the lagoons twice in twenty-four hours passes over great beds of growing coral, and from all the observations we have is largely charged with carbonic acid, owing probably to the large number of living animals on the outer reef over which the water passes on its way to the lagoon. This water passes continually over the dead coral and sand of the lagoon, and takes up and removes large quantities of carbonate of lime in solution (as well as suspension), for in these lagoons the spaces covered by dead coral *débris* always greatly exceed the patches of growing coral. Owing to the fact that the water of the lagoon is continually in motion and constantly renewed, the layer in contact with the bottom of coral sand can never become saturated or unable to take up more lime, as is apparently the case in the layers of water in contact with the Globigerina ooze and other calcareous deep-water deposits.

From the foregoing discussion and observations it is evident that a very large quantity of carbonate of lime is in a continual state of flux in the ocean; now existing in the form of shells and corals, but after the death of the animals passing slowly into solution, to go again through the same cycle.

On the whole, however, the quantity of carbonate of lime that is secreted by animals must exceed what is re-dissolved by the action of sea-water, and at the present time there is a vast accumulation of carbonate of lime going on in the ocean. It has been the same in the past, for with a few insignificant exceptions all the carbonate of lime in the geological series of rocks has been secreted from sea-water, and owes its origin to organisms in the same way as the carbon of the carboniferous formations; the extent of these deposits appears to have increased from the earliest down to the present geological period.

At the present time most of the carbonate of lime carried to the ocean by rivers has been directly derived from calcareous stratified rocks formed by organic agency in the sea in earlier geological ages, but the calcium in these formations was in the first instance derived from the decomposition of the lime-bearing silicates of the earth's original crust, and this decomposition, which is still going on in the sea and on the land surfaces is a continuous additional source of carbonate of lime.

In considering the analyses showing the average composition of sea salts, one is struck with the relatively small quantity of those very substances which are extracted so largely from sea-water by plants and animals, viz., carbonate of lime and silica. Siliceous deposits are of vast extent, yet silica occurs merely in traces in sea-water; carbonate of lime deposits are of vastly greater magnitude, yet carbonate of lime makes up only $\frac{1}{100}$th part of the saline constituents of sea-water, and only $\frac{1}{3300}$th part of the whole bulk of sea-water. Sulphate of lime is ten times more abundant than the carbonate in sea-water; on the other hand, the river water that is poured into the ocean contains about ten times as much carbonate as it does of sulphate of lime.*

The total amount of calcium in a cubic mile of sea-water is estimated from analyses to be 1,941,000 tons, and the total amount of calcium in the whole ocean is calculated at 628,340,000,000,000 tons. The total amount of calcium in a cubic mile of river water is estimated at 141,917 tons, and the total amount of this element carried into the ocean from all the rivers of the globe annually is estimated at 925,866,500 tons. At this rate it would take 680,000 years for the river drainage from the land to carry down an amount of calcium equal to that at present existing in solution in the whole ocean. Again, taking the *Challenger* deposits as a guide, the amount of calcium in these deposits, if they be 22 feet thick, is equal to the total amount of calcium in solution in the whole ocean at the present time. It follows from this that if the salinity of the ocean has remained the same as at present during the whole of this period, then it has taken about 680,000 years for the deposits of the above thickness, or containing calcium in amount equal to that at present in solution in the ocean to have accumulated on the floor of the ocean. From the data here furnished a number of other interesting speculations might be indulged in, relating to the amount of carbonic acid that has been abstracted from the atmosphere and fixed in carbonate of lime deposits; the total amount of disintegration of lime-bearing siliceous rocks measured in terms of the calcium at present existing in solution in water and fixed in calcareous deposits; the relative proportions of substances secreted from the ocean as compared with other materials derived from the direct disintegration of the land-forming deep-sea deposits; and the apparent accumulation of carbonate of lime formations towards the equatorial regions of the globe.

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* Murray, "Total Rainfall of the Globe," *Scot. Geogr. Mag.*, 1887.

LIQUID KINO.*

BY J. H. MAIDEN, F.L.S., F.C.S.,

Curator of the Technological Museum, Sydney.

Angophora intermedia (D.C.), the narrow-leaved apple tree, is a tallish tree, which extends from Victoria to Queensland, and is the only species of the genus which is found in the southern colony. In the following respect it is perhaps unique amongst Australian trees. Frequently, when an incision is made into the bark, and more particularly when the knobby excrescences sometimes found on this tree are cut, there exudes a watery liquid, which occasionally is almost as clear and as colourless as water, and at other times of an orange-brown or reddish-brown colour, and of the consistency of a thin extract, or even as thick as treacle. This is doubtless the substance which was sent from New South Wales to the Paris Exhibition of 1867, labelled "apple-tree juice," with the statement that it is used as a varnish; but this is not correct, as the liquid is aqueous. It is used by fishermen for tanning their nets. Mr. Kirton informed Baron von Mueller that a single tree will yield as much as 2 gallons of liquid, which is generally called "liquid kino." This is a modest computation, for the tree which yielded the Bangley Creek sample (*infra*) yielded from 8 to 10 gallons. The quantity is, in any case, by no means small, and is dependent on a variety of circumstances.

Two samples of this "liquid kino" having recently been forwarded to the Technological Museum, the author has had an opportunity of examining it.

1. From Bangley Creek, Cambewarra, N.S.W., of a clear reddish-brown colour, and in order to give precision to the tint, it is very like raw linseed oil, Strassburg turpentine, or dark balsam of copaiba, but redder than any of them. It has a specific gravity of 1·008 at 60° F., and an acidulous smell (owing to the presence of acetic acid), accompanied by an odour not so pleasant and reminding one somewhat of spent tan liquors. It deposits a quantity of sediment of a buff colour, consisting almost entirely of catechin. It contains tannic acid ·772 per cent., "non-tannin" ·508 per cent. (Löwenthall's process). The water amounts to no less than 98·3 per cent. The catechin was not estimated in this sample.

2. This was obtained from Cambewarra, but from a different locality. It is darker in colours than the preceding sample, being of a rich ruby colour. Like No. 1, it deposits a small quantity of sediment (catechin). This liquid kino had a specific gravity of 1·022 at 60° F., when received in April, 1888.

The following results were obtained in December to January, 1889:—Tannic acid 3·048 per cent. (of the liquid kino, without evaporating), "non-tannin" 1·27 per cent. (a portion of liquid kino, kept in agitation so as to obtain a fair proportion of sediment, was added to water to make up the strength of 1 grain of liquid kino to the litre), water 96·7 per cent. (after filtration from deposited catechin). The catechin and a little phlobaphene filtered off, were found to be in the proportion of ·495 per cent. of the original liquid kino. Ether agitated with the filtrate took up ·15 per cent., of which one-third was estimated to be catechin, and the rest resin.

Mr. Kirton has recorded liquid kino from the Illawarra district of New South Wales, but since there appears to be no reason why it should be found in one colony more than another, it will doubtless also be obtainable in Victoria, most likely on application to fishermen.

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* Read before the Royal Society of Victoria, July 11, 1889. Communicated by Baron Ferdinand von Mueller, K.C.M.G., F.R.S., etc.

ON SOME RELATIONS BETWEEN HOST AND PARASITE IN CERTAIN EPIDEMIC DISEASES OF PLANTS.*

BY H. MARSHALL WARD, F.R.S.

Professor of Botany, Royal Indian Engineering College, Cooper's Hill.

INTRODUCTION—RELATIONS BETWEEN PHYSIOLOGY AND PATHOLOGY.

I thought I could not better respond to the honour of the invitation to give the Croonian Lecture this year than by choosing a subject from the domain of plant pathology, which should, at least, have the merit of being of general interest and importance, and it seemed probable that an account of some of the more conspicuous features and recent results of the study of certain fungoid diseases might be so placed before you that it should illustrate not only the kind of progress which plant pathology is making, but also show how dependent that progress is, and must be, on the advances of physiology. Moreover, I hope to be able to demonstrate that the connection between these two modern branches of science is (in botany, at any rate, and I have no reason to doubt that the truth applies to the animal kingdom as well) so close and so mutual that the problems which arise daily appeal to students of both departments, and necessitate that each shall know what the other is about. This, of course, is not the same as saying that either branch of study is deficient in its special questions; but it cannot be too much insisted upon that, while the facts and generalizations of pathology often throw light on physiological questions, the inquirer into the pathology of plants has to pause at almost every step and ask some question in physiology, and his progress may be slower or more rapid in proportion as the answer is obscure or the reverse.

For, after all, the pathology of plants embraces those phenomena of abnormal life-processes which can go on in the long series of changes between normal, healthy, vigorous life, and the cessation of that life as such, *i.e.*, death; and it is obviously impossible to study these abnormal life-processes (pathological) without reference to the normal ones (physiological). In other words, then, pathology is the study of disturbed or abnormal physiological processes, and I thought that it would be possible to interest you in some of the phenomena of abnormal plant-life, and especially in the working of some of these factors which result in producing certain diseases, in which fungi play the prominent part, and which occasionally assume the nature of epidemics so suddenly that the phenomena continually prove too much for the inherent credulity of those who are not in the habit of investigating complex chains of causation, and give rise to speculations of the most superstitious description.

THE DISEASES OF PLANTS AND THEIR CLASSIFICATION, ETC.

The diseases of plants have been classified in various ways, at different times, and by different observers. Passing over the earlier attempts,† based for the most part on errors which were natural at the time, but some of which seem almost incomprehensible now, as some of our present errors will appear in the future, it may be said that no very exhaustive survey of these diseases as a whole was possible until comparatively recent times. The successive attempts of modern authors‡ have been almost entirely along one or other of two lines; they have classified the diseases either (1) according to the symptoms externally visible and the organs attacked, or (2) according to the causes which seem most concerned in producing the disease.

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* Croonian Lecture. From the 'Proceedings' of the Royal Society.

† An excellent account of the earlier writers appeared in the *Gardeners' Chronicle*, 1854, from the pen of the late Rev. M. J. Berkeley, F.R.S.

‡ The literature is for the most part in Hallier's 'Phytopathologie,' (1868) Frank's 'Krankheiten der Pflanzen,' (1880) and Sorauer's 'Pflanzenkrankheiten,' (second edition) 1886.

Whichever method is adopted, it is repeatedly found that large assumptions have to be made and recognized in order to bring given diseases into the sphere of treatment for the time being, and difficulties of very peculiar nature continually make themselves felt.

As an instance, we may take the well-known symptom of the appearance of yellow leaves. Not only are yellow leaves characteristic of many diseases due to fungi of the groups Uredineæ and Ascomycetes (*Peziza*, *Hysterium*, *Polystigma*, etc.), or to the attacks of insects (*e.g.*, Aphides), but they may indicate "something wrong" at the roots—want of drainage, over-drainage, or lack of some ingredient such as iron, or the presence of some noxious mineral, to say nothing of parasites (*Phylloxera*, *Melolontha*, *Agaricus melleus*, etc.).

In cold weather in the spring yellow leaves may mean that the temperature is too low for the production of the green chlorophyll; while frost is responsible for the yellowing of other leaves by a totally different procedure—the acid substances in the cells are enabled to diffuse through to the chlorophyll corpuscles and kill them.

Yellow leaves often indicate the access of too little sunlight, but they may be produced by too intense insolation and consequent destructive changes in the cells.

Leaves injured by acid gases and poisonous substances in smoke also turn yellow, and the yellow hue of autumnal leaves is well known, while we have numerous yellow varieties of leaves among cultivated plants, the causes for which are less clear.

These are by no means all the cases observable, but they will suffice to show how little can be inferred from a symptom which may be due to so many causes, operating alone or in combination, be it said. In fact, as a symptom, the yellowing of leaves is of scarcely any classificatory value, and we are driven to the conclusion that the leaves of plants react to most injuries by turning yellow.

It is much the same with other classes of disease named after the prominent symptoms. What is usually termed "canker," for instance, is in different cases referred by different authorities to the agency of excessively low temperature (frost[*]), or of insects,[†] or of fungi,[‡] or of two of these combined, to say nothing of other causes. If we now ask how the matter stands with regard to the method of classifying diseases of plants according to their chief causes, the answers are no clearer. It is the custom to proceed somewhat as follows:—

There are, *first*, diseases due to the action of the non-living environment (soil, climate, mechanical injuries, etc.), and, *secondly*, diseases due to the attacks of living beings (parasitic insects, fungi, etc.).

Now leaving out of account altogether certain totally unexplained diseases, such as some forms of "gumming," etc., it becomes apparent that we are liable to all kinds of errors unless we recognize that no one factor ever accounts for a disease; it is not so obvious, however, that the changes which result in disease are usually due to several factors acting in concert or successively, and I shall try to show that, even in marked cases, it is by no means easy to decide which of the co-operating factors are to be brought into the foreground, though until this is decided it may be a hopeless task to consider prophylactic measures. As examples of the complex interactions that may be met with in the first group of diseases as arranged above, we might consider the following:—

A soil is said to be unsuitable as regards aspect, or elevation, or steepness, but it will be evident that the degree of unsuitableness may vary with the depth and structure of the soil, and with the latitude, the proximity of mountain ranges or the sea, and other factors which influence the climate; instances of disease, in the broad sense of the word, are frequent enough where two neighbouring crops or growths of the same species of plant suffer in very different degrees, owing to slightly different combinations of such factors of the environment; and the difficulty of referring the disease more especially to any one cause only increases with experience. Or, take the structure, etc., of the soil. It may vary in chemical composition, in capacity for retaining water, in physical texture, and so forth; and the enormous differences to be met with are best known to those who have to cultivate large estates or continuously observe large tracts of country. But it is matter of general experience that the chemical composition of a soil is one of its least important features within wide limits; much more important is the amount of water and air in it, and the way they are held there. These, especially under certain crops, affect the climate of the immediate locality, and all kinds of complexities result. To mention one only, there are certain combinations of soil and climate, etc., which result in the trees being "frost-bitten" whenever there are late spring frosts. In some cases it is found that mere drainage puts an end to the evil; this means not only a removal of water, but an increase of air in the soil and general elevation of temperature. In others it is noticed that the more shaded trees suffer most; this is in part because their tissues are more watery, and their cell-walls more delicate. In others the injury occurs on a particular side of the tree, and is ruled chiefly by the prevailing winds. Now, here is a problem of considerable complexity. Frost (*i.e.*, too low a temperature) is the agent directly concerned, but it accomplishes the injury because the shoots are too succulent, and the tissues too feebly developed, to resist a temperature which they would be perfectly able to resist if more carbohydrates had been formed under a brighter light, and if less water containing more oxygen had ascended their stems, and so forth.

It is at least difficult to class such cases, and they arise every day. Who would have suspected that one result of bringing the larch down from its mountain home would be to render it more liable to injury from certain pests kept in abeyance on its native Alps, because it is stimulated to put forth its young leaves when the insects are about which puncture the cortex and afford means of entrance for certain parasitic fungi?

On turning attention to the diseases referred to the action of living organisms, we meet with difficulties rather greater than less, and it is chiefly on account of these that so many wild hypotheses are current as to this class of diseases.

Omitting more than a mere reference to the diseased or weakened conditions due to competition with weeds, and with overbearing associates, such as *Thelephora laciniata*, which may overshadow young conifers, and eventually kill them simply by depriving them of light,[*] and to the various parasitic phanerogams such as *Loranthus*, the mistleto, dodder, etc.,[†] we come to an enormous series of diseases due to parasitic insects (and other animals) and fungi.

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[*] Sorauer's 'Pflanzenkrankheiten,' vol. i., 1886, pp. 305—448.

[†] Frank, 'Krankheiten d. Pflanzen,' 1880, p. 719.

[‡] Hartig, 'Lehrb. d. Baumkrankheiten,' pp. 89 and 109.

[*] R. Hartig in 'Untersuchungen aus d. Forstbot. Institut zu München,' 1880. p. 164.

[†] See Solms-Laubach, 'Ueber den Bau und die Entwicklung der Ernährungsorgane paras. Phaner' ('Pringsheim's Jahrbücher,' vol. vi., 1867—8, p. 509).

The chief difficulty connected with the investigation of diseases induced by fungi is due to the double set of complications involved. It is difficult enough to unravel the tangled skeins of causes and effects in the case of the comparatively simple diseases referred to above; but when the problem consists in disclosing the life-history of a microscopic fungus on the one hand, and then in discovering its relations to the plant (the biology of which is always assumed to be known) on or in which it passes the whole or part of this life-history, on the other, the matter rapidly attains unexpected proportions. Yet this is never the whole, or necessarily the major part, of the *real* problem—the nature of the disease—and before that can be even approximately solved we have to obtain an insight into the influence of the non-living environment on both the host-plant and the parasitic fungus, an inquiry which may assume appalling proportions before it is far advanced.

Nor is this the end, though it is quite sufficient to account for the fact that we never know all about any of these diseases.

There is a factor—or set of factors—which always tends to baffle the inquirer into these matters, and that is the internal disposition[*] of the parts of the organisms concerned; call it what we will—constitution, inherited disposition, etc.—the fact remains that the host-plant and the parasite alike exhibit peculiarities of behaviour that cannot be explained in the present condition of science as directly due to the action of any external agency of the environment, although we are no doubt right in concluding that it is the outcome of the cumulative results of the vicissitudes of the species and its ancestors in the long past.

But it is just the reactions of this constitution, and its variations induced by changes in the physical environment, which are so often and so persistently overlooked, although the attempt to understand any disease is hopeless unless we take them into consideration. I hope to show, in the course of this lecture, how the modern study of the pathology of plants differs in methods from that of our predecessors, especially in this very particular—the recognition of the reactions of the host to its living and non-living environment, as opposed to the reactions of the parasite to *its* living and non-living environment, and, further, of the truth that disease is the outcome of a want of balance in the struggle for existence just as truly as normal life is the result of a different poising of the factors of existence.

Of course, inasmuch as the abnormal state of affairs, while detrimental to the host, is the best possible for the parasite, we have here the elements of a paradox. But there is no real confusion of ideas here; we are concerned with a particular case, illustrative of the struggle for existence, in which a given set of variable factors of the environment favour one organism at a time when they disfavour another.

THE HOST-PLANT AND THE BEHAVIOUR OF ITS NORMAL TISSUES.

I begin by briefly calling attention to the healthy tissues of a normal green flowering plant, and we need only consider for the moment what is going on in the parenchyma cells of a leaf or stem, such as everyone knows the anatomy of. In a selected piece of such tissue we find the mass cut up into a number of thin-walled chambers, the cells, each of which contains a lining of living, colourless protoplasm, with strands or plates of the same running across; in this protoplasm are embedded the nucleus and the green chlorophyll corpuscles. In the large vacuoles or sap-cavity of each cell is a clear liquid, the cell-sap, consisting of water with small quantities of mineral salts, dissolved gases, organic acids, and salts and other crystalline and non-crystalline substances in various proportions at different times.[*] Of course, I need not here enter into a long description of the histological peculiarities of the cell, and it will probably suffice to remind you that great differences occur in detail as to the size of the cell, the thickness of the wall, number and sizes of the chlorophyll corpuscles, and the presence or absence of colouring matters, crystals, various organized bodies, and so forth. Finally, it will be remembered that all the parts—cell wall, nucleus, chlorophyll corpuscles, and protoplasm generally[†]—are more or less thoroughly saturated with water, and that aqueous vapour and gases will be found in varying proportions in the passages between the cells, and continuous with the atmosphere on the one hand, and with the water in the roots and soil on the other.

Let us now inquire what these normal living cells are doing when they still form an integral part of the tissues of the healthy plant.

In the first place they are respiring. That is to say, the protoplasm absorbs oxygen gas[‡] brought to it in the water from the roots, from the intercellular spaces which communicate with the atmosphere by means of stomata and lenticels, and from the chlorophyll corpuscles when they are assimilating in bright light. The oxygen enters in solution into the protoplasm, and combines with some of the bodies which for the time being enter into the composition of this complicated structure. The effects of these unions of the oxygen are expressed in molecular disturbances in the protoplasm; some bodies are broken down, others enter into new unions. Finally, the disturbing actions of the energetic oxygen result in the combustion of certain carbon compounds to carbon dioxide and water, and these escape from the field of action: such combustion implies the liberation of energy, and we recognize this in the complicated movements and life-processes set up in the protoplasm and in the rise of temperature, which can be proved to take place.[§] One point of importance should be insisted on from the first. When the oxygen-molecule enters the protoplasm it must be pictured as coming into a busy arena, where numerous but definite possibilities are presented to it, and although we are not in a position to trace its movements,[‖] and the intermediate effects of these, in detail, the evidence shows that while the quantities produced accord with the general view that it is such substances as glucose, and similar carbohydrates, which yield the fuel and energy—as they do in ordinary combustion—nevertheless, we must not fall into the error of supposing that so much sugar or starch in the protoplasm is forthwith and simply oxidized to carbon dioxide and water, nor may we conclude that the process is one of simple and direct oxidation at all.[¶]

(*To be continued.*)

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[*] Sach's 'Lectures on the Physiology of Plants,' pp. 189—204.

[*] On the subject of the extreme complexity of the cell-sap and protoplasm, see Pfeffer, 'Beiträge zur Kenntniss der Oxydationsvorgänge in lebenden Zellen' ('Abandl. Math.-phys. Classe Sächsischen Gesellsch. d. Wiss.,' vol. xv., 1889, pp. 455—466).

[†] For particulars as to these, *cf.*, *e.g.*, Zimmermann, 'Die Morph. und Physiol. der Pflanzenzelle;' Schenk's 'Handbuch,' vol. iii., Heft 2, pp. 497—700; and Noll, 'Die wichtigsten Ergebnisse der botanischen Zellenforschung in den letzten 15 Jahren' ('Flora,' 1889, pp. 155—168).

[‡] *Cf.* Sachs, 'Lectures on the Physiology of Plants,' pp. 395—408; Vines, 'Physiology of Plants,' pp. 195—202; Pfeffer, 'Pflanzenphysiologie,' vol. i., pp. 346—368.

[§] Rodewald, *Pringsheim*, *Jahrb. f. wiss. Bot.*, vol. xvii., 1886, p. 338; vol. xix., 1888, p. 221.

[‖] It may be regarded as certain that for respiration it does not suffice for a body to be merely in the protoplasm (see Pfeffer, 'Oxydationsvorgänge,' pp. 489—490).

[¶] For the older literature, see Pfeffer, 'Pflanzenphysiologie,' vol. i., p. 353; Sachs, 'Lectures on the Physiology of Plants,' pp. 395—408; and Vines, *op. cit.*, p. 214.

The Pharmaceutical Journal.

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SATURDAY, JULY 12, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE SALE AND USE OF METHYLATED SPIRIT.

IT is evident from the remarks made in the course of the discussion raised by Mr. AITKEN's letter, at the late meeting of the North British Branch Executive, and from questions asked at the meeting held last week at Brixton, that there is still some misconception prevailing in the minds of chemists as to the regulations affecting the sale of methylated spirit by retail, and also as to those relating to the use of methylated spirit in any art or manufacture by those who sell this spirit retail. The various regulations in question are scattered through a number of general orders issued by the Board of Inland Revenue, and although these are annually published in the Calendar of the Pharmaceutical Society, together with any additions or alterations that are made from time to time, it will probably be an advantage to some of our readers and to members of the trade generally, to give in a more connected form a statement of the requirements that have to be complied with by retailers of methylated spirit, and those who, holding a licence to sell it by retail, also desire to make use of methylated spirit in any art or manufacture. We are induced to do this by the view expressed in Mr. AITKEN's letter (see p. 1067), that a great majority of chemists are in ignorance contravening the law daily. If that be the case, it is obviously very desirable that they should be made fully acquainted with the facts of the case, and we venture to think that if they be fully considered in all their bearings, it will be found that there is little difficulty or inconvenience to be apprehended from compliance with the existing regulations. In the first place it must be remembered that the permission to use spirit free of duty in the form of methylated spirit is a concession granted by Parliament for the convenience of the public, and to meet the necessities of certain manufacturers. That being the case it is evidently requisite that the sale and use of methylated spirit should be conducted under such precautionary conditions as will prevent its misapplication and protect the revenue as well as manufacturers from disadvantages that would result to both from any abuse of the privilege intended to be conferred.

For the present purpose it is only necessary to consider the regulations relating to the retail sale of methylated spirit. The licence for selling it now costs ten shillings and it holds good for one year from the 1st October, on which date it is renewable. The obligations specified in the Spirits Act, 1880, as being entailed on the holder of this licence are 1, that he must inform the Commissioners of Inland Revenue as to each room or place where he intends to keep or sell the spirit; 2, that he must not keep or sell it in any place that is not so entered; 3, that he must not receive or have in his possession at any one time more than fifty gallons of the spirit; 4, that he must obtain the spirit only from an authorized methylator or from another retailer, and in the latter case only to the extent of one gallon at a time; 5, that he must not sell more than one gallon at a time to, or for the use of, one person; 6, that on the request of an excise officer he must at all reasonable times produce his stock of the spirit for examination; 7, that he must keep an account in prescribed form of his stock of the spirit and of his sales of it. For contravening any of these regulations the Act provides that a retailer renders himself liable to a penalty of fifty pounds and to forfeiture of the spirit in respect to which any such offence is committed. These regulations present a somewhat formidable appearance in the Spirits Act, but it is considered by the Inland Revenue authorities that they are not at all in excess of what is necessary for the protection of the revenue from the possibilities afforded for fraudulent practices by allowing the use of duty free spirit. As regards the administration of the Act, moreover, it does not appear that these regulations have ever been enforced in a harsh manner. In another section of the Spirits Act there are provisions by which persons selling methylated spirit as or for a beverage are made liable to a penalty of one hundred pounds. A similar penalty would also be incurred by persons preparing methylated spirit for use in any way as a beverage, or using it in the preparation of any article capable of being used wholly or partially as a beverage or internally as a medicine, and any person having in his possession any such article in the preparation of which methylated spirit or any derivative thereof has been used would be liable to the same penalty. For chemists, this is a very important section of the Spirits Act, and its terms are such as to allow the use of methylated spirit in the preparation of certain liniments for external application that are sometimes required for public institutions at the reduced cost which the use of methylated spirit admits of. Formerly it was only soap liniment and compound camphor liniment that were recognized as coming within the terms of this exemption, but some years ago it was pointed out in this Journal that aconite and belladonna liniments are equally, if not still more, entitled to the exemption, inasmuch as they cannot be used as a beverage or even internally as medicine. On that ground it was contended that the law did not apply to those preparations, and when that view was submitted to the Commissioners of Inland Revenue by the Council of the Pharmaceutical Society its justice was admitted. It must, however, be understood that though the use of methylated spirit in the preparation of any of these four liniments does not constitute a breach of the excise law, it is permissible only in cases where such preparations are specifically demanded, and even then the liniments must not be described as B.P. preparations. Mention has lately been made of interference with the preparation of opium liniment with methylated spirit, and this has been considered a hardship. At first sight it seems to be, since it may be held that opium liniment is as little capable of being used as a beverage as the soap liniment it contains, and not very likely to be used internally as a medicine. But this latter use is not altogether impossible, and on that ground alone opium liniment must be regarded as coming within the prohibitory terms of the Spirits Act. There is, however, another consideration that is still more important, especially from the Excise point of view; for though tincture of opium is evidently a preparation for which methylated spirit must not in any case be used, a recognition of opium liniment as being exempt from the provisions of the Act, would be a tacit admission that tincture of opium might be prepared with methylated spirit, inasmuch as it constitutes one-half the volume of opium liniment. It is on that ground and also on account of certain transgressions of the law that the Excise authorities have decided to withdraw the permission that had been granted for making methylated opium liniment.

Since the use of methylated spirit is liable to be abused, it is considered by the Excise authorities necessary that they should be made aware of the places where it is being used, and for that reason the Act provides that the premises of every maker, retailer or user of methylated spirit shall at all times be open to the inspection of their officers. In the case of retailers who desire also to use methylated spirit in any art or manufacture, there is a further provision in the Spirits Act and in the General Order of 21st July, 1888, that they must first obtain permission to do so from the Board of Inland Revenue. It is also provided that security shall be given, in the shape of a bond, that the spirit shall not be used for any other purpose than the art or manufacture, and that the provisions of the Act as well as the prescribed regulations will be observed. Any licensed retailer of methylated spirit who uses the spirit for making finish, varnish, French polish, the liniments above mentioned, or any other purpose is required to obtain this permission in order to protect himself from liability to interference. It is, we believe, readily granted, unless there be strong reasons to the contrary, and the object of the Board of Inland Revenue in requiring that this regulation shall be complied with is simply that the officers of the Board may have cognizance of the persons who use methylated spirit, and of the places where it is used for manufacturing purposes. By a General Order that has recently been issued this year it is provided that retailers of methylated spirit using the spirit in any art or manufacture and keeping a stock of it not exceeding fifty gallons, need not give the bond above referred to; but in all such instances the Board's permission to use the spirit must be obtained. This latter requirement is not new, and if, as Mr. Aitken believes, many chemists are not complying with it, the foregoing explanation will suffice to show that there is need for altering their position in this respect. It is not a case in which there is any possibility of placing the use of methylated spirit in the making of varnish or French polish in the same position as its use for making belladonna liniment. The latter application is altogether outside the Spirits Act, but the former is specifically and necessarily subject to its provisions. In reference to the questions put at the Brixton meeting it may be added that the possession of a licence to sell methylated spirit by retail does not confer a right either to sell or to make the methylated liniments, nor is a licence requisite for either purpose. The holder of such a licence, however, is to a certain extent debarred from making those liniments, since he can only do so lawfully when he has permission from the Board of Inland Revenue. A chemist who has no licence for retailing methylated spirit can make methylated liniments without that permission, because the making of them is in itself outside the Spirits Act, and the need for permission arises only when a retailer of methylated spirit desires to carry on that manufacture.

THE SOCIETY OF CHEMICAL INDUSTRY.

Pharmacy itself is so notable an instance of applied science that it is only natural its followers should regard with a certain amount of interest the proceedings of a society having for its object a greater extension of the application of scientific principles to the every day work of British industries. The Society of Chemical Industry has not yet quite completed its first decade, but its inception so manifestly fitted a want of the time that from its first foundation its future was assured, and under the management of capable men it has already become a vigorous organization of upwards of two thousand five hundred members. On

Wednesday it met under the Presidency of Sir Lowthian Bell, in the fine chemical theatre of the University College, Nottingham, the very existence of which building is a remarkable illustration of the increased recognition of the value to the community of scientific teaching, it having been built, as stated with pardonable pride by the Mayor, at the expense of the town for the benefit of the town.

As a rule the Presidents at similar meetings have been men eminent in some great industry, who have, in their addresses, been able to illustrate the benefits following the displacement of the "rule of thumb" by the reign of science. On Wednesday the occasion was not an exception, Sir Lowthian Bell having had an almost unique experience in the iron industry, which enabled him to tell with authority the story of the application of chemical principles to the smelting of iron ores. As remarked by Mr. E. Rider Cook, the Honorary Treasurer, when proposing subsequently a vote of thanks, there is no very close association in the popular mind between the blast furnace and the principles of chemistry, but their application to its management has nevertheless been justified in an improved product and an economy in the consumption of fuel. Sir Lowthian Bell himself put the case of the importance of chemical principles to the ironmaster very aptly, when he pointed out that soda ash, the product of another great industry which specially appropriates the adjective "chemical," might contain as much as 15 per cent. of foreign substances without being adversely affected as an alkali for most of the purposes for which it is required, whilst a sample of pig iron that contains no more than one part in two thousand of impurity would be rejected by the Bessemer manufacturer as unsuitable for the making of steel.

Perhaps one of the principal lessons taught by the experimental results recorded in the address, was the necessity for caution in drawing inferences, so that they shall not be too sweeping. Thus, for instance, it might seem not to be a very difficult task to ensure the pretty complete conversion of carbon into carbon dioxide; but the results obtained show that the conditions for this do not exist even in the most improved blast furnaces, where about 40 per cent. of the fuel still escapes oxidation beyond the monoxide stage. Another instance mentioned was the limitation of the size of the furnaces to a capacity which cannot be exceeded with economy, at least with regard to the quantity of fuel burnt. Then some experiments were briefly referred to, which seemed to point to the conditions under which the deoxidizing action of the carbon monoxide or the oxidizing action of the dioxide might alternately preponderate, and the opinion was expressed that in the most perfect furnaces of the day the conditions are approximated to which ensure the best relations of these antagonistic influences. The address wound up by showing that the imperfect oxidation of the fuel in the blast furnace does not result altogether in a loss, since the carbon monoxide is burnt to heat the boilers and the hot air stoves, whilst the heat of the gases escaping at the chimneys, and even that of the slag, is now utilized in the evaporation of brine.

We have been requested to mention in reference to the meeting held at Brixton last Thursday evening that owing to the superabundance of matters to be discussed it was inadvertently omitted to move a resolution to thank the originators of the meeting, Mr. Bascombe and his colleagues, Messrs. Bate, Powell and Robinson, for their exertions in getting together such a large number of South London chemists. There is, however, no doubt of the fact that the value of their services in that respect was fully appreciated by all present.

* * *

We understand that in response to invitations that have been received in one case from the chemists of the three towns of Plymouth, Devonport and Stonehouse and in the other from the chemists of Exeter the President of the Pharmaceutical Society intends to be present at meetings which will be held at those places towards the end of the present month. Mr. Balkwill, of Plymouth, has, we believe, for some time past, taken an active part in suggesting the holding of such meetings, not only there but also at other places throughout the country, and there is every reason for thinking that the adoption of such a course would be very beneficial in promoting the interests of chemists by establishing more harmonious relations between individuals engaged in the business and inducing a sounder appreciation of the advantages to be derived from connection with the Pharmaceutical Society, as well as a recognition of the fact that the support of the Society as a representative body is a duty which every member of the trade should fulfil.

* * *

The Pharmacy Act (Ireland) Amendment Bill was on Thursday, the 3rd inst., read a third time and passed in the House of Commons and on the following day was read a first time in the House of Lords.

* * *

Dr. A. P. Luff, a former Bell Scholar and Pereira Medallist, has been appointed Physician to the Out-patient Department of St. Mary's Hospital, Paddington.

* * *

We have pleasure in stating that Mr. William Kirkby, Pharmaceutical Chemist, was last week elected Assistant Lecturer in Materia Medica and Pharmacy at Owens College, Manchester.

* * *

From a paragraph in the Cape *Argus* of June 4, it appears that the Attorney-General of Cape Colony, Sir T. Upington, has introduced a Bill into the Legislature providing for the licensing and registration of medical practitioners, apothecaries, dentists and chemists and druggists entitled to practice their respective callings in the colony.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

July 8, 1890.

The following are the questions that were set for this examination:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin*:—

1. Both the boy and the girl were being taught by the master.

2. The king opens the gates of the city with his own hand.

3. This message being received, some were filled with joy, others with fear.

4. Crassus told his slave that he would give him five talents.

5. We must take care not to act unjustly.

II. Translate into English either A. (Caesar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CAESAR.

1. Nam ne ejus supplicio Divitiaci animum offenderet, verebatur. Itaque priusquam quicquam conaretur, Divitiacum ad se vocari jubet et, quotidianis interpretibus remotis, per Caium Valerium Procillum, principem Galliae provinciae, familiarem suum, cui summam omnium rerum fidem habebat, cum eo colloquitur; simul commonefacit, quae ipso praesente in concilio Gallorum de Dumnorige sint dicta, et ostendit, quae separatim quisque de eo apud se dixerit; petit atque hortatur, ut sine ejus offensione animi vel ipse de eo, causa cognita, statuat, vel civitatem statuere jubeat.

2. Denique hos esse eosdem, quibuscum saepenumero Helvetii congressi, non solum in suis sed etiam in illorum finibus, plerumque superarint, qui tamen pares esse nostro exercitu non potuerint. Si quos adversum proelium et fuga Gallorum commoveret, hos, si quaererent, reperire posse, diuturnitate belli defatigatis Gallis, Ariovistum, quum multos menses castris se ac paludibus tenuisset, neque sui potestatem fecisset, desperantes jam de pugna et dispersos subito adortum, magis ratione et consilio, quam virtute, vicisse.

Grammatical Questions.—For those only who take Caesar.

1. Decline through all cases of the plural only—*suum familiarem*; and through all cases of the singular only—*Galliae provinciae, omnium rerum.* (Par. 1.)

2. Give the principal parts of all the verbs in paragraph 2.

3. Account for the moods of *offenderet, vocari, dicta sint, jubeat*; and explain the construction of *quotidianis interpretibus remotis.* (Par. 1.)

4. Write down the Latin for—*a million, the thirty-seventh, each one of us, three hundred of us, twenty sesterces apiece.*

B. VIRGIL.

1. Est in secessu longo locus: insula portum
Efficit objectu laterum, quibus omnis ab alto
Frangitur inque sinus scindit sese unda reductos.
Hinc atque hinc vastae rupes geminique minantur
In coelum scopuli, quorum sub vertici late
Aequora tuta silent; tum silvis scena coruscis
Desuper, horrentique atrum nemus imminet umbra.
Fronte sub adversa scopulis pendentibus antrum,
Intus aquae dulces, vivoque sedilia saxo,
Nympharum domus: hic fessas non vincula naves
Ulla tenent, unco non alligat ancora morsu.

2. Quum venit, aulaeis jam se regina superbis
Aurea composuit sponda, mediamque locavit.
Jam pater Aeneas et jam Trojana juventus
Conveniunt, stratoque super discumbitur ostro.
Dant famuli manibus lymphas, Cereremque canistris
Expediunt, tonsisque ferunt mantilia villis.

Grammatical Questions.—For those only who take Virgil.

1. Decline through all the cases of the plural only—*aurea sponda, strato ostro*; and through all cases of the singular only—*pater Aeneas, Trojana juventus.* (Par. 2.)

2. Give the principal parts of all the verbs in paragraph 1.

3. Parse fully—*Dant famuli manibus lymphas* (Par. 2.)

4. Write down the Latin for—*a million, the thirty-seventh, each one of us, three hundred of us, twenty sesterces apiece.*

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. A merchant bought 45 gallons at 3*s.* $2\frac{1}{4}$*d.* per pint, and 13 gallons for £15, and then, mixing the whole with 22 quarts of water, sold it at the rate of 3*s.* 3*d.* per quart. How much did he gain or lose by the transaction?

2. Find the rent of 6 poles 4 yards 2 feet 36 inches at 6*s.* 3*d.* a square yard.

4. Subtract $\frac{2\frac{4}{7} \text{ of } 3\frac{3}{8} \text{ of } 99\frac{4}{5}}{1\frac{10}{11} \text{ of } 6\frac{7}{8} \text{ of } 7\frac{1}{3}}$ from the sum of $9\frac{1}{16}$, $10\frac{7}{8}$, $17\frac{23}{48}$, and $1\frac{3}{4}$.

4. Reduce $3\frac{3}{4}$*d.* to the decimal of 10*s.*, and divide the result by 12·5.

5. A person is able to perform a journey of 142·2 miles in $4\frac{1}{2}$ days, when they are 10·164 hours long; how many days will he be in travelling 505·6 miles when the days are 8·4 hours long?

6. Divide 80 hectares of land between A., B., and C., so that A. shall have 2 hectares 76 ares more than B., and C. 11 hectares 12 ares more than B.

7. A stationer sold quills at 11*s.* per thousand, by which he cleared $\frac{1}{8}$ of his purchase money, but raised them to 13*s.* 6*d.* per thousand on their growing scarce what did he clear per cent. by the latter price?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. "The Romans invaded Britain."—Write out this sentence (*a*) with the predicate extended by a *prepositional phrase*; (*b*) with the predicate extended by an *adverbial sentence* relating to *time.*

2. Parse fully:—

"Let me have music dying, and I seek
No more delight."

3. Correct the following sentences, giving your reasons:—

(i.) "There are always there a set of worthy and moderately gifted men."

(ii.) "Nor want nor cold his course delay."

(iii.) "He put a stop to making of saleable drugs."

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—there was a dr oldfield who was always talking of the duke of marlborough he came into a coffee-house one day and told that his grace had spoken in the house of lords for half an hour did he indeed speak for half an hour said belchier the surgeon yes and what did he say of dr oldfield nothing why then sir he was very ungrateful for dr oldfield could not have spoken for a quarter of an hour without saying something of him.

*5. Write a short composition on *one* of the following subjects:—

---

* This must be attempted by every Candidate.

(i.) Benevolence.
(ii.) The proper Choice of Books.
(iii.) Free Trade.
(iv.) "'Tis granted, and no plainer truth appears,
Our most important are our earliest years."

JACOB BELL SCHOLARSHIPS AND REDWOOD SCHOLARSHIP, 1890.

The following are the questions that were set for this examination, which was held on Tuesday, the 8th inst.:—

PART I.—Time allowed, three hours (11 *to* 2).

In awarding marks the neatness and legibility of the writing will be taken into account.

Notice.—In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

LATIN.

Translate into English:—

"Non tali auxilio, nec defensoribus istis
Tempus eget: non, si ipse meus nunc afforet Hector.
Huc tandem concede: haec ara tuebitur omnes;
Aut moriere simul." Sic ore effata, recepit
Ad sese et sacrâ longaevum in sede locavit.
Ecce autem elapsus Pyrrhi de caede Polites,
Unus natorum Priami, per tela, per hostes
Porticibus longis fugit, et vacua atria lustrat
Saucius.

Vergilii Aeneis. Lib. ii., 521—529.

2. Translate also the following passages:—

"Frigida sub terra tumidum quem bruma tegebat."
"Me cernere fefisti."
"Sensit medios delapsus in hostes."

3. Comment on the construction of the last two sentences and give the usual prose form; derive *bruma*; decline in the singular *tali*, *istis*, *meus*, *sese*, *caede* and *porticibus*; give the gender of *caede* and *porticibus*; parse fully *auxilio*, *afforet*, *moriere* and *effata*.

4. Translate into Latin prose:—

Hasdrubel passed over into Italy with a great army. If he had been able to join his brother Hannibal, the Roman empire would have been ruined. After him, Julian, who was a man of great eloquence, obtained the government, and made war on the Parthians. He took several of the towns of the Persians by storm. Returning victorious, he was slain by an enemy, on the sixth day before the Kalends of July.

ENGLISH.

1. Parse the words and expressions in italics in the following passages:—

"*This vesper service closed*, without delay,
From that exalted station to the plain
Descending, we pursued our *homeward* course."
"*No* trace remained
Of those celestial splendours; *grey the vault*—
Pure, cloudless, *ether*; and the star of eve
Was *wanting*; but inferior lights appeared,
Faintly, *too faint almost for sight*; and some
Above the darkened hills stood *boldly* forth
In twinkling lustre *ere* the boat attained
Her mooring-place."

2. Write a short essay on one of the following subjects:—The Penny Postage Jubilee. The Habit of Smoking. The Colonies and India.

ARITHMETIC.

1. A gentleman bought an estate of 754 hectares, 7 ares and 5 centiares for 1,655,000 francs; at what price per hectare must he sell it in order to gain 10,000 francs?

2. Two cubic inches of a liquid weigh one pound avoirdupois, and 100 cubic inches of a gas, 31 grains; how many miles in height will a column of the gas reach, which has the same weight, and stands on a base of the same area, as a column of the liquid 29·388 inches high?

3. A person met two children, *A* and *B*, and, having in his pocket $(3\frac{7}{11} \div 4\frac{4}{7})$ of $(10\frac{5}{7} \div 7\frac{1}{2})$ of $0·14\dot{2}5\dot{9}$ of a moidore (27*s.*), gave *A* $\frac{1}{7}$ of $\frac{2}{3}$ of that sum, and *B* $\frac{3}{8}$ of the remainder; what did each receive?

FRENCH OR GERMAN.

The candidate is at liberty to choose either French or German, and is not required to show a knowledge of both. Marks will only be awarded for one.

French.

1. Translate into French:—

God has willed that divine truths enter from the heart into the mind, and not from the mind into the heart (*Pascal*). We are all ignorants; as to the ignorants who are consequential, they are below the apes (*Voltaire*). I fear God, dear Abner, and have no other fear (*Racine*). I have said long ago, that to know anything it is necessary to write it (*Pellisson*). The money that it has cost me has acquired for me the dearest and most valuable friend that I have upon the earth (*Fénelon*).

German.

1. Translate into German (*writing in the Gothic character*):—

You do not look well; are you indisposed? Yes, I have a bad cold and a sore throat. Is not Goethe the poet whom they admire most in Germany? Yes, and Shakspeare is the one whom the English people prefer to all others. Who commanded instead of the King? The Crown Prince commanded in accordance with his father's orders. Who has given you this splendid double-barrelled gun? I have not had it given; I have bought it.

PART II.—Time allowed: Two hours (3 *to* 5).

CHEMISTRY AND PHARMACY.

1. What are the points of resemblance, physically and in their chemical reactions, between iodine, bromine and chlorine?

2. Calculate the volumes at standard temperature and pressure of ten grams each ammonia, hydrogen sulphide and carbon monoxide, and state how these three gases may be obtained.

3. How is acidum hydrobromicum dilutum directed to be made by the official process? Give an equation of the reaction.

4. What is "reduced iron," and how is it made officially? Give equations.

5. Enumerate the "green extracts" of the Pharmacopœia, and state generally how they are manufactured.

BOTANY.

1. Define raphides, internode, verticillate, didynamous, glabrous and deciduous.

2. Compare briefly the flower and fruit of the buttercup with those of the wallflower.

SCHOOL OF PHARMACY PRIZE EXAMINATION.

PHARMACY AND PRACTICAL PHARMACY.

MR. INCE.

SESSIONAL EXAMINATION FOR A SILVER MEDAL.

Time allowed—10 *a.m. to* 1 *p.m.* *Thursday, July* 10.

The following are the questions that were set for this examination:—

1. What, in your view, are the alcoholic extracts of the British Pharmacopœia? Defend your opinion by typical illustrations.

2. Explain the methods employed for combining volatile oils and hygroscopic masses into pilular consistence.

3. Give the strength of the chief ingredient in the following:—Confectio Opii, Injectio Ergotini Hypodermica, Glycerinum Acidi Tannici, Infusum Quassiæ, Liquor Arsenicalis, Liquor Strychninæ Hydrochloratis, Mistura Scammonii, Mucilago Acaciæ, Mucilago Tragacanthæ, and Tinctura Nucis Vomicæ.

4. Write full dispensing note on (*a*) Chloroform; (*b*) Quinine Formulæ.

5. Should "Sal Volatile" be accepted as a synonym for Spiritus Ammoniæ Aromaticus, or the contrary?

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

A stated monthly meeting of the Council was held on Wednesday afternoon, July 2, at 11, Harcourt Street.

Mr. Charles Evans, President, occupied the chair.

The members of the Council present were—Messrs. W. H. Wells, Vice-President; G. D. Beggs, P. Merrin, Dr. Burnes, R. Simpson, W. Hayes, E. M. Hodgson, J.P., Professor Tichborne, LL.D.

Mr. Arthur T. Ferrall, Registrar, read a letter from the General Medical Council, enclosing a copy of a resolution in regard to Preliminary examinations.

The Chairman observed that the resolution merely had reference to increasing the standard for the Preliminary examinations.

Mr. Hayes pointed out that the increase of the standard had reference only to medical students.

The President: That is so. But it was under consideration to make our examination severer.

Mr. Merrin asked was there anything in the resolution about physics?

Mr. Ferrall, Registrar, said there was nothing about physics in it.

The Chairman did not consider it was necessary to take any further notice of the communication.

The Registrar read a communication from the Pharmacopœia Committee, General Medical Council, enclosing a list of thirty-seven medicines and compounds which have been selected to form the proposed addendum, and requesting the Council to consider how best to define or prepare same.

Mr. Wells said that each member of the Council had received a copy of the list from the Medical Council.

The President said that when the original letter came they referred the matter to a committee to consider what they should do. The subject required great attention, and he would like to get the views of the Council upon it.

Mr. Wells thought the best thing that could be done was for all the licentiates who wished to assist them to communicate with the Council on the subject.

Mr. Hayes suggested that a circular should be addressed to the licentiates.

The suggestion was adopted.

The Registrar read a communication from the South London School of Pharmacy (Limited), requesting that same may be added to the list of schools recognised by the Society.

The President reminded the meeting that they had had the matter before them last month, when it was resolved to adjourn it for another month, in order to have inquiries made. He was prepared to receive any suggestions that might be made as to the wisdom of increasing the number of schools at present.

Mr. Hodgson: Is this the school we were contemplating allowing being put on our list, and there was some question as to the wisdom of the step?

The President said it was not the same school.

Mr. Wells: I understand we shall have another application of a similar nature.

The Registrar read a letter from Mr. J. W. Cussons, in support of the foregoing application.

Dr. Burnes said that with reference to the City School, the licentiate of the Society with whom Professor Tichborne had communicated had reported favourably upon it. It might be well to ask Professor Tichborne to have this school inspected also.

Mr. Simpson said that so far as this school was concerned there was no better school in England.

Mr. Wells: There is no doubt we will receive more applications. A gentleman spoke to me the other day and asked would we accept a certificate from a Scotch University. Of course if we want our licentiates to gain knowledge we must give them a fair opportunity of getting it. It is hard to say that they should come to Dublin to take out their certificates. At the same time we should be very careful in having the fullest inquiry made.

It was resolved, on the motion of Dr. Burnes, seconded by Mr. McCormack, that Professor Tichborne be requested to write to the Society's licentiate in London, asking him to visit the school on our behalf, and report to the next meeting.

The Registrar read a letter from the Smithsonian Institution acknowledging receipt of Calendar for 1890.

The Registrar next read a letter from Mr. H. Conyngham, M.P.S.I., with reference to the Pharmacy Act (Ireland), 1875, Amendment Bill; also a letter from Mr. Peter McDonald, M.P., to the effect that most members of his party were against the Bill at present before the House.

The President said they had already the chief facts as to what had taken place in reference to this subject, but if any member of the Council had anything to propose in reference to it his suggestion would receive every attention.

Mr. McCormack said the suggestions which they had put forward would come on when the Pharmacy Bill was taken up by the House of Commons.

Mr. Wells said they had had a copy of the letter from Mr. Conyngham before them in London.

The Registrar was directed to acknowledge receipt of the letter.

The Registrar read a letter from a member with reference to prosecutions.

Marked "under consideration."

The Registrar next read a letter with reference to the deaths of the late Mr. William Goulding, Dr. Aquilla Smith, and Dr. Charles Henry Leet.

It was resolved, on the motion of Mr. Beggs, seconded by Mr. Wells, that the names be erased from the Register.

The Registrar reported that he had received a letter from Mr. Charles O'Hagan, L.P.S.I., desiring to become a member of the Society, and that he had forwarded him all necessary information.

The Registrar read the following letter:—

"Council Office, Dublin Castle,
"*June* 26, 1890.

"Sir,—With reference to your letter of the 20th inst., I am directed to transmit to you a copy of an Order in Council made on the 24th inst., approving of the temporary appointment of Dr. E. M. Cosgrave to conduct the examinations to be held on Monday, July 7 next, for the purposes of the Pharmacy (Ireland) Act, 1875, in the room of Dr. H. C. Tweedy, temporarily absent from Ireland.

"I am, sir, your obedient servant,
"W. B. KAYE.

"The Registrar, Pharmaceutical Society."

The Registrar read a report from the Pharmacy Act Amendment Committee.

The President said that most of them were aware of what had taken place since the meetings were held to consider the Pharmacy Bill. If any of them were not aware of what had taken place he would be happy to let them know what had been done in trying to get a compromise with the druggists. The result of the meetings they had held was that the first time Mr. Wells and he were appointed to go to London they had a conference with Sir Henry Roscoe, M.P., Dr. Fitzgerald, M.P., Mr. Sexton, M.P., Dr. Kenny, M.P., Mr. Webb, M.P., Dr. Tanner, M.P., Dr. Farquharson, M.P., Mr. McDonald, M.P., and Mr. Clancy, M.P., and the result was that they all said they should have a compromise; that in Parliament if it were a matter that would require much delay or debating it was certain to be shelved, and that under the circumstances, if possible, a compromise was better. They then returned to Dublin and held another meeting, but failed to effect a compromise. A letter was sent to the Druggists' Society asking for another meeting, but they declined. The Council of this Society was most anxious to come within measurable distance of them, but it seemed of no avail. The points they put forward were perpetuation, representation and title, but the druggists would not give way, and consequently they were obliged to write to the Attorney-General saying that as they could not agree as to these points they considered a conference useless. After their second visit Mr. Boyd wrote the letter they had all seen. On the last occasion of their visit to London he (the President) went alone, but the druggists held out more strongly than ever. Their contention was that they should get the title of chemist up to the passing of this Act, and after that they would be satisfied to be styled "registered druggists." These were all the important points raised so far as he recollected.

Mr. Wells said there was one very important thing took place in reference to the interview Mr. Hayes had with some members of the Druggists' Society in the lobby of the House, when it was suggested that if they gave up the right to be represented on the Council it would probably see its way to give in on the question of perpetuation. They were anxious to meet the druggists on this point in order that they might discuss the other points on which they differed afterwards, and the druggists agreed to meet them next morning. Then the druggists flatly refused to meet, saying that they had not promised to give way on the question of representation. When they came to look into the question of title it turned out that they wanted the title down to 1889 and after that the title to be "druggist," so that they gave no concession whatever. Mr. Hayes would bear out the fact that both Mr. Evans and himself were willing to have a conference and give way on perpetuation, but the other side would not give way on a single point. They saw Mr. Sexton, M.P., and had a long interview with him. He told them plainly that unless they came to some agreement amongst themselves there would be no chance of the Bill passing this session if it were opposed in any shape or form. He advised them to have a meeting with the other side. Mr. Hayes asked if they met and were able to get certain things settled between ourselves, would he (Mr. Sexton) be willing to take the chair at a meeting and act as arbitrator between them on the remaining points, and he said he would. Mr. Boyd came home then and reported to the druggists that as regarded Mr. Sexton he mentioned that it was not their conversation but Mr. Wells that had upset the arrangement referring the matter to the honourable gentleman. However, he thought the meeting would see that neither he nor the Pharmaceutical Society had upset the arrangement. Mr. Boyd also made the following statement:—"As a matter of fact Mr. Madden was not consulted on the subject at all." The President said in the letter that Mr. Madden was willing to assist them, all who were on the deputation could tell them that. Mr. Madden said the same as Mr. Sexton, that if they would agree among themselves on some points he would assist them on any point that might remain. These statements would give them an idea of the difficulties the deputation had to contend against. They could get nothing from the other side, and everything they did was misrepresented. As the matter stood then the Bill would be before the House that day, and if the amendments were got over it would be carried.

Mr. Hayes said there was no opposition to the Bill, but there were several friendly amendments to which there would be no objection.

Mr. Wells said that Dr. Fitzgerald told them he would propose the amendments. However, they could not do more than they did with them.

The President: We had a great deal of correspondence with the Attorney-General, and we sent him all the papers.

After some further conversation the subject dropped.

The Registrar read a report from the Certificates Committee.

On the motion of the President, seconded by Dr. Burnes, the following were unanimously elected members of the Society:—Mr. Alexander Ferguson Allen, L.P.S.I., the Adelaide Hospital, Dublin; Mr. Peter John Devlin, L.P.S.I., Main Street, Thurles; Mr. James Kiloh, L.P.S.I., 108, Patrick Street, Cork; Mr. Francis Joseph Neade, L.P.S.I., 3, Terenure Road, Rathgar; Mr. Patrick Scanlan Pearse, L.P.S.I., 108, Georges Street, Limerick.

On the motion of Professor Tichborne, seconded by Dr. Burnes, Mr. William Williams, L.P.S.I., Fermoy, was proposed for membership.

The proceedings then terminated.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third botanical excursion of the season took place on Wednesday, June 25, to Blackford Hill. The members assembled at Blackford Hill station at 9 p.m., and after a very enjoyable ramble round and over the hill returned to town about 11 p.m. The following medicinal plants were collected, *Rosa canina*, *Digitalis purpurea*, and *Sambucus nigra*. Among others met with *Cytisus Scoparius*, *Trifolium repens*, *Myosotis collina*, *Chrysanthemum leucanthemum* and *Hypochœris radicata* were of interest as being mentioned in "Lessons from Fields and Lanes" in the previous Saturday's *Pharmaceutical Journal*. Since this hill was thrown open to the public the wild flowers have to a great extent disappeared. *Digitalis purpurea* and *Verbascum Thapsus* used to grow in abundance, but now the former is rapidly disappearing and the latter is quite extinct.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

The members and friends held their annual picnic on Wednesday, July 2, at Altna-Guissach, Spittal of Muick. The company left Aberdeen by the 7.50 a.m. train for Ballater, the Railway Company kindly placing at their disposal their new and spacious family saloon carriage. On arrival at Ballater four large brakes were in waiting to convey the party, and through the kindness of Dr. Profeit, H. M. Commissioner, they were permitted to go by the Queen's private drive along the north side of the Muick to Altna-Guissach. *En route* a fine view was obtained of the stately mansion and private chapel of Glen Muick, the residence of Sir J. Thompson Mackenzie; Bracklay House, the residence of Alan Mackenzie, Esquire; Birkhall, one of the residences of H. R. H. the Prince of Wales; and the lodge at Altna-Guissach, the property of Her Majesty. At the falls of Muick, where a halt was called, the party dismounted and descended to the bottom of the Falls, which were looking their best after the recent heavy rains, and Niagara-like their roar was heard in the distance. The drive, which extended to nine miles, is one of the finest on Upper Deeside, and was thoroughly enjoyed by all. On arrival at Altna-Guissach at 11.15, a sumptuous supply of sandwiches, tea, etc., which had been prepared by the pioneer party, who drove straight through from Ballater, was amply done justice to. At 11.30 the mountaineering party, after being provisioned, left for Lochnagar, under the leadership of Mr. Giles. When about half way up they encountered what the Englishman is pleased sarcastically to call a Scotch mist, which continued the whole afternoon and evening, much to the inconvenience and discomfort of the party, who were completely drenched.

Dr. Profeit, who in the ordinary course of his duties happened to be passing, was hospitably entertained, and the President (Mr. Johnston) in a neat and happy speech proposed his health, and thanked him for the permission he had so kindly granted.

Dr. Profeit, in reply, assured the party that any little pleasure he could give them at any time would be given most heartily to his friends, the chemists, whom he considered part and parcel of the medical profession; and several of those whom he saw present he could class amongst his oldest friends. On the motion of the Secretary three cheers were given for the Queen, and after singing the National Anthem the Doctor drove away.

At 4 p.m. the party assembled at Altna-Guissach, and did as much justice as possible (under a drenching rain) to what would have otherwise been a most enjoyable dinner. To the credit of the company, however, be it said, every one tried to make the best of a bad day. Tea was served immediately after dinner, and at 5.30 the party beat a hasty retreat, Ballater and Aberdeen being each reached in due course. The whole party numbered about forty, and about twenty reached the highest summit of Lochnagar.

Society of Chemical Industry.

ANNUAL MEETING.

On Wednesday morning, the annual general meeting of the Society of Chemical Industry was opened in the Chemical Theatre of the University College, Nottingham. The chair was taken at 11 o'clock precisely by the President, Sir Lowthian Bell, Bart., F.R.S. About 200 members were present.

After the minutes of the last meeting had been read and approved, the Mayor of Nottingham offered the members, on behalf of the corporation, a hearty welcome to the town, and expressed the thanks of the municipality for the honour done by the Society in selecting Nottingham for this year's meeting. The President, having briefly acknowledged the welcome—

Messrs. E. N. Butt and S. V. Holgate were appointed Scrutators to examine and report on the balloting papers.

THE ANNUAL REPORT.

The General Secretary (Mr. Creswell) then read the annual report of the Council, which was a very favourable one. It stated that the membership had grown from 2,445, as reported at the last meeting, to 2595, or a net increase of 150 members. During the year 298 new members had been elected, and the names of 148 had been erased through death, resignation and other causes. In the same time 73 papers and 14 communications had appeared in the Journal, for which the Council expressed its thanks to the authors. It was claimed that the Journal is now recognized as the leading authority on applied chemistry in the English language, and that the different sections of the abstracts formed a very complete epitome of the literature of the subject. The Treasurer had reported in June that the sum of £1720 stood to the credit of the Society at the bankers, against £1214 in the previous year. As there had been no change in the investments, which then amounted to £3688, this showed that the revenue had exceeded the expenditure by upwards of £600. The balance was a smaller one than had accrued in the previous year, but this had been foreseen, and was due to diminished returns from advertisements and increased expenditure upon the Journal. It was also announced that in constituting the governing body of the Imperial Institute, the right of appointing one of its members had been conceded to the Society.

The adoption of the report was moved by Mr. E. K. Muspratt, seconded by Professor Clowes, and carried unanimously.

The Honorary Treasurer (Mr. E. Rider Cook), in presenting the accounts, the principal points in which were referred to in the report, said that not only had there been an increase in the number of members, but more had paid their subscriptions than in the previous year. He added that he might just warn the members that the Council had taken a rather extravagant fit in the expenditure and therefore they must not expect that the excess of revenue over expenditure next year would be so large as this year.

The President in moving the adoption of the accounts and a vote of thanks to the Honorary Treasurer, said the utility of a Society like that was not measured by a balance at the bank, which might be better employed if spent in the service of the members.

Mr. Archbutt seconded the motion and it was carried unanimously.

THE PRESIDENT'S ADDRESS.

The President said before he performed the official duty assigned to him he wished to acknowledge the honour he had experienced in having been selected to fill the office of President during the past year. No one who took the trouble to examine the results of the labours of the Society, and especially of some of the members of the Council, could fail to be impressed with the high honour that was involved in being appointed to fill the office. The President then proceeded to deliver an address, of which the following is an abstract, the subject being:—

The Smelting of Iron Ores Chemically Considered.

The President said, in introducing the subject, that it was only natural, in a Society occupying itself with chemical industry, that the subjects referred to in a presidential address should be largely dealt with from a chemical point of view. Fifty years ago, the choice of subjects would have been comprised within a comparatively narrow compass, not so much from the smaller extent of this country's industrial pursuits, as from a supposed want of connection between some of them—the manufacture of iron being one—and the science of chemistry. Notwithstanding this indifference on the part of the ironmasters themselves, men of science, particularly in Germany and France, had devoted much attention to those branches of knowledge more directly bearing on metallurgical questions. Great Britain was behind both these nations in that sphere of learning, but that Society and others were now doing their best to advance the iron manufacturers of this country. It was a little remarkable, however, that during the half century Great Britain, in point of production and in manufacturing invention and proficiency, had occupied the foremost rank as an iron-making nation.

An article like soda ash, an undoubted chemical product in the popular sense of the word; might contain, besides sodium carbonate, 15 per cent. of foreign matter, without seriously impairing the commercial value of its alkali. If, however, pig iron had notably above one part in two thousand, ·05 per cent., it would be rejected by the Bessemer steel maker as unsuitable for his purpose. Cases proving the extraordinary effects of minute quantities of foreign substances on the quality and properties of steel, sometimes in one direction, sometimes in another, might easily be multiplied. How to deal with these, or how to remove them, came clearly within the range of chemical investigation.

Many ores of iron as delivered to the blast furnace contain 30 or 40 per cent. of earthy ingredients. To these had to be added the ash contained in the fuel and the lime of the flux employed for the fusion of the silica and alumina brought in by the other minerals. From this considerable weight of sterile matter pig iron was obtained by one of the most successful examples of heat utilization. The crude metal did not, however, run the gauntlet unhurt, through substances capable of so materially affecting its properties. To those influences it was exposed at an intense temperature in some cases for forty-eight hours and upwards, and it was therefore not surprising that some carbon, silicon, sulphur and phosphorus should be found as constituents of pig iron. The metal thus contaminated was transferred, still liquid, to the Bessemer converter, where a very rapid current of highly compressed air oxidized the metalloids, or a greater part of them, with such an evolution of heat that the mass, 99¾ per cent. of which consisted of pure iron, was raised to whiteness or dazzling splendour. By a small addition of carbon and manganese, in about a quarter of an hour from leaving the blast furnace, 10 to 15 tons of cast iron might be thus changed into steel of great malleability and strength. These considerations, among others, justified him in asking assent to the proposition that the work of the blast furnace was one of the most interesting and successful applications of chemical science known in industrial enterprise.

In dealing with the rationale of the smelting process, the President quoted the following description of the action of the blast furnace from the latest work on chemistry. "A large number of investigations have been made on the chemical changes which occur in the blast furnace, but in spite of these our knowledge of this subject is still far from complete. The fuel uniting with the oxygen of the blast burns with formation, in the first place, of carbon dioxide, and this is reduced to carbon monoxide by contact with glowing carbon. This latter gas, coming in contact with the constantly descending charges of ore, reduces the ferric oxide to spongy metal. . . . . . The zone in which this reduction occurs is situated at a higher or lower part of the furnace according to the nature of the ores, and its temperature varies from 600°-900° C. As the spongy iron descends it arrives at the hotter parts of the furnace. . . . . . At this point the finely divided spongy iron begins to take up carbon, and it may therefore be termed the zone of carburization." The zone in which fusion takes place was then described, along with the reduction of certain other metals and metalloids. Allusion was subsequently made to experiments of Cailletet, from which "it appears that even in the hottest parts of the furnace and at the point at which the combustion is most perfect, carbon exists in the solid state from the dissociation of carbon monoxide into carbon dioxide and carbon, brought about at very high temperatures." The President said his own experiments and investigations had led him to conclude that the action of the blast furnace was somewhat less simple than might be inferred from this description. That the greater portion of the reduction of the ore takes place in the upper zone was beyond all question. Nothing, however, was said of the important part played by a distance of from 30 to 60 feet in the depth of the furnace in intercepting the heat which, but for it, would be wasted. To such an extent was this duty performed that he had estimated in a modern furnace that for every unit of heat evolved at the tuyeres, 2¼ units were returned to this point from the magazine stored in the descending current of materials. It could also be shown that besides the deposition of carbon at high temperatures mentioned by Cailletet, that action commenced with the reduction of the ore, say, at 150° C. If reduction was ever completed in the upper zone, which was more than doubtful, the spongy iron then produced would, during its passage through the zone of heat interception, and in presence of an intensely deoxidizing atmosphere, be reoxidised by the action causing the deposition of carbon. However that may be, there seemed strong reasons for believing that something like 10 per cent. of oxygen required to form Fe_2O_3 remains in the ore until at or near the point where fusion takes place.

When carbon monoxide deprives an oxide of iron of all or any part of its oxygen, it is converted into carbon dioxide. As the heat evolved by carbon passing into the state of the latter compound is more than three times as much as when the former oxide is generated (as 8000 is to 2400), it is obviously of great importance that the proportion of carbon dioxide in the gases as they leave the blast furnace should be as large as the nature of the operation will permit. Assuming each 20 parts of pig iron to contain 18·6 of iron, there would be liberated in the reduction of this quantity of the metal 7·97 parts of oxygen, equal to converting 5·97 parts of carbon in the form of carbon monoxide into carbon dioxide. Experience had led him to infer that 5·97 cwt. of carbon as carbon dioxide per ton of iron made was all that would be met with in the gases escaping from furnaces engaged in smelting ores like those of Cleveland. It was perfectly true that carbon monoxide could be entirely converted into dioxide by contact with oxide of iron but that happened under conditions as to temperature, etc., which did not obtain in the case of the blast furnace. If the correctness of this proposition were conceded it followed that the remainder of the heat must be made up by the combustion of carbon to the condition of carbon monoxide, supposing the air driven into the furnace had the temperature of zero of the centigrade scale. What this quantity of heat might be depended on the nature of the ore under treatment and the character of the furnace in which the operation was conducted. By the results of experience, recorded in an elaborate table and discussed, it was shown that the best results were achieved in the cold-blast furnace when about 15 tons per 1000 feet of furnace capacity per week was being run, whilst in one driven with hot air a speed represented by 37 tons per 1000 cubic feet per week, both making Cleveland iron, was the most successful. The hotter the blast is the quicker the furnace could be driven, and the cooler were the escaping gases. The saving of fuel in smelting iron ore with hot air was attributed to two causes: each unit of fuel had its calorific power raised from 2727 calories in the cold blast to 3660 calories in the hot-blast furnace, while the total quantity of heat required was smaller. As causes of this diminution it was pointed out that using less coke gave less water to be evaporated, and less atmospheric moisture to be decomposed. A reduced quantity of coke ash lessened the limestone required for fluxing, and in its turn needed less heat for the expulsion and dissociation of its carbon dioxide, along with a smaller weight of slag to be melted. Economy in coke and in limestone told greatly on the volume of escaping gases, and this with their reduced temperature caused a saving of coke.

The President then proceeded to discuss the advantages derived from increasing the height of the blast furnace, and described the experiments that led him to the conclusion that any addition to the height of a furnace after a certain altitude would prove useless. While there might be some advantages connected with colossal furnaces, he greatly doubted whether economy of fuel could be justly reckoned among them. In his opinion a height of 80 feet, and a capacity of 16,000 cubic feet, sufficed for all that could be expected in this direction.

After some remarks on recent increases in the temperature of the blast, the economy of fuel in furnaces of most modern construction, and the relative quantities of fuel required according as limestone or caustic lime were used, the general conclusions were stated that those who thought that in order to effect further economy in the consumption of coke in the blast furnace, furnaces of great height and large dimensions should be adopted, together with the use of caustic lime, and who insisted on imparting unmanageable heat to the blast, should give attention to the lessons taught by an example, where a furnace of 15,500 cubic feet capacity, blown with air at a comparatively moderate temperature, and using raw limestone, compared favourably with furnaces twice its size with a much hotter blast and deriving such advantages as calcined limestone was capable of affording.

The reading of the address up to this point having taken a considerable time, the President referred cursorily to some experimental work, and inferences drawn therefrom, especially some referring to the chemistry of the reduction of oxide of iron in the blast furnace, which he said would appear together with the tables when his address was published, and concluded by remarking that he had attempted in what he had said to establish for the blast furnace a character for an economical use of fuel. At the same time it had been proved that the duty performed was by no means equivalent to the whole of the useful effect which coke is capable of affording. Taking a ton as being able to produce 20 cwt. of pig iron from Cleveland ironstone, this, after an allowance for ash, etc., represented, when burnt to carbon dioxide, 147,200 calories, whereas something like 90,000 calories had been the limit of the power obtained. This apparent sacrifice of nearly 40 per cent. was incurred by what was considered to be the physical impossibility of bringing, in this particular process, the whole of the carbon burnt to its highest point of saturation with oxygen. Forty years ago, this unexpended energy was not turned to any useful account. This loss was now avoided by burning under the boilers and in the hot-air stoves the carbon escaping from the furnace as combustible monoxide. By this beautiful application of what was a waste product, all the mechanical power needed at the works was obtained, at the same time that the blast was heated, and these advantages were accompanied by a considerable saving of labour. With the present improved form of furnace the coal consumed for these two purposes would be much less than formerly, but even then it would not be much short of 10 cwt. per ton of metal. When fire-brick stoves supplied the heat to the blast the loss at the chimneys was about one-half of what it was with those of iron pipes. There remained, however, a considerable loss at the boiler chimneys, but this at the Clarence Works was utilized by applying the waste heat for the evaporation of brine. A similar use was about to be tried at the same place with the heat contained in the molten slag before it was thrown over the spoil heap.

At the conclusion of the Address the Honorary Treasurer moved a hearty vote of thanks to the President. The motion was seconded by Mr. Mond and carried with acclamation.

ELECTION OF OFFICERS.

The report of Messrs. Butt and Holgate on the result of the ballot was then read. It stated that the nomination by the Council of the various officers had been approved and that for the six vacancies on the Council the greatest number of votes had been given for Messrs. A. H. Allen, H. Grimshaw, R. Meldola, E. K. Muspratt, T. L. Patterson, and T. W. Stuart. These gentlemen, with Messrs. L. Archbutt, S. B. Boulton, J. Brock, J. Calderwood, J. Pattinson, and J. Spiller will constitute the Council for the coming year.

The officers elected were:—President and Honorary Treasurer, Mr. E. Rider Cook; Vice-Presidents, Sir Lowthian Bell and Messrs. D. Howard, B. E. R. Newlands, and J. C. Stevenson, M.P.; Honorary Foreign Secretary, Dr. F. Hurter.

On the motion of Mr. Tyrer it was agreed to accept an invitation for the Society to meet next year in Birmingham.

The President then moved a vote of thanks to the authorities of University College, for the use of the Chemical Theatre in which the meeting had been held, which was seconded and carried with acclamation.

The Mayor of Nottingham, in acknowledging the vote on behalf of the Corporation, said he was proud to have been able to receive the Society in a building like that. Although there were other towns in which similar buildings existed, he believed that only the corporation of Nottingham had had the courage to build a college for the use of a town and pay for it out of the rates.

The business meeting having been brought to a close a large party met at the Midland Station soon after one o'clock, and went by train to Derby to inspect the Midland Railway Works. Others visited Morley's Hosiery Factory and other works in Nottingham and neighbourhood that had been kindly thrown open to the members of the Society. In the evening there was a Conversazione at Nottingham Castle.

On Thursday morning a number of the members left for an excursion to Burton to visit the famous breweries there, and in the afternoon there was an excursion to the Butterley Iron Company's works. There were also various alternative excursions, and in the evening the members dined together at the Exchange Hall.

On Friday the meeting was to close with an excursion to Welbeck Abbey and Clumber.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

EARLY CLOSING IN LIVERPOOL.

Sir,—My attention has been drawn to a letter which appeared under the above heading in the Journal of June 21. With your permission I would wish to make a few remarks on the said letter, and also on behalf and in defence of myself, as one of the "dissentient" chemists and druggists of this city.

Mr. Bain appears to divide us—the "dissentients"—into two classes; "the black sheep of whom he cannot get rid, but whom he can generally afford to ignore;" and "the few—only a very few—chemists who appear to be very reluctant to close at nine, and who are not black sheep, but highly respectable business men." This is your correspondent's classification; yet towards the end of his letter he, by implication, very illogically and totally ignores it, for he dubs the totality of us who will not close at 9 o'clock, "sordid, though still lean and starving apothecaries!" What an astounding definition is this! I hold that by this letter Mr. Bain has done more harm to the early closing movement than he can undo in a twelvemonth. Is he aware that taking all the chemists in city and suburbs the "dissentients" are in a majority? So I have been informed by one who "closes at 9 o'clock." Does he know that not a few of these "sordid apothecaries" are men of lengthened and considerable experience, men who have been in practice on their own account for thirty or forty years? I opine that after such a business career these antiquated "apothecaries" will not only indignantly resent the word "sordid" as a misnomer, but on the other hand will class themselves as highly respectable, easy-going, well-to-do citizens of no mean city, who have served their fellows in their day and generation, and are now gratified by the acknowledgment of a public benefited by their skill and experience.

I will dismiss Mr. Bain's letter for the present (recurring to it further on), in order to say a few brief words about the chemists' early closing movement in Liverpool. During my business life—an extended one, it is almost needless to say—I have been engaged in several of these movements, and when times seemed more propitious to such undertakings; but they all failed. Now, the present seems to me peculiarly unfitting to inaugurate the new departure; it appears to me that there are several existing reasons which, taken together, tend to make the movement an untimely one. Shopkeepers of all sorts complain of the decadence of the retail trade. It would seem that large firms, co-operative stores, etc., selling retail at wholesale prices (*sic*) are gradually swamping or weeding out the small and impoverished shopkeeper. This is why we see so many empty shops in our city streets. It is one cause out of many of the depreciation in the value of shop property; rents having fallen thirty, forty, and in some cases even fifty per cent.

Again, as affecting chemists' establishments especially, we find tailors, drapers, grocers, provision dealers, chandlers, etc., dealing largely in drugs, patent medicines, perfumery, and sundries. At these places the public can obtain 2 ozs. of certain tinctures or spirits for 6½*d*., phial included. In all my experience I have never known so great an invasion of "outsiders" into our own special domain, and as there is no remedy, they can still advance in increasing numbers. There is yet another and perhaps more disastrous incursion into the business and practice of the chemist and druggist. I allude to the increasing propensity of many medical men to act as their own apothecaries. They have fitted up surgeries where they dispense their own medicines. Many medical men also have initiated and opened "cheap dispensaries" where advice and an 8 oz. bottle of physic can be obtained for 6*d*. In view of these ominous and impending changes—changes which will become more numerous as time advances—I would ask is it now a wise and sound policy for the chemist to lock his door and enshroud his blue and red bottles in darkness? Can any sane man say that the time is ripe for the chemist to commit a moral suicide by politely yet sadly turning his customers into the street every night except Saturday at 9 o'clock? I trow not. I foresee troublous times for the chemist of the future; only by civility, capability, punctuality and a readiness to supply the wants of his customers at whatever time most convenient to themselves, will he be able to hold his own against competitors of every sort and degree. And, believe me, it will tax all his strength and energy.

Mr. Bain's letter strikes me as having been penned in a desponding mood. After having bestowed upon us names which would not be permitted by the rules of debate, he astutely diplomatizes; he condescends to reason with us, lamenting that "by our present attitude all the labour of those who have tried to improve matters may be in vain." He also says that "there is an indication of the thin end of the wedge of dissent by some keeping open later on Friday because the grocers do so." Here are the premonitory signs of a failing cause; it now only remains for the committee to follow the lead of the perruquiers who close their shops every Thursday afternoon at 2 o'clock. Imitate the barbers at once, take an entire half day every week, and then we shall see the whole fabric of the movement totter to its fall, burying the builders in its ruins! A significant advertisement has appeared in the newspapers lately, emanating from the proprietor of a large number of chemists' shops in this city. This proprietor joined the Association in the first instance, but so great had been the diminution in the weekly returns that it seems to have been thought necessary to advertise the public that all the establishments would be open on Fridays as well as Saturdays in future until the usual hour. This, as Mr. Bain says, is "the thin edge of the wedge of dissent." By and bye a final knock will be given by each one in turn, and the aforesaid "wedge" will be driven home.

On glancing over the names of the Committee I notice some who have always closed at 9 or before. The peculiar nature of their business and neighbourhood has permitted them to do so. Consequently, in advocating and favouring this early closing movement, they are sacrificing nothing. Each assistant in turn must remain in, I suppose, after hours to answer the bell. Have these gentlemen bestowed a thought on the poor chemist who perchance is less favourably located? Have they ever realized the fact that there is such a being as *the poor man's druggist*, standing behind the counter until a late hour, and *obliged* to serve his penny customers unaided by assistant or apprentice? To call these "black sheep" is all very fine, some would denominate it very clever. But "hard words butter no parsnips;" they pay neither rent nor taxes. Closing at 9 o'clock would not benefit such as these; they would neither be able to "get out for a walk in the gas-lit street," nor "enjoy a stroll in the twilight in the parks and lanes" (as your correspondent so poetically puts it), because their presence would be required in the dingy back parlour—dingy and dismal, alas, at all times—but made more hideous still by the tintinnabulations of that horrid business bell! There is a chemist of another type or class who would very likely lose half his income by closing at 9. This is the "respectable man" of your correspondent. Take this man, "an' it please you." Let me say he is not in the business part of the city, but in a "stylish" locality, say in proximity to one of the great squares. The houses thereabout, as is well known, are let in apartments to young men engaged in business during the day. These young gentlemen have no time to make purchases whilst engaged in their usual avocations; they often spend the evening at the house of a friend, or they attend a concert or a lecture; it is becoming late when they return home; the sight of the chemist's shop reminds them that they are in want of a box of seidlitz powders or a pot of cherry tooth paste, and they go in and purchase accordingly. Here we have two types or photographs of the chemist as we see him to-day—both cultivated men—but the one the direct antithesis to the other as regards sphere of business, and both suffering most severely (for so I have been assured by both) by closing at what is for them the early hour of 9 o'clock.

In conclusion, and in few words, the trade or profession—whichever you like to call it—of the chemist and druggist differs in its character from all others; in its nature it is isolated and unique, and cannot be arbitrarily dealt with by any Early Closing Committee, however constituted. The chemist of to-day is a man of education; as such he stands at the head of the shopkeeping class, and will neither be cajoled by flattery, persuaded by dictation, nor intimidated by opprobrious epithets. Early closing, *per se*, may or may not be a good thing, but for the various reasons above given, I regard unanimity impossible—success impracticable—failure inevitable.

One of the Dissentients.

Mr. T. Rheeder is thanked for his communication.

Erratum.—In Index, p. 1078, the reference to "Capsicum, Ethereal Tincture of," should be p. 979 instead of p. 974.

W. J. Shepperd.—(1) *Hieracium aurantiacum.* (2) *Alchemilla vulgaris.* (3) *Apargia hispida.* (4) *Stellaria media.* (5) *Peltigera canina.* (6) *Cladonia rangiferina.*

W. Quick.—(1) *Dipsacus sylvestris.* (2) *Stachys sylvatica.* (3) *Digitalis purpurea.* (4) *Galium Mollugo.* (5) *Tamus communis.* (6) *Thuja occidentalis.*

Communications, Letters, etc., have been received from Messrs. Walker, Hunt, Bransom, Morrison, Butterworth, Hill, Douglas, Oxen, G.W.

LESSONS FROM FIELDS AND LANES.

JULY.

During the latter part of June and the earlier weeks of July there can be little doubt that both in the garden and the lanes the most conspicuous features are the roses. In last month's lesson some points of resemblance between the order *Rosaceæ* and the pea order were touched upon, and reference was also made to the distinctive features of the respective orders. The genus *Rosa* includes so many species which run into one another—so forming an endless number of varieties—that it will be enough for us to note the features of the genus, and especially those which are characteristic of the order. The whole order may be divided into two great groups, using as the basis of division the relation of the calyx tube to the ripe fruit. In the cherry, the bramble, and the strawberry the ripe carpels are not enclosed in the calyx tube, while in the apple, the pear, and the rose they are so enclosed. The characters of the fruits were described in the article of last September (*Pharm. Journ.*, xx., p. 181), but if a longitudinal section of a wild rose be made the pistil will be seen to consist of numerous carpels enclosed in the calyx tube. In some of the species, *R. arvensis*, for instance, the styles are united to form a column, while in others, *R. canina*, they are free. The calyx throat is closed, or nearly so, by the disc, and on this are inserted the numerous (*indefinite*) stamens; the petals are five in number and on the calyx; the calyx lobes are fine and their form is often useful in the determination of species. In *R. arvensis* they are almost simple, and purple, while in *R. canina* they are green and cut in a pinnate manner. In the garden roses most of the stamens have become converted into petals; some of them are *hybrids* produced by the crossing of indigenous species, while many are the offspring of plants imported from Southern Europe and Asia.

Flowering alongside and among the roses there is now to be found an abundance of brambles or blackberries (*Rubus fruticosus*), and lanes in mountainous districts furnish an equal abundance of raspberries (*R. Idæus*). These are both too well known to require description, but it should be noted that they belong to the group of *Rosaceæ* in which the ripe carpels are not enclosed in the calyx-tube. In both cases the fruit is an *etærio of drupes*—a fruit composed of an agglomeration of drupes or succulent one-seeded fruits. Each part of the fruit of the bramble or raspberry is of the same structure as the cherry. The varieties of bramble which have been described are quite as numerous and as confusing as the varieties of rose. The genera *Rosa* and *Rubus* are among the best examples to be found of the instability of species, as shown by the number of intermediate forms they produce and by the fact that experienced botanists differ in their opinions as to the distinctiveness of many of the species.

There are several members of the rose order which have already been noticed now in fruit, and the opportunity thus afforded should not be lost. The strawberry, consisting of a succulent *receptacle* studded with *achenes*, should be compared with its barren relative, in which the structure of the fruit is the same, with this difference, that the receptacle in the latter remains dry. The cultivated cherry, with its sweet edible *mesocarp*, furnishes a striking example of the influence of selection and cultivation when compared with its bitter, inedible, wild relations.

The soft white *cymes* of the meadowsweet, or queen of the meadow (*Spiræa ulmaria*), are fast breaking out in meadows and moist places. When looked at superficially this looks more like an umbellifer than a member of the rose order; but a glance at the structure of one of the flowers, or even at the leaves, with their large stipules and serrate leaflets, soon shows its affinities. The twisted carpels are a remarkable feature of the meadowsweet, and should be noted when the plant is in fruit. The genus (*Potentilla*) to which the barren strawberry belongs now furnishes several common and interesting species. Best known of all perhaps is the common silver-weed (*P. anserina*) which may be found growing by most roadsides. It has pinnate leaves with serrate leaflets having a silky under surface, from which is derived the term silver-weed; the large, solitary, yellow flowers much resemble some of the buttercups and are frequently mistaken for them. Healthy places are brightened up with the small yellow flowers of the tormentil (*P. tormentilla*), with their few wedge-shaped petals. The creeping cinque-foil (*Potentilla reptans*) closely resembles the tormentil both in its flowers and leaves; it may generally be readily distinguished by its *five* petals, larger size and *palmate* leaves, those of tormentil being usually *ternate*. The two plants are often found growing together, and very often several varieties will be found intermediate between the two species, and consequently very puzzling to the beginner. The calyx is a very distinctive feature in the potentillas and should therefore be noted. In tormentil there are apparently eight sepals in two whorls, while in cinque-foil there are ten arranged in a similar manner. The outer whorl is generally regarded as an *involucre* and its component parts are therefore described as *bracts*; in tormentil the bracts are generally narrower than the true sepals, while in cinque foil they are about the same width. There are several rarer species of *Potentilla* that may perchance be dropped on in the course of a ramble in a prolific district, but a familiarity with those just mentioned will make the recognition of the genus easy. Two plants closely resembling the cinque-foils may yet be found in flower; the wood avens (*Geum urbanum*) and the water avens (*G. Rivale*), are generally more noticeable from their fruit than from their flowers. The fruit is an *etærio* of *achenes*, each of the *achenes* being surmounted by a *persistent* style, with a hooked tip; these hooks cling to animals, and so furnish the seed with an important means of dispersion. The leaves of both species of *Avens* are *impari-pinnate*, with serrate leaflets—as in most of the *Rosaceæ*—the terminal leaflet being large; in both the petals are yellow, but the water species has a very characteristic, reddish-brown calyx.

A Rosaceous plant, of which the fields have furnished an abundance all the summer, should not be overlooked in the course of a botanical ramble. The common lady's mantle (*Alchemilla vulgaris*) is readily recognized by its large, palmately-cleft, *plaited* leaves, with serrate margins and crowded cymes of minute yellowish-green flowers. The petals are absent, but their place is taken by the sepals, which, as in the cinque-foils, are furnished with a row of bracts. The *disk* is a conspicuous feature in the lady's mantle; and, as in the roses, closes the throat of the calyx. In the flowers there is a partial separation of the sexes, some of them being provided with a long style and abortive stamens, whilst others have long stamens and a short style. The field lady's mantle, or parsley piert (*A. arvensis*), frequents dry places, and bears the impress of its less rich habitat in its narrower leaves, smaller size, and altogether more starved appearance. The alpine lady's mantle (*A. alpina*) appears to be intermediate between the above species. It has leaves deeply cut into five or seven lobes, with a silky under-surface. The whole plant has a decidedly attractive appearance, especially in the high regions in which it is to be found, disputing possession of the soil with the heather and the parsley-fern. On the slopes of Glen Ridding—one of the routes to Helvellyn—it is one of the most marked features of the vegetation.

From the lady's mantle it is an easy leap to the burnets. The salad burnet (*Poterium Sanguisorba*) loves limestone soils, and like the lady's mantle has flowers which are destitute of corolla. The calyx is *gamosepalous*, with a limb divided into four segments, and purple; the flowers are in short rounded spikes, and the stamens are numerous, with long filaments, a feature of very great importance in the fertilization of the plant, for this is one of the loveliest members of the order, and is dependent on the wind for fertilization (*anemophilous*); the leaves are mostly radical and are compound with serrate leaflets. The upper flowers of the spike are generally destitute of stamens, while the lower are sometimes destitute of pistil. The average height of the plant is about a foot. The great burnet frequents richer land and is generally larger and altogether more bushy in habit, although its general resemblance to its lesser relative makes its recognition comparatively easy; its stamens are only four and are not *exserted* (projecting beyond the calyx) as in the other. A review of the *Rosaceæ* of the month would scarcely be complete without some reference to agrimony (*Agrimonia Eupatoria*), a plant much valued by those learned in "herbs." Its leaves closely resemble those of the burnets, but it is readily recognized by its spike-like racemes of yellow flowers; fields and lanes in most districts now yield an abundance of it.

During the months of June and July the botanical rambler is sure to have his attention called to some of the wild geraniums. These belong to an order (*Geraniaceæ*) whose flowers differ so much in structure from the order just considered that they are placed in a different division—*Thalamifloræ*; the roses, it will be remembered, belong to *Calycifloræ* (*Pharm. Journ.*, xix., p. 951). The pretty little wood sorrel (*Oxalis Acetosella*), which was such a marked feature in the woodland flora two months since, is a member of this order, and its pale green ternate leaves (very much like those of the clovers) may yet be found in most moist woods, with here and there a dainty white and purple flower peeping out from among them. The genus *Geranium* is, however, the one most likely to be met with now. Its most characteristic feature is its *beaked capsule*, from which originates the term "crane's-bill" applied to all its species. The stork's-bill, belonging to another genus of the same order, is possessed of a similar characteristic, but may be distinguished from the geranium by the presence of five stamens only—the geranium being furnished with ten—five more having become abortive and been reduced to scales. The dove's foot crane's-bill (*G. molle*) and the herb-robert (*G. Robertianum*), if not the most conspicuous, are the most widely distributed members of the genus; in the former the leaves are *orbicular* and deeply cut all round, the peduncles are two-flowered, the flowers are provided with five pink notched petals, and are seldom so much as half an inch across, while the general habit of the plant is *decumbent* (lying on the ground but rising towards the extremities). Herb-robert is much more aspiring in habit, varying in height from six inches to two feet, with reddish stems, strong smelling compound leaves, flowers of similar size to the dove's-foot crane's-bill, but with narrower and entire petals. The meadow crane's-bill is one of the most robust looking members of its order, and will be recognized by its bushy habit (height two to four feet), large bluish-purple flowers (one to one and a half inches across), and orbicular round cut leaves. There are several other species of geranium—such as *G. dissectum*—which are well known to the farmers as weeds, and all proclaiming their affinities in the characteristic beaked fruit. The shining crane's-bill (*G. lucidum*), with its red branches and bright green leaves all looking as if they had just been polished, is a conspicuous ornament on old walls in some districts, but like the bloody crane's-bill (*G. sanguineum*), with its large solitary crimson flowers, is decidedly local in its distribution.

Rocks by the seaside, old walls and roofs now furnish an abundance of the biting stone-crop (*Sedum acre*), a plant belonging to the order *Crassulaceæ* and therefore nearly allied to the saxifrages. Its bright yellow petals, crowded, fleshy and cylindric leaves and prostrate branches can never be mistaken. If the flower be examined fine honey-secreting scales will be found at the base of the stamens and between them and the pistil. If a minute piece of the plant be chewed the origin of the specific name will soon be discovered; it is strongly acrid and is an emetic and cathartic. *S. anglicum* in general habit is much like the biting stone-crop, but has white petals with pink streaks; it is most likely to be met with on the west coast, and on some of the islands in the Firth of Clyde it is at the present time the chief floral ornament. *S. Telephium* is the largest member of the genus, its flowering stems sometimes reaching a height of two feet. It is a common ornament on wall-tops in the lake district. *S. Rhodiola*, known as rose-root, from the rose-like smell of its rootstock, is only to be found on the higher mountains of Scotland, Wales, and the lake district.

Both fields and lanes should now furnish several members of the order *Fumariaceæ*, an order closely allied to the buttercup and poppy orders, although readily distinguished by its very irregular flowers. The fumitories (*Fumaria capreolata* and *officinalis*) are common field weeds. In both the leaves are compound, the stamens *diadelphous* (in two bundles), and the petals, four in number, pink and very irregular, one having a *gibbous* (pouched) base, as in valerian. The latter is most readily distinguished from the former by its smaller size and more divided leaves. One of the varieties of *F. capreo-*

lata possesses the remarkable property of changing the colour of its flowers, after they have become fertilized; they are nearly white before fertilization and afterwards become pink. Lane-sides and thickets should be searched for *Corydalis claviculata*, a plant whose relation to the fumitories may be seen at a glance, although its flowers are yellowish-white in colour; it will be found climbing by means of *tendrils* among the stronger vegetation by which it is surrounded.

A large proportion of the plants now in flower are members of the great Composite order, for a description of which the article of last July should be consulted (*Pharm. Journ.*, xx., p. 21). Waste places are their favourite haunts, and have their monotony relieved by thistles (*Carduus*), sow thistles (*Sonchus*), feverfews (*Matricaria*) and chamomiles (*Anthemis*); in similar resorts will be found the nipplewort (*Lapsana communis*), distinguished from all the other members of the sub-order, in which the florets are all ligulate, by the absence of *pappus*; its *capitula* are small and in striking contrast to its bushy habit and large lyrate leaves, which, however, gradually get smaller upwards. Walls, embankments, woods and mountains furnish the hawkweeds (*Hieracium*), lettuces (*Lactuca*), and rag-worts (*Senecio*), while fields and pasture-lands furnish hawk's-beards (*Crepis*), and hankbits (*Leontodon*), in addition to the moon-pennies and cat's ears, mentioned last month.

The orchids, too, with the valerian, the foxglove and many other interesting members of their orders (*Pharm. Journ.*, xx., p. 22), contribute largely to the flora of the month. An interesting little member of the foxglove order—the eyebright (*Euphrasia officinalis*) is now one of the brightest looking heath plants. The whole plant seldom exceeds a few inches in height; its corolla is *labiate* and in colour lilac or white, with purple veins and a yellow spot on the lower lip, which serves as a "honey-guide." It is deserving of special notice from the fact that it has two kinds of flowers, one being large and conspicuous, and in other ways specially adapted for cross-fertilization, self-fertilization being rendered impossible; while in the other the flowers are small and inconspicuous and regularly self-fertilized.

A wayside ramble in July is almost sure to furnish us with at least one of the mallows. They are readily recognized by their *monadelphous* (in one bundle) stamens which are characteristic of the order to which they belong (*Malvaceæ*). *M. sylvestris* is erect in habit, while *M. rotundifolia* is *decumbent*. In both the flowers are lilac or purple, and in the axils of the leaves.

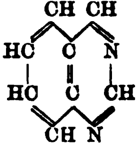
The same lane which yielded the mallows may perchance have its hedges overrun and their gaps filled up by the long trailing branches of the bitter-sweet (*Solanum Dulcamara*), a plant of some pharmaceutic interest and belonging to an order which yields some of our most valued drugs—henbane and belladonna—and food stuff, the potato. The leaves of the bitter-sweet are very often—although by no means invariably—*auricled* (furnished with lobes at their bases). The purple corolla and yellow anthers (forming by their lying closely together a kind of cone) give the flower a very distinctive appearance; it should be noted that the anthers dehisce by pores at their apex. Henbane (*Hyoscyamus niger*) may be lighted on in some waste place but is distinctly rare; it will be readily recognized by its pubescent, viscid, pinnatifid leaves and dirty yellow corolla with purple veins; the fruit is a *pyxidium* (a capsule opening by a lid) and is very distinctive. The deadly nightshade (*Atropa Belladonna*) is also rare and will be recognized by its drooping greenish-purple flowers and by the general resemblance of its leaves to those of the potato.

OREXIN.*

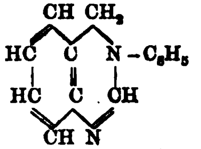
BY DR. A. DONNER.

The materia medica has been enriched recently by a stomachic, which comes into commerce under the name "orexin," and is the hydrochloride of a base designated "phenyldihydrochinazoline." The physiological properties of this compound have already been described; in the following communication it is considered more particularly from a chemical point of view.

Phenyldihydrochinazoline is a derivative of the compound known as chinazoline, which is characterized by containing two atoms of nitrogen in a six-membered ring:—



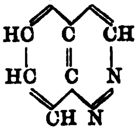
Chinazoline.
(Phenmiazine).

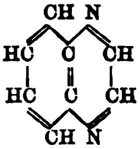


Phenyldihydrochinazoline.
(Phenyldihydrophenmiazine).

Chinazoline is distinguished from chinoline by having a second atom of nitrogen in the place of a CH group in the nitrogen-containing ring. By the introduction of the syllable *az* (from the French *azote*, nitrogen) the relation of chin-az-oline to chinoline finds expression.

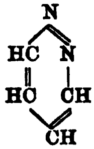
In the formulæ given above the two atoms of nitrogen are represented as in the meta position towards each other; but they may also take the ortho or the para position, forming two isomers of chinazoline:—



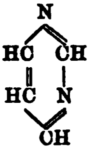


With a view to introduce a method of designation that shall rationally express the relative position of the nitrogen atoms in this class of compounds, Widmann has suggested a new nomenclature which has recently been much used by chemists. So far as it applies to orexin and the substance from which it is derived it may be briefly summarized as follows.

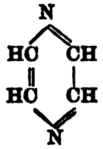
As "azines" Widmann designates compounds consisting of six carbon and nitrogen members bound together in a ring by nine bonds. According to the number of nitrogen atoms present he distinguishes them as "monazines," "diazines," and "triazines." In distinguishing the diazines he indicates the relative position of the nitrogen atoms upon which the isomeric relations above referred to depend by replacing the first letter of the word "diazine" with the first letter of "ortho," "meta," or "para," as the case may be, so that the diazines become—



Oiazine.



Miazine.



Piazine

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* From the *Pharmaceutische Zeitung*, July 5.

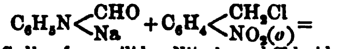
If now one of these rings becomes blended with a benzene ring, as is the case in chinazoline, this is indicated by prefixing the syllable "phen." According to Widmann's nomenclature, therefore, as will be seen by reference to the formulæ already given, chinazoline would be called "phenmiazine" and the base of orexin would be "phenyldihydrophenmiazine."

Orexin, according to the inventor, is prepared in the following manner. Formanilid—a compound that is produced by the action of formic acid upon aniline, just as acetanilid is formed by the action of acetic acid on aniline—is treated with metallic sodium, which results in the hydrogen atom still joined to the nitrogen being replaced by the metal, with the formation of sodium formanilid.

$$C_6H_5{\cdot}NH{\cdot}CHO + Na = C_6H_5{\cdot}NNa{\cdot}CHO.$$

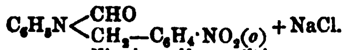
Formanilid. Sodiumformanilid.

In the production of this latter compound the calculated quantity of sodium is added to a solution of formanilid in ten times its weight of pure benzene in a roomy retort fitted with a return condenser and heat is applied until it disappears. The new compound then separates as a voluminous white mass. Without separating it from the benzene a calculated quantity of o-nitrobenzyl chloride is allowed to react with it, when the sodium combines with the chlorine to form sodium chloride and the organic residues unite to form o-nitrobenzylformanilid.



$$C_6H_5N\begin{cases}CHO\\Na\end{cases} + C_6H_4\begin{cases}CH_2Cl\\NO_2(o)\end{cases} =$$

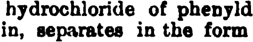
Sodiumformanilid. o-Nitrobenzyl Chloride.



$$C_6H_5N\begin{cases}CHO\\CH_2{-}C_6H_4{\cdot}NO_2(o)\end{cases} + NaCl.$$

o-Nitrobenzylformanilid.

The reaction begins after a slight warming, setting the benzol in violent ebullition, and is completed in half an hour. In order to separate the o-nitrobenzylformanilid from the other products of the reaction water is first added, which causes the formation of an aqueous layer, containing the sodium chloride, and a benzene layer in which the o-nitrobenzylformanilid is dissolved. The latter is separated and submitted to distillation in a current of steam to remove benzene and unattacked o-nitrobenzyl chloride. The residue solidifies, after the addition of a little alcohol-ether, to a crystalline paste, which is freed from an adherent smeary impurity by washing with ether. The product so obtained contains, besides o-nitrobenzylformanilid, a small quantity of another bye-product, o-nitrostilbene—



$$C_6H_4\begin{cases}CH{\cdot}CH{\cdot}C_6H_5\\NO_2(o).\end{cases}$$

This is removed by fractional crystallization from alcohol, from which it is the first to separate.

Upon warming the alcoholic solution of o-nitrobenzylformanilid with granulated tin and hydrochloric acid the tin double salt of phenyldihydrochinazoline hydrochloride separates in white or faintly yellow coloured flat needles or scales. By treatment with sulphuretted hydrogen the tin is removed from this compound as sulphide, and from the filtrate, after concentration, the hydrochloride of phenyldihydrochinazoline, or orexin, separates in the form of concentrically grouped needles.

Orexin crystallizes with two molecules of water of crystallization in white needles that melt at 80° C., and which when kept for some time in an exsiccator pass into the anhydrous form, melting at 221°.

A specimen of commercial orexin was submitted to examination by the author, with the following results:—

In the first place Dr. Donner sought to determine, by means of the melting point, whether in the white powder supplied to him he had to do with the hydrated or the anhydrous compound. The substance presented however by no means a definite melting point; it began to change at 80° C., but it was not completely melted until 110° was reached. This behaviour appeared to indicate that it was a hydrated compound which had lost water of crystallization through efflorescence. Determination of the water of crystallization, by drying the compound at 65° until it ceased to lose weight, confirmed this assumption, the loss of weight amounting to only 12·2 per cent., whilst the formula $C_{14}H_{12}N_2HCl + 2H_2O$ would indicate 13 per cent. The residue after drying melted, though not very uniformly, at the melting temperature of the anhydrous salt, 221° C.

A loss of water of crystallization therefore takes place, as shown by this experiment, upon the exposure of orexin to the air. A sample recrystallized from water, and melting at 80° C., after twenty-four hours' exposure to the air, no longer showed a sharp melting point, and was first completely fused at a temperature considerably over 80°. In the interest of exact administration, therefore, the author recommends that in the place of the crystallized salt the anhydrous form should be used.

Orexin dissolves in water and in alcohol, but not in ether. In a determination of the solubility it was ascertained that 100 grams of an aqueous solution saturated at 20° C. contained 6·72 grams of anhydrous orexin, corresponding to 7·74 grams of the crystalline compound. The solubility in water of the anhydrous compound is therefore 1 : 15 and of that containing two molecules of water 1 : 13.

An aqueous solution of orexin (1 : 20) gives the following reactions:—

Mercuric chloride produces a white crystalline precipitate that dissolves in hot water, and upon slow cooling of the solution separates in the form of fine white needles.

Upon the addition of potassium bichromate solution a yellow precipitate forms, which is also dissolved by hot water, and separates on cooling in golden yellow crystals. The precipitate when kept does not become discoloured, as it does in the case of many chromic acid compounds of the alkaloids.

An aqueous bromine solution, prepared by the decomposition of equal parts of the volumetric solutions of potassium bromide and potassium bromate by means of sulphuric acid, is decolorized, and there is a formation of a yellowish amorphous precipitate.

Potassium permanganate solution is decolorized by the orexin solution in the cold.

A very characteristic reaction of orexin is produced by mixing a small quantity of the compound in a test tube with about double the quantity of zinc dust and heating for a short time over a free flame, when a strong carbylamine-like odour becomes perceptible. If then the cooled residue be warmed with a little hydrochloric acid, filtered, and a few drops of chloride of lime solution added, the liquid assumes a blue colour. This latter reaction depends upon the previous decomposition into benzonitrile and aniline by heating with zinc dust.

As orexin is prepared by the decomposition of the tin double salt, and as in such decomposition of double compounds a small quantity of the metal frequently clings tenaciously to the organic base, there was the possibility of an inorganic contamination. A small portion of the sample was therefore burnt upon platinum; it left no residue, and was therefore, so far as this test goes, free from such impurity.

Upon the basis of the foregoing experiments Dr. Donner describes the characters of orexin as follows:—

(1) Orexin forms a white powder melting at 80° C., or colourless acicular crystals. It dissolves in 13 parts of water, as well as in alcohol; in ether it is insoluble.

(2) In the aqueous solution (1 : 20) mercuric chloride

produces a white and potassium bichromate a yellow precipitate, not altered by exposure to the air. Potassium permanganate solution is decolorized by it in the cold, and bromine solution with the formation of a yellowish amorphous precipitate.

(3) Upon heating a mixture of orexin with zinc dust a short time over a free flame a strong carbylamine odour is given off. After treating the mixture with hydrochloric acid, the filtrate, on the addition of chloride of lime solution, is coloured green.

(4) Heated upon platinum the compound burns without leaving any residue.

THE BOTANICAL ORIGIN OF SOME UNITED STATES PHARMACOPŒIAL DRUGS.*

BY JOHN M. MAISCH.

The recent publication of the sixth edition of Gray's 'Manual of the Botany of the Northern United States,' and the fact that this standard work has been thoroughly revised and extended by Professors Sereno Watson and John M. Coulter, naturally lead to a comparison of its authoritative statements with those of the present U.S. Pharmacopœia, and invite further inquiries concerning drugs derived from either indigenous or naturalized plants. The following fragmentary notes have thus originated; they cannot lay claim to completeness, but are reported now with the view of inducing others to similar investigations.

Prickly ash bark is obtained from two species of Xanthoxylum, which are usually distinguished as the Northern and Southern prickly ash. The botanical nomenclature of both species has been rather confused in the past, and it may therefore not be considered out of place to briefly mention the various synonyms which are quoted in full in the excellent "Report on the Forests of North America," by Professor C. S. Sargent, issued in 1884 as one of the supplemental reports of the tenth census.

X. americanum, Miller, is the Northern prickly ash, and the following are synonyms for the same plant: *X. Clava-Herculis*, Lamarck (not Linné); *X. fraxinifolium*, Marshall; *X. fraxineum*, Willdenow; *X. mite*, Willdenow; *X. ramiflorum*, Michaux; *X. tricarpum*, Hooker, and *Thylax fraxineum*, Rafinesque. It is shrubby, or a small tree not often 7 metres high, with a trunk 0·15 to 0·20 metre in diameter. Its habitat is on rocky hillsides, or more frequently along streams and rich river bottoms, from Massachusetts west to northern Minnesota, eastern Nebraska and eastern Kansas, south to the mountains of Virginia and northern Missouri; its greatest development being reached in the region of the great lakes.

The southern prickly ash is now called *X. Clava-Herculis*, Linné. To this name there are the following synonyms (See Sargent, "Forests," page 30):

X. fraxinifolium, Walter (not Marshall); *Fagara fraxinifolia*, Lamarck; *X. carolinianum*, Lamarck; *X. aromaticum*, Willdenow; *X. tricarpum*, Michaux; *Kampmania fraxinifolia*, *Pseudopetalon glandulosum*, *Ps. tricarpum* and *X. Catesbianum*, the last four names being used by Rafinesque in his different writings. The plant is popularly known as tooth-ache tree, prickly ash, tea ash, pepper wood and wild orange. According to Schoepf's 'Materia Medica Americana,' page 148, it was known here during the past century as toothache pellitory. Its habitat, varieties, etc., are thus given in the "Report on the Forests."

Southern Virginia, southward near the coast to bay Biscayne and Tampa bay, Florida, westward through the Gulf states to north-western Louisiana, southern Arkansas (south of the Arkansas river), and the valley of the Brazos river, Texas. A small tree, rarely twelve to fourteen metres in height, with a trunk 0·30 metre in diameter, of very rapid growth; usually along streams and low rich river bottoms, reaching its greatest development in southern Arkansas, Louisiana and eastern Texas.

A form with trifoliate leaves is *X. macrophyllum* Nuttall, 'Sylva,' iii., 10.

The variety *fruticosum*, Gray (*X. hirsutum*, Buckley), is a low shrub or on the Texas coast a small tree six to eight metres in height, with a trunk 0·20 to 0·30 metre in diameter.

Grisebach (Flora, British West Indian Islands, p. 138) regarded this species as being identical with *X. lanceolatum*, Poiret, and *X. caribæum*, Lamarck, and states that it is found in Jamaica and all the British West Indian colonies; also in Cuba, Guadeloupe, etc. De Candolle ('Prodromus' i., 727) regarded *X. lanceolatum* Poiret, as a species distinct from *X. Clava-Herculis*, Lin., and *X. caribæum*, Lamarck (not Gaertner), as identical with the latter, the habitat being the forests of the Caribbean Islands.

But *X. caribæum*, Lamarck, is now recognized as entirely distinct from the Hercules club; it is the *satinwood* of semitropical Florida and the West Indies, and the following synonyms are given by Professor Sargent: *X. Clava-Herculis*, Linné, in part (also De Candolle, Prodromus and Grisebach, Flora of the West Indian Islands); *X. lanceolatum*, Poiret, and *X. floridanum*, Nuttall. According to Chapman's Flora of the Southern United States, its branches and petioles are unarmed.

To what extent the barks of these evidently closely related species agree, it is impossible to say in the absence of well authenticated specimens. But it should be stated that for some years past the southern prickly ash of our market has to some extent differed in macroscopic appearance from that formerly seen, the chief difference being the reduced number or almost total absence of the stout spines with which the branches of our southern plant are armed, they being replaced by numerous large conical corky excrescences. Since the anatomical structure does not differ materially from that of the bark formerly met with, it is not unlikely that the present bark may be derived exclusively from the trunk and older branches. I hope to soon procure authentic botanical specimens, when this question may be definitely settled. If the opinion expressed here be the correct explanation, it would appear that the present gatherers of southern prickly ash bark were not as considerate as those of thirty or forty years ago when the bark of the branches was exclusively or chiefly collected; such a course did not destroy the tree, which must necessarily be the case if the trunk itself be stripped of its bark.

But another interesting question arises in connection with the nomenclature adopted by the new edition of the 'Manual,' and in view of the results obtained by chemical analysis. The southern prickly ash bark was chemically investigated by Geo. H. Colton (*Amer. Journ. Pharm.*, 1880, p. 191), E. T. Moffitt (*ibid.*, 1886, p. 417) and E. G. Eberhardt (*ibid.*, 1890, p. 231), who established the presence of an alkaloid, which, however, does not show any similarity with berberine. This latter alkaloid was isolated by J. D. Perrins nearly thirty years ago (*ibid.*, 1863, p. 459), from the bark of the Caribbean *X. Clava-Herculis*, Lin., and had been described by Chevallier and Pelletan as early as 1826 under the name of *Xanthopicrite*. Mr. Perrins' bark was furnished by Daniel Hanbury, and agreed with Martiny's description in being of a "highly laminated texture, splitting readily into thin plates like garden bast;" Perrins adds that this bark must not be confounded with that of *X. Clava-Herculis*, Lamarck, the latter species being totally distinct; as above shown it is our Northern prickly ash.

The distinction in these physical characters was pointed out by Bridges ('Proceedings, Amer. Pharm.

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* From the *American Journal o Pharmacy*, July.

Assoc.,' 1864, p. 272), when he established the source of our southern prickly ash bark from specimens collected by Mr. Wm. Heyser, of Chambersburg, Pa. Dr. Bridges also quoted from 'Spach's Histoire Naturelle' a distinctive characteristic to be found in the spines which in the Caribbean species are "short, in pairs, and dilated at the base," while those of our southern species are "very pointed, and strongly dilated at the base, sometimes attaining an inch in diameter."

A fuller description of the West Indian xanthoxylum bark is given by Guibourt ('Histoire Naturelle des Drogues Simples,' iii., 513), who states that "the bark of the *clavalier jaune* (yellow Hercules club) or *épineux jaune des Antilles* (yellow-thorn) has some resemblance to the true angostura bark, is thin, has a similar odour, and a bitter very disagreeable taste, leaving upon the tongue an impression of acridity and producing salivation; it is, however, easily distinguished by its canary-yellow colour, by its imparting a yellow colour to the saliva, and by the fibrous layers of the interior portion presenting a smooth fracture." By the characters named this bark is readily distinguished from our southern prickly ash. Its origin was first suggested by Virey in 1820 (*Journ. de Pharm.*, vi., 88), who described it under the name of *cascanoqui*.

According to Grisebach (*loc. cit.*) the species in question is known in the British West Indies as *prickly yellow wood*, and different species of *Xanthoxylum* and *Tobinia* (the latter now united with the former genus by Bentham and Hooker) are designated as *yellow wood*; also as *fustic*, which name is, perhaps, more frequently given to the osage orange, *Maclura aurantiaca*, Nuttall (ord. *Urticaceæ*), and in Kentucky to *Cladrastis tinctoria*, Rafinesque (ord. *Leguminosæ*).

It follows from the above investigations that the West Indian Hercules' club differs from our southern prickly ash botanically, as well as chemically, even if its acrid principle should ultimately be found to be identical with that of our southern indigenous species. In this connection it may be of interest to note the medicinal properties of this bark, which according to Lindley ('Flora Medica') is much used in the West Indies in malignant ulcers, both internally and externally: an infusion is reckoned antispasmodic; tincture found by Dr. Gillespie, a West Indian practitioner, to be a good febrifuge; according to others the decoction is anti-syphilitic.

As at present constituted by Bentham and Hooker, the genus *Xanthoxylum* comprises about 110 species, which are mostly found in tropical regions, four being indigenous to the United States, but only two confined to this territory. These two species are now recognized by the Pharmacopœia as *X. fraxineum* and *X. carolinianum*—names which appear to the writer to be more descriptive, and therefore preferable to the older names *X. americanum* and *X. Clava-Herculis*, of which particularly the latter has been the cause of much confusion.

Cytisus scoparius, Link, *broom*, is a shrub introduced from Europe, and in the new Gray's 'Manual' is stated to grow in Virginia and southward. It is, however, completely established in and near Philadelphia, along the Philadelphia, Wilmington and Baltimore Railroad, where it grows quite profusely in some localities in sandy soil and sunny locations. The shrub deserves to receive some attention, as during its flowering period in May and June it has quite an attractive appearance owing to the numerous bright yellow flowers, which afford a pleasant relief to barren, and frequently bare hillsides. The young branches have been admitted into the United States and British Pharmacopœias, though they are no longer thus distinguished by the Pharmacopœias of Continental Europe; they are, however, still popularly used there for their diuretic and purgative properties; and the flower buds have been used sometimes as a substitute for capers, and the roasted seeds in the place of coffee. The plant was placed by Linnæus in the genus *Spartium*; French and German botanists usually follow either Lamarck, who placed it in the genus *Genista*, or Koch (*Sarothamnus*), or Link (*Cytisus*). Bentham and Hooker have grouped about forty species in the genus Cytisus, the plant in question belonging to the first section Sarothamnus.

Senega.—During the past year (*Amer. Journ. Pharm.*, Sept. 1889, pp. 449–453) I have shown that the keelless or false senega root, which has been in the market during the past fourteen years, is produced by *Polygala alba*, Nuttall. Since the present edition of Gray's 'Manual' includes also the plants west of the Mississippi to Western Kansas, it gives a description of this plant as well as of the true senega plant, and it will, therefore, be of special interest to compare the botanical characteristics of the two, which are given as follows:—

P. Senega, Linné.	*P. Alba*, Nuttall.
Stems several from thick and hard knotty rootstocks, simple (six to twelve in. high);	Stems several from a hard rootstock one foot high;
Leaves lanceolate or oblong-lanceolate, with rough margins;	Leaves narrowly linear, 3–12 lines long, acute;
Wings (*i.e.*, two inner sepals) round-obovate, concave;	Wings oblong-obovate;
Crest (of lower petal) short;	Crest small;
Caruncle (of seed) nearly as long as the seed.	Lobes of the caruncle half the length of the appressed-silky seed.
Habitat. Rocky soil, W. New England to Minn., and southward.	Nebraska and Kansas to Texas.

From the descriptions it will be observed that the close resemblance is not confined to the roots, but applies also to the overground organs of the plant.

Fennel "has become naturalized along the shores of Maryland and Virginia, and is a common escape." The name preferred for the plant is *Fœniculum officinale*, Allioni, while the present Pharmacopœia has *F. vulgare*, Gaertner.

Caraway, *Carum Carui*, Linné, is stated to be "naturalized in many places, especially northward."

Conium maculatum, Linné, appears to have spread considerably on this continent. Of late years I have received specimens of the plant from several localities in Pennsylvania and neighbouring states, where it did not exist about twenty years ago. The present 'Manual" states that the plant grows in waste places from New England to Pennsylvania, and west to Iowa and Minnesota.

Burdock is enumerated under the Linnæan name *Arctium Lappa*, replacing *Lappa officinalis*, Allioni, of the Pharmacopœia.

Dandelion is now *Taraxacum officinale*, Weber, in the place of *T. Dens-leonis*, Desfontaines, as at present recognized by the Pharmacopœia.

Lactucarium is not likely to be prepared in the United States on a large scale, as long as a sufficient supply is furnished from Europe at a moderate price. But it is of interest to note that one of the plants yielding it has considerably increased the number of its habitations on this continent; for, according to the 'Manual,' *Lactuca Scariola*, Linné, extends in waste grounds and on roadsides, from the Atlantic States to Missouri and Minnesota. Since, a good medicinal lactucarium may also be prepared from our indigenous species, it should be noted that the plants regarded as mere varieties in the preceding edition of the 'Manual' have been restored to the dignity of species, accordingly we have now *L. canadensis*, Linné, *L. integrifolia*, Bigelow, and *L. hirsuta*, Muhlenberg.

Sweet Fern is no longer *Comptonia asplenifolia*, Aiton, the genus having been united as a section or subgenus with *Myrica*; hence we have now *Myrica asplenifolia*, Endlicher.

Chestnut leaves are henceforth collected from *Castanea sativa*, Miller, var. *americana*, instead of from *C. vesca*, *L.* The latter name appears to be more appropriate for our indigenous tree, which is rarely cultivated.

ON SOME RELATIONS BETWEEN HOST AND PARASITE IN CERTAIN EPIDEMIC DISEASES OF PLANTS.*

BY H. MARSHALL WARD, F.R.S.

Professor of Botany, Royal Indian Engineering College, Cooper's Hill.

(*Continued from page* 29.)

In the first instance, it is chiefly owing to the vagaries of the oxygen molecules in the living protoplasm, that the latter exercises the processes of *metabolism*, the second group of functions we have to consider.

The metabolic processes which can be referred to the changes brought about during respiration,† result in two series of events. On the one hand, compounds of various kinds pass out of the protoplasm—the arena of metabolic activity—into other parts of the cell, and especially into the cell-sap; and, on the other hand, bodies of comparatively simple constitution are brought from the cell-sap and elsewhere into the arena of activity, and there worked up into more complex bodies. It is impossible to separate these two sets of processes; but, if we abstract them mentally, for purposes of simplicity, we may say that the following series of events important for our present purposes are taking place.

Carbohydrates, especially in the form of glucoses, are being taken up into the protoplasm, and built up into the structure of its substance: here, owing to the attacks of the oxygen of respiration, the structures into which they enter are more or less broken down—as before said, not necessarily merely oxidized as such or directly—and the complex into which they have temporarily entered becomes decomposed, again to be built up anew by the aid of more carbohydrates, and so on repeatedly.

Among the temporary products of these *destructive* processes, in the complex alternations of building up and breaking down here going on, we find certain nitrogenous compounds (amides and allied bodies) like asparagin, leucin, glutamin, etc., playing important parts. The evidence goes to show that so long as plenty of carbohydrates are at the disposal of the protoplasm, these amide bodies are again worked up with them into the more complex bodies, to be again broken down, and repeat the process,‡ and so on.

If, however, for any reason a lack of these carbohydrates occurs, then these amide-bodies increase for the time being, and the protoplasm suffers accordingly; in fact, it undergoes further decompositions as a result of starvation.

The evidence also goes to show that organic acids (such as malic, citric, tartaric, oxalic, etc.) are formed in the protoplasm, and accumulate in the cell-sap during these metabolic processes, as products of incomplete oxidation, and their variations in quantity depend greatly on the activity of these metabolic processes, and, therefore, on the intensity of respiration.* A fact of primary importance for us is that these organic acids increase considerably in amount under conditions which lead to less complete oxidation, and, conversely, they decrease when certain oxidation-processes in the cell are promoted. In other words, they are continually being formed and destroyed in metabolic changes, and sometimes one process, sometimes another, predominates.

As a third group of life processes which our selected cells would exhibit, we may regard the phenomena of *growth*; processes which are intimately dependent upon *respiration* and *metabolism*, and, indeed, inseparable from them in life.

For our present purpose, it suffices to regard growth† as consisting in an extension of the still soft cellulose cell-walls, which tends to increase the area of the membrane at the expense of their thickness, and in a compensating increment in their thickness due to the activity of the protoplasmic lining in secreting and laying on cellulose on the inside of, or even in the structure of, the wall. Passing over the fact that the secretion of this cellulose is another manifestation of metabolic activity on the part of the protoplasm, it is important to notice that growth is only possible so long as respiration is proceeding, and so long as the cell is turgid.‡ Now turgidity depends on the presence in the cell of water under pressure; that is to say, in a turgid cell there is in the sap cavity sufficient water not only to supply all the demands of the cell-walls and protoplasm, but to keep them distended as well, and this to such a degree that the cellulose walls, with their lining of protoplasm, are positively stretched in opposition to the elastic resistance offered by the former. Recent researches have proved that this excess of water is largely due to the osmotic attraction exerted by the organic acids and their salts dissolved in the sap of the cell,§ and since we have seen that the formation and destruction of these acids depend on the processes connected with oxidation and respiration, we obtain a further glimpse into the complicated correlations here concerned. For our purpose the important points are that, during active turgescence, the growing cells tend to become very watery and their cell-walls to be thinned by stretching, and this in spite of the activity of the protoplasm in adding new materials; while bodies such as soluble amides and organic acids are being formed continuously and in relative and varying abundance, to undergo further changes in the never ending turmoil of metabolism, as already indicated.

But it is evident that these processes of respiration, destructive metabolism, and growth must sooner or later come to an end if the stores of carbohydrates fail, since these are the substances which ultimately supply the fuel for respiration, and which form the raw materials by means of which new protoplasm may be constructed; and it is well known that the plant respires and grows to death if placed in such circumstances that no new supplies of these substances are possible. We must remember that we are concerned with normal green cells, however, and we have now to consider the new set of events due to the assimilative action of the chlorophyll corpuscles to which these cells owe their colour. Is is not necessary to remind you that this process of carbon *assimilation*[*] consists in the coming together of carbon dioxide and water in the green corpuscles, where, by means of energy obtained in certain rays of sunlight, the molecules of the carbon dioxide and water are torn asunder and eventually in part rearranged; speaking generally, we may say that some of the constituents (oxygen)[†] escape, while others (carbon, hydrogen and oxygen) form new combinations, which result in the production of carbohydrates, which then separate from the protoplasm.[‡]

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* Croonian Lecture. From the 'Proceedings' of the Royal Society.

† Strictly speaking, metabolism includes all the chemical changes in the protoplasm which constitute it living substance; it is a mere convention to speak of different kinds of metabolism, and to separate carbon assimilation as a special function.

‡ See E. Schulze, 'Landwirthschaftliche Jahrbücher,' 1876, vol. v., p. 848; Borodin, *Bot. Zeitg.*, 1878, col. 801; Palladin, 'Ueber Eiweisszersetzung in d. Pflanzen,' etc. (*Ber. d. Deutsch. Bot. Gesellsch.*, 1888, p. 205, see p. 212). Further literature in Pfeffer, 'Pflanzenphys,' p. 301.

* See especially Warburg, 'Ueber die Bedeutung der organischen Säuren für den Lebens-process der Pflanzen' (*Unters. aus. d. Bot. Inst. zu Tübingen*,' 1886-88, vol. ii., pp. 53-152, where the literature is collected up to date; and Palladin, 'Athmung und Wachsthum' (*Ber. d. Deutsch. Bot. Gesellsch.*, 1886, pp. 322-328), and the same on 'Bildung der organischen Säuren in den wachsenden Pflanzentheilen' (*ibid.*, 1887, pp. 325—326).

† For a general account of growth, *cf.* Sachs, 'Lectures,' pp. 411-424 and 567-569.

‡ See de Vries, 'Unters. über die mechanischen Ursachen der Zellstreckung,' Leipzig, 1877, and the literature there quoted.

§ De Vries, 'Ueber die Bedeutung der Pflanzensäuren für den Turgor der Zellen' (*Bot. Zeitg.*, 1879); also Palladin, 'Bildung der organischen Säuren in den wachsenden Pflanzentheilen' (*Ber. d. Deutschen Bot. Gesellsch.*, 1887, p. 325). Other literature will be noticed where necessary as we proceed.

We are here, of course, less concerned with the difficulties which beset the questions, what rays of light are concerned in this process, how their energy is employed in the chlorophyll, and what part the chlorophyll itself takes directly in the process; or with questions as to the exact products formed during the putting together of the carbohydrate in the protoplasm of the chlorophyll corpuscle, and so on, than with certain well-established facts and conclusions, such as the following.

The process of building up the products obtained by the decomposition of the carbon dioxide and water in the protoplasm into carbohydrates goes on continuously in the sunlight so long as it is sufficiently intense, and the excess beyond what is immediately required for the nourishment and respiration (*i.e.*, the maintenance of metabolic activity) of the living substances of the cell takes the final form (usually[§]) of starch. Free oxygen escapes all the time, and, in so far as this is not absorbed for purposes of oxidation, there and then in the cell, this oxygen goes to enrich the atmosphere. Moreover, these temporary stores of starch are continuously being transformed into soluble glucoses by means of diastatic ferments[||] in the protoplasm; this process goes on day and night, and its result may be easily demonstrated in the case of leaves removed from the plant after exposure to the sunlight during the day. After a few hours in a warm, dark, normal atmosphere, relatively large quantities of glucose are found in the cells, while the starch is disappearing. This glucose, I need hardly remind you, is the soluble movable form of the carbohydrates,[*] and it is worked up again, so far as it is in excess of the immediate requirements of the living protoplasm, into the form of reserve starch, etc., by the protoplasm.[†]

At certain periods, therefore, the cells may contain relatively large quantities of this soluble, nutritious, and easily oxidized glucose.

We have still to refer to another set of events taking place in the normal living cells, the connection of which with the above simultaneous functions will be obvious. This is the *passage of water* from one cell to another, a process depending essentially upon the modified evaporation—*transpiration*[‡]—going on at those surfaces of the cell walls which are in contact with the air in the intercellular spaces, etc., and the rapidity and magnitude of whose movements depend on a variety of circumstances.

This water comes from the vascular system, by which it is brought up from the soil after being absorbed by the root-hairs, and it contains traces of the necessary mineral salts—chiefly sulphates, nitrates, and phosphates of calcium, magnesium and potassium, in small and varying quantities—as well as dissolved gases. Whether the oxygen dissolved in the water absorbed at the root reaches the cells higher up in the plant or no, it is at least clear that the water in these cells becomes oxygenated by contact with the atmospheric air which penetrates into the intercellular spaces, *viâ* the stomata and lenticels.[§] Moreover, it is impossible to doubt that oxygen reaches the water in the cells from the assimilating chlorophyll corpuscles. However, we are not confined to inferences in this connection, since Pfeffer has conclusively shown that free oxygen does exist in the cell-sap[||] in the normal condition.

The importance of this matter for my purpose is that the movements of water, chiefly due to transpiration, but also incidentally caused by local decomposition, osmotic absorptions, etc., are effective in bringing about aëration of the tissues; of course this aëration (or ventilation) is not to be confounded with the movements of free gases, due to diffusion or to expansions or contractions due to changes of temperature.[*]

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[*] For a general account of carbon assimilation see Sach's 'Lectures on the Physiology of Plants,' especially pp. 296—323.

[†] This oxygen is not active (see Pfeffer, 'Beitr. z. Kenntn. Oxydationsvorgänge,' p. 478).

[‡] The literature of this part of the subject is enormous, and dates from Priestley ('Phil. Trans.,' 1772) to the present time. It may be said to fall under four heads: (1) the nature and functions of chlorophyll; (2) the absorption of carbon dioxide and the evolution of oxygen; (3) the intensity and kind of light necessary; (4) the chemical processes which intervene between the coming together of the carbon dioxide and water and the production of the final visible product—starch. I shall, naturally, here refer only to such special literature as bears on the main subject of the present lecture.

[§] Sachs, 'Flora,' 1862, Nos. 11 and 21, and 1863, p. 33; also *Bot. Zeitg.*, 1862, col. 366; Godlewski, 'Flora,' 1873, p. 378, and 'Arc. des Bot. Inst. Würzburg,' vol. iii., Heft 1, 1884; G. Kraus, *Jahrb. für wiss. Bot.*, vol. vii., 1870, p. 511; Famintzin, *Jahrb. für wiss. Bot.*, vol. vi., p. 34.

[||] Baranetzky, 'Die Stärkeumbildenden Fermente,' 1878.

[*] Numerous interesting results have been obtained of late years confirming and strengthening our theory of carbohydrate assimilation: see Böhm (*Bot. Zeitg.*, 1883, col. 33), A. Meyer (*Bot. Zeitg.*, 1886, col. 81), Laurent (*Bot. Zeitg.*, 1886, col. 151), who proved that leaves deprived of starch can form it from various sugars, glycerine, etc.; also Wehmer (*Bot. Zeitg.*, 1887, col. 713), O. Löw, *Ber. d. Deutsch. Chem. Gesell.*, 1886, p. 141), Bokorny (*Ber. d. Deutsch. Bot. Gesellschs.*, 1888, p. 116), who confirmed the above and proved the same for methylal, methyl alcohol, glycol, etc.; and Saposchnikoff (*Ber. d. Deutsch Bot. Gesell.*, 1889, p. 258). The organic acids cannot be employed with the same results (see Wehmer, *op. cit.*, p. 713), though they can be absorbed and oxidized in the living cells (Warburg, *op. cit.*, pp. 112—118) more rapidly than they are decomposed outside the plant.

[†] See Schimper, 'Unters. über die Entstehung der Stärkekörner' (*Bot. Zeitg.*, 1881, p. 881); A. Meyer) *Bot. Zeitg.*, 1880, Nos. 51 and 52).

[‡] For the general exposition see Sachs, 'Lectures on Physiology of Plants,' pp. 246—254, and the text-books quoted. Then Kohl, 'Die Transpiration der Pflanzen,' etc., Brunswick, 1886; Eberdt 'Die Transpiration d. Pflanzen und ihre Abhängigkeit von äusseren Bedingungen,' Marburg, 1889. The literature is collected by Burgerstein in 'Verhandl. d. K. K. Zool.-Bot. Gesell. zu Wien,' vol. xxxvii., 1887; vol. xxxix. 1889.

[§] See Godlewski's explanation of the fine air-passages which run between the medullary ray-cells and place them in communication with lenticels (Pringsheim's 'Jahrb. f. wiss. Bot.,' 1884, pp. 569—630).

[||] 'Unters. a d. Bot. Inst. in Tübingen,' vol. i. p. 684, and 'Beitr. zur Kenntniss der Oxydationsvorgänge in lebenden Zellen' ('Abhandl. der Kgl. Sächsischen Gesell. d. Wiss.,' vol. 15, 1889, p. 449).

These, then, are some of the changes which are continually and continuously going on in the living cells of the normal plant. Of course, I have not attempted any exhaustive list, or even a complete sketch of the structure and processes met with in living cells, the purpose being simply to bring prominently into view certain features of importance to the matter in hand.

The Death of the Cell.

The next point to consider is, what changes are observed when such cells as the above are killed.[†] It appears to be of little moment how the killing is brought about, so far as the final appearances are concerned. We may place the cell, for instance, for a few minutes in hot water (say 55–80° C.), or expose it to very low temperatures, or to the vapour of chloroform, to acid gases, etc., and in each case the morphological changes are substantially the same.[‡] In the first place, the movements of the protoplasm cease, and the granulation increases, while the whole contracts away from the cell walls into a more or less shrivelled, irregular lump. The cell-sap, previously held in the sap-vacuoles[§] under pressure in the turgescent living cell, now escapes, and suffuses the whole tissue, evidently because, the structure of the protoplasm being destroyed, it can no longer be kept in bounds as it was before. It would carry us too far to enter into the discussion as to what kind of changes the protoplasmic lining has undergone in its different layers; it suffices to note the fact that, whereas the living protoplasm was able to regulate the entrance of substances into the cell-sap and their escape from it, it is no longer able to do so when the cell has been killed, and the uncontrolled sap escapes as said. This sap is acid, often strongly so, and contains among other things certain bodies, known generally as chromogenes, which, on exposure to the air, undergo oxidation changes which result in the formation of brown colouring matters. We know very little about these chromogenes beyond the fact of their existence, but the evidence goes to show that they are unstable bodies of various kinds which are present in the cell-sap under such conditions that they are not directly oxidized by the passive oxygen dissolved in the sap; on exposure to the air, however, some substance in the sap acts as an oxygen-carrier, and they undergo the change of colour referred to.[||] The consequence of this is that the disorganized protoplasm, cell-walls, etc., of the tissues thus suffused turn brown, resulting in the well-known colours of dead vegetable tissues. The changes are accelerated by the organic acids, which cause the chlorophyll grains to turn yellow, and then suffer further changes from the oxygen of the air.

It is, of course, unnecessary to remark that all the rhythmical series of processes connected with the living cell are now put an end to; respiration, metabolism, growth, assimilation have obviously ceased, as have all the other functions of the cell. Moreover, the evaporation of water is no longer controlled by the conditions imposed on it by the protoplasm of membranes of living cells,[*] and if the weather becomes dry the dead tissues rapidly desiccate and shrivel.

In attaining the above described extreme, commonly called death, the normal living cell, in the condition commonly called health, passes through a series of vicissitudes which affect every part of it; but it is necessary to admit that the state called death and that called life in the above discussion are by no means definite and utterly distinct from one another. On the contrary, the very essence of life consists in its mobility, and the living cell is continually approaching and receding from the state termed death. In a certain sense, no doubt, death may be regarded as the cessation of life, but this does not help us, because the *crux* resides in determining when life ceases in the protoplasm. Of course we can lay our hands, as it were, on given cells or tissues of cells and say these are "living," whereas others are "dead," but the difficulty is to decide when the one state passes into the other.

Between normal life, *i.e.*, the condition of affairs where the life processes are going on actively, and the state of permanent death, then, there are all possible gradations: many of these gradations coincide with the phenomena of disease—pathological conditions—and it is toward this difficult domain that I have now to carry the discussion.

Variations in the Environment as Affecting the Physiological Processes in the Host.

In describing the phenomena going on in what was termed the normal, living cell, I only hinted at the fact that variations, more or less periodic in nature, occur in the intensity of the processes, a truth which at once shows the difficulty of deciding what a normally living cell really is. But it is of the utmost importance to recognize that all the life-processes and the changes dependent on them, are in their very nature variable. One set of factors which bring about the variations are internal and inherited, and very little is known of them beyond the fact of their existence, which is usually formally expressed by the admission that different plants differ in "constitution;" fortunately, this series of factors does not concern us at present, and it does not vitiate our general conclusions to assume that on the whole the differences in constitution between plants of the same species are so minute that they may be neglected.

The second set of factors is of much greater importance, because they give rise to pronounced and easily recognizable changes in the plant. These factors are such as the following:—Changes of temperature, variations in the intensity of the light, differences in the amount of aqueous vapour in the atmosphere, etc.; in short, the variable factors of the physical environment of the plant. That these affect the physiological processes in the cells is well known;[†] but what I have to do is to trace some of the effects, and show how they bring the living tissues into such conditions that they more or less readily resist or succumb to the attacks of certain parasitic fungi.

Taking the more or less arbitrarily chosen but convenient headings already employed—respiration, metabolism, growth, carbon assimilation, etc.—let us now see what kinds of effects the external agents referred to may produce.

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[*] For further discussion see Pfeffer, 'Pflanzenphysiologie,' vol. i., pp. 112—118, and the literature on transpiration.

[†] On this subject, *cf.* Frank, 'Krankheiten der Pflanzen,' 1880, pp. 12—15; Detmer, in *Bot. Zeitung*, 1886, No. 30; Pringsheim, in 'Jahrb. f. wiss. Bot.,' vol. xii., 1880 (pp. 47—50 of the separate copy); also de Vries, 'Untersuch. mechan. Ursachen d. Zellstreckung,' pp. 17—21.

[‡] This, of course, without prejudice as to the sequence of molecular changes which bring about the final result.

[§] See Pfeffer, 'Osmotische Unters.,' de Vries, 'Studien üb. d. Wand d. Vacuolen,' etc., in addition to the foregoing.

[||] See especially Pfeffer, 'Beitr. zur Kenntniss d. Oxydationsvorgänge in lebenden Zellen,' pp. 447—454, where the older literature is collected. The remarkable behaviour of these substances in the cell-sap suggests how extremely complex every part (even the presumably simplest) of the organism of the cell must be.

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[*] See Sachs, 'Physiologie Végétale,' pp. 258, for proof that water evaporates less rapidly from living cell-surfaces than from dead ones, and for literature (my edition is the French one of 1868).

[†] See Sachs, 'Lectures on the Physiology of Plants,' pp. 189—204, 299—308, 552—555, etc., for an introductory general account. The special literature will be noticed as we proceed.

Respiration, though it proceeds at very low temperatures,[*] is rendered considerably more energetic as the temperature rises, until, after a certain relatively high temperature (about 45° C.) is reached, it becomes less intense, and injury to the cells soon results, undoubtedly from damage to the structure of the living substance, owing to the excessive disturbances brought about in its metabolism. Speaking generally, we may fairly say that at temperatures near 0° to 5° C. the respiration is very slow; as the temperature rises the respiratory activity increases, at first slowly, and gradually more and more rapidly, till at 35° to 45° C. it is at its *maximum* intensity; beyond that it rapidly declines, and ceases with the death of the protoplasm at about 50° C.

Light appears to exert little or no effect on the normal process of respiration, unless relatively very intense,[†] when it may possibly promote it; but bright light may accelerate certain processes of oxidation which would otherwise have gone on more slowly.[‡] This much probably may be said, however, in so far as light influences oxidation processes (other than respiration) in the living cell, the action increases with the intensity of the light.[§] As we shall see later on, there are some other remarkable changes going on in the cell, and connected indirectly with the action of light and respiration, but these do not probably affect the general conclusions just advanced, close as is the connection between respiration and metabolism generally.

The question now arises as to the quantity of oxygen necessary for respiration, and as to the effects of undue accumulation of the carbon dioxide; it is too long a subject, and it is unnecessary to discuss it in detail.[||] I need only remind you that in the absence of oxygen respiration ceases,[¶] while it is interfered with when the amount of oxygen is much greater per unit of volume than in ordinary air, *i.e.*, when the oxygen is condensed; under ordinary circumstances, however, the free oxygen of the atmosphere amply suffices, provided it can pass readily into the cells and be renewed. Anything of the nature of stagnation must be assumed to impede respiration, whether simply from the accumulation of carbon dioxide, or other products of respiratory activity and consequent metabolism, or because sufficient oxygen-molecules do not pass into the protoplasm in a given time. Since the extremes are not nearly attained in nature, however, I pass by this subject with the remark that in proportion as the intercellular passages or other communications with the atmosphere[**] become blocked by condensed water, for instance, the ventilation of the plant—and therefore its respiration—may suffer[††] for the time being simply on account of the slower diffusion of the gases, carbon dioxide and oxygen, from one part of the plant to another.

(*To be continued.*)

DISTRIBUTION OF SOLANINE AND ITS MICRO-CHEMICAL REACTIONS.

M. E. Wotozal has published an elaborate paper on this subject in Russian. He finds only three trustworthy tests for the presence of solanine, viz.: (1) Mandalin's vanadin-sulphuric acid, *i.e.*, 1 part of ammonia-metavanadinate in 1000 parts of tri-hydrate of sulphuric acid ($H_2SO_4 + 2H_2O$). The test is one of extraordinary delicacy; if the preparation contain solanine, it goes through the following series of colours: yellow, orange-red, purple-red, brown, pure red, violet, blue-green, and then disappearing altogether. (2) Brandt's reagent: 0·3 gram sodium selenate in a mixture of 8 c.c.m. of water and 6 c.c.m. of pure sulphuric acid. If the preparation containing solanine is first warmed, then, on cooling, it becomes first violet-red, then orange-red and yellow-brown, the colour finally disappearing. (3) Pure sulphuric acid as a macro-chemical reagent, but this test has no advantage over the other two.

Solanine was found in nine species of *Solanum* and three of *Scopolia*. In the tubers it is found chiefly in the neighbourhood of the "eyes." In the vegetative portions it occurs in greatest abundance in the young tissues, and in the mature tissues it is usually entirely wanting except in the neighbourhood of the buds, and of the origin of the roots. In the floral organs the reverse is the case, the quantity of solanine increasing for a time in both calyx and corolla as the flower opens, but ultimately disappearing from these organs, while it continues to increase in the green unripe fruit, diminishing again when the fruit is ripe, and being then localized chiefly in the peripheral layers. The seat of the solanine is the cell cavity, where it occurs in the form of a soluble salt, and from which also it penetrates the cell wall by diffusion.

The author regards solanine as a product neither of primary synthesis nor of disorganization, nor as a secretion or excretion, nor as a reserve substance, nor as a transporting form like asparagin, but as an intermediate stage in the series of chemical changes which the already forward plastic substances undergo in the living cell. In the flowers and unripe fruits it undoubtedly also serves as a protection against consumption by animals.

SPLITTING OF THE FRUIT OF AURANTIACEÆ.

In the 'Bolletino' of the Society of Naturalists of Naples, Sig. Savastano contributes a paper on the cause of the splitting which is so common a phenomenon in the fruits of the various Aurantiaceæ, especially of the orange, and in some other fruits, such as stone-fruit, pomegranates, pears, figs, etc. He states it to be the result, not of the attacks of any fungus or bacterium, but of the excessive absorption of water by the protoplasm, and of the small resistance offered by the cell-wall to compression from the tissue of the sarcocarp.

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[*] See Kreussler in 'Landwirthschaftliche Jahrbücher,' vol. xvi., 1887, and vol. xvii., 1888, for the dependence of respiration on temperature.

[†] Of course referring to ordinary daylight only.

[‡] See Pfeffer, 'Pflanzenphysiologie,' vol. i., p. 376, as to possible bearing of this on decomposition of organic acids (Pfeffer, 'Über d. Oxydationsvorgänge in leben. Zellen,' pp. 454, 469, 472).

[§] As to the effect of very intense light, see Pringsheim, 'Ueber Lichtwirkung und Chlorophyllfunction in der Planze' (*Jahrb. f. wiss. Bot.*, vol. xii., 1880, pp. 84—93). It should be remarked that Pringsheim not only shows that the action is really due to light, and not heat-rays, but that the more refrangible rays (blue, etc.) are the most active (see pp. 40 and 52). These and others of Pringsheim's observations may be accepted without prejudice as to his theory of assimilation.

[||] For further details, *cf.* the text-books already cited, *e.g.*, Pfeffer, vol. i., p. 377.

[¶] We are of course not concerned with so-called "intramolecular" respiration (*cf.* Pfeffer, vol. i., pp. 370—374).

[**] See Russow, 'Zur Kenntniss der Hölzer,' etc., in *Bot. Centralbl.*, 1883, vol. xiii., p. 136.

[††] It is no uncommon event, even in England, to see the intercellular passages of leaves blocked with suffused water after a cold night, but the phenomenon is much commoner in the tropics, and occurs quite generally in the hill country in Ceylon, for example. As the temperature rises during the morning, the water quickly evaporates and the leaf loses its dark, suffused, limp appearance, and becomes normal. Of course, the phenomenon is due to proportionally more water being absorbed from the relatively warm soil than the cool air can take up. See also Pfeffer, 'Pflanzenphys.,' vol. i., p. 172, and the literature concerning the ascent of water in plants (collected in Marshall Ward, 'Timber and some of its Diseases,' 1889, pp. 59—141).

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PHARMACEUTICAL LEGISLATION.

IN view of the contemplated drafting of a new Pharmacy Bill, and of the probable discussion of the provisions that it is desirable should be embodied in it, some useful purpose may perhaps be served by calling attention to certain features of the Irish Pharmacy Bill that is now before Parliament. The sixteenth clause of that Bill provides that any person or persons lawfully keeping open shop for the sale or compounding of poisons and for dispensing or compounding medical prescriptions shall personally manage and conduct such shop and the sale or compounding of poisons and medical prescriptions therein, or shall employ for those purposes as an assistant or manager in such shop a duly registered chemist and druggist or a licentiate of the Pharmaceutical Society, or a pharmaceutical chemist. And the same clause further provides that the person or persons lawfully keeping open shop as above shall for the purposes of the Act and of the principal Act of which it is intended to be an amendment, be held to be the seller of poisons or the compounder of medical prescriptions sold or compounded by the assistant or manager. In this clause, therefore, the principle of the responsibility of the proprietor or proprietors of a chemist's business is upheld at the same time that the necessary qualification of the acting assistant or manager is enforced.

But the introduction of the word " persons " in this clause raises some doubt as to whether sufficient security is provided for the qualification in all instances of the "persons" who may lawfully keep open shop as aforesaid. For since clause fourteen only provides that it shall be unlawful for any person in the future to assume the title of chemist and druggist without having passed an examination, and the interpretation clause does not state that the provisions of the Act are to apply to corporations, it seems as if the keeping open shop by a corporation might still be lawful, and that although the proprietors of such a shop would be responsible for the sales of poison and compounding of prescriptions therein they would not as a corporation require to be qualified. The seventeenth clause of the Bill, providing for the disclosure of the proprietor or proprietors of a business and the names of the duly qualified assistants or managers of such shops as are not conducted by the proprietors, seems also to point in the same direction, and to suggest that it is contemplated to recognize the legality of keeping open shop for the sale of poison and for compounding prescriptions by "persons" constituting a company and being in this respect and so far outside the provisions of the law, as in the case of the English Pharmacy Act. This is a point that will probably receive attention while the Bill is before the House of Lords, though it has already been passed through the Commons.

THE MICROBE CONFLICT IN THE ORGANISM.

ALTHOUGH the results of recent researches would seem to have demonstrated that immunity against various diseases can be produced by the injection into the organism of the soluble products of the life of microbes, up to the present there has been a complete failure to identify the substance to which in any case this "chemical immunity" is due. It is true that it has been suggested that the action is in some way associated with the production of ptomaines, but although the ptomaines made by microbes concerned in the causation of diseases against which "chemical immunity" has been attained have in many cases been isolated, no experiment has yet been published proving the production of the immunity by such a substance. In fact, in a valuable report on the conflict between the organism and the microbe, presented by Mr. E. H. HANKIN to the Scientific Grants Committee of the British Medical Association and published in the current number of the Journal, reasons are given for supposing that not ptomaines, but compounds of quite a different nature, are the active agents in causing immunity.

Adopting the theory that the immunity is, for the most part, at least, the result of an acquired tolerance of a poison in the organism, Mr. HANKIN points out that acquired tolerance of an alkaloidal poison, although not unknown, has only been obtained to a limited degree as the result of a long-continued succession of doses, whilst in the case under consideration a very persistent tolerance, lasting for months, or even years, appears to be induced by administering a single dose, or at most a very few doses. Further he suggests that whilst the poison in regard to which tolerance is established is probably produced by the microbe to enable it to live in the organism by lowering the bacteria-killing power possessed by every living animal body, no analogous property is known to be possessed by alkaloidal compounds. On the other hand, certain poisons supposed to possess the property of suppressing the bacteria-killing power of the body are all albumoses or inseparable from them, and it is known that an immunity from the poisonous effects of some members of this class of proteids can be established by the ingestion of very small doses. These considerations led Mr. Hankin to make a successful attempt to isolate an albumose from the products of anthrax cultures, and by means of this albumose he has found it possible to produce immunity against anthrax, not only in rabbits, but even in mice, which are so sensitive to the disease that previous attempts in this direction had failed. It has also been ascertained by other authors that poisonous albumoses occur in the products of cultures of diphtheria, tetanus, cholera and typhoid microbes. So far therefore as this part of the subject is concerned it would appear that any immunity established is due to giving the organism an opportunity, under special conditions—*i.e.*, by the ingestion of minute doses—of becoming tolerant of the presence of an albumose poison which when introduced under the conditions that ordinarily prevail in the setting up of disease has power to paralyse the normal bactericidal function of the body.

In connection with this subject of the resistent power of the organism against the invasion of microbes, Mr. Hankin, in another part of the report, under the heading "Defensive Proteids," refers to a globulin which he has isolated from lymphatic glands and found to possess the power of killing anthrax bacilli. In some respects it resembles the fibrin ferment, since it has the property of causing blood to clot, but the fibrin ferment does not seem to have any bactericidal power. Some interesting experiments were made to test the effect on the microbe-killing properties of this globulin of contact with leech extract, which is said to have the property of arresting the coagulation of blood by destroying the fibrin ferment. It was found that a small quantity of an extract made by exhausting the heads of leeches with water at a temperature of 37° C., did not destroy the bacteria-killing property of the globulin, but a larger quantity limited it so as to allow of the development of a characteristic anthrax culture in its presence. It was also ascertained that a solution of the extract was capable of preventing many times its volume of blood from clotting. Mr. Hankin thinks that the immunity obtained with the anthrax albumose is a proof that this class of proteids forms one of the factors in the conflict between the organism and the microbe, and that if it could be shown that cell-globulin has or tends to have an action in the organism similar to that it has in a test tube, the question would arise as to whether the anthrax bacillus defends itself from the action of the cell-globulin by means of its albumose.

In addition to the official notices that have appeared in the advertisement pages of the Journal we take this opportunity of calling attention to the fact that next Wednesday, the 23rd inst., will be the latest time for entering as a candidate for the Pereira Medal and other Council Examination Prizes. In order to compete for these prizes candidates must have passed the Society's Major examination during the present session and have been Associates of the Society at the time of passing that examination.

* * *

The arrangements at present made for the meetings of chemists and druggists to be held in the west of England at the end of this month are, that the Exeter meeting will take place in the Clarence Hotel on Tuesday, the 29th inst., at 8 p.m., and the Plymouth meeting on the day following at the Athenæum in that town at an earlier hour in the day. There is to be a dinner in the evening, and if time permits, an excursion in the afternoon after the meeting has broken up.

* * *

From a report published in the *British Medical Journal* for the 12th inst., it appears that at the last meeting of the Parliamentary Bills Committee of the British Medical Association, the Chairman, Mr. Ernest Hart, presented a Memorandum "which he had drawn up with great care so as to increase the means of restriction for the sale of poisons," and suggested that it should be circulated among the members of the Committee with a view to its discussion next year. Eventually this was agreed to, and authorization was also given for copies to be transmitted to the President of the General Medical Council, the Master of the Apothecaries Society, and the President of the Pharmaceutical Society.

* * *

Some communications have been received expressing regret that Mr. Holmes has decided to resign the position he has recently occupied in connection with the teaching of materia medica. No doubt that regret will be very generally felt, but it must be remembered that the duties connected with teaching have been found by Mr. Holmes to take up so much of his time as to interfere with those appertaining to the curatorship of the Museum. These latter are essentially of a personal nature, and Mr. Holmes's experience serves to justify the reluctance with which, in deference to pressure, he undertook the additional duties of teaching materia medica, which he now finds that he cannot continue to discharge satisfactorily.

* * *

Notice has been received of the death, at the age of 83, of Mr. John Ralfs, the botanist, who has for some years past resided at Penzance, and has long been known as a diligent cultivator of botanical science, especially in relation to the flora of Cornwall and Devon.

* * *

The *Times* of last Monday reports the death of Mr. William Kitchen Parker, formerly Hunterian Professor of Comparative Anatomy at the Royal College of Surgeons, which took place on the 3rd inst. at the house of his son, Professor Parker, of the South Wales University College, Cardiff. As a special point of interest for readers of this Journal we may call to mind the circumstance that for some years before taking up the study of medicine Mr. Parker was a chemist's assistant, and it is recorded of him that while engaged in business in that capacity from seven in the morning until ten at night, it was his practice to rise several hours before his morning work began to collect botanical specimens. After coming to London he became assistant to Professor Todd at King's College, and qualified for medical practice in 1849. His first work as an anatomist, published in 1857, related to the Foraminifera, and it was followed up by a long series of memoirs of first-class importance relating to the morphology of the skull and other anatomical subjects. Mr. Parker was 67 at the time of his death.

Pharmaceutical Society of Ireland.

JULY LICENCE EXAMINATIONS.

The following are the names of the candidates who passed this examination:—Messrs. Blackham, Lees, MacSweeny, Kay, McWalker, Beck, Ryan, Garry and Moore, have been adjudged by the examiners to be competent to act as Pharmaceutical Chemists.

JULY PRELIMINARY EXAMINATION.

The following are the names of the candidates who have passed this examination:—Messrs. Telford, Getty, Meeke, Bullock, Huston, Lawson, O'Neill and Kerrigan have passed. Six were rejected.

Society of Chemical Industry.

VISIT TO THE BURTON BREWERIES.

As stated last week, among the visits made by the members attending the ninth annual general meeting of the Society of Chemical Industry held at Nottingham on Wednesday, July 9, an excursion was made to Derby to inspect the Midland Railway Company's works there, and on the following day a large majority of the members present journeyed to Burton-on-Trent, the centre of what is perhaps the most important brewing district in the world. Through the courtesy of the five great representative firms, Messrs. Bass, Allsop, Inde Coope, Salt and Worthington, admirable preparations had been made for their reception, and the company having divided itself into smaller parties and made choice of the brewery which they wished to see, separated for the work of inspection.

The brewing industry at Burton-on-Trent is carried on under highly favourable conditions, which from their uniformity cause the methods of manufacture and the more essential portions of the plant to be practically identical throughout the town, thus rendering a series of visits to the individual breweries unnecessary for gaining an insight into the general principles of the trade, and giving the visitors ample time to go over one of them without undue haste, and obtain fuller information than would otherwise have been possible. Moreover, the moderate size of the parties allotted to the different breweries made it easy for every visitor to hear the descriptions and explanations of the gentlemen who kindly undertook the office of guides, and to pass comfortably from one point of interest to another without the undignified scrambling that is apt to mar expeditions of this kind.

The party whose visit it is proposed to describe were taken in brakes to Messrs. Worthington's and hospitably received upon arrival by the firm's representatives, and invited as a preliminary measure to ascertain the quality of the commodity they produced, a proposition which was agreed to *nem. con.* and acted upon forthwith. A movement was then made for the building devoted to the production of the first necessity for beer, viz., malt. The barley when first received is cleaned, it being absolutely essential for successful brewing for dirt and dust to be removed, and imperfect or broken grains to be eliminated; it is even necessary to get rid of small grains and use a very uniform product in order that the malting process may proceed regularly. Contrary to the popular belief, much of the barley is not English, but comes from districts where artificial manuring is less common, as, for example, Bohemia and Moravia, the grain thus grown containing less albumenoid matter and being richer in starch, an obvious advantage.

The cleaned barley is conveyed to large rectangular tanks, where it is steeped in water to start germination. At the malthouse visited there are four such cisterns, each capable of containing sixty-five quarters of grain, the output being about 190 quarters in four days. At this time of year the whole of the structure is empty and deserted, as malting does not begin until September. The grain after soaking is spread out on large floors, one for each tank, and the process of germination allowed to continue, the barley being constantly turned over, while the temperature is watched and regulated by central ventilators; the proper quantity of moisture is ensured by the use of sprinklers arranged at short intervals. When germination has progressed as far as is desired, the barley is conveyed to drying floors made of square perforated tiles, heated by baskets of live coke some thirty feet below them.

The tiles are of peculiar construction and are worthy of a short description. They are of ordinary red tile clay, about nine inches square, and on the under side are holes about three quarters of an inch in diameter, which do not, however, penetrate completely through, but cease when a thickness of about a quarter of the total thickness of the tile remains. The thin disc thus left is perforated by some half-dozen smaller holes tapering from the under side of the disc to the upper side, *i.e.*, the upper side of the tile itself. By this arrangement the tile can be made of a thickness sufficient to enable it to bear considerable pressure, while the heat is not unduly obstructed, and the small holes are not liable to become choked, for being coned in the manner described they are to a certain extent self-clearing. Tiles of this description are made in the town and cost about eightpence apiece.

At this stage the grain ceases to be barley and becomes malt; the roots which have made their appearance during germination are removed and constitute "combings," finding a market as a food for sheep, while the finished malt is stored in bins holding some 3000 quarters.

Leaving the malt house the party crossed the road to the brewery proper, it being a characteristic feature of Burton, doubtless due to its steady natural growth, to have portions of the same brewery scattered over the town, but in direct communication by a network of little private lines which cross the streets on the level almost exclusively, and give them a curiously hybrid appearance.

The first operation which the malt undergoes is that of grinding; it is fed into a hopper, passed through a riddle to remove stones or similar accidental impurities, and ground between Steel's rollers. The removal of possible stones is very necessary, for were one to find its way to the rollers, a spark might well be produced and cause an explosion in so dusty an atmosphere. The grist thus formed passes to the mashing room, where it goes through a Steel's masher consisting of a shaft with radial spokes revolving within a horizontal cylinder; here it meets hot water and is beaten up to a pasty consistency and delivered into the mash tun through a wide copper nozzle capable of serving either of two adjacent tuns. The mash tun (which is cylindrical) is fitted with a false bottom consisting of perforated copper plates framed by wooden sectors, an agitator, and a pipe for supplying hot water at its base; it can mash about forty-six quarters at a time. It is covered in to prevent access of dust and its concomitant germs. After mashing, in which process the temperature has to be very carefully watched, the sweet wort, as it is termed, is allowed to flow out through the perforated bottom, and the exhaustion of the grist completed by repeated treatment with hot water until all soluble matter is removed; the residue constitutes "brewers grains." The wort is then pumped into the coppers, which are simply large copper cauldrons heated either directly or by close steam; the proper proportion of hops is added and the whole boiled for about three hours, after which it is run into a tank termed the top-back, the wort run off and the exhausted hops pressed and sold as manure. 250 barrels are produced at every mash, the time occupied being six hours, and this continues without intermission the week through. The separated wort goes to a settling tank, in which it is also cooled to some extent, the cooler clear liquor being continually drawn off from the top by an ingenious device consisting of a vertical tube formed of segments fitting together telescopically and attached to each other by chains; the top one is connected by a chain passing over a couple of pulleys with a float, which as it sinks with the wort raises the segments successively from those below them, thus reducing the available length of the tube, and lowering its upper end just beneath the surface of the wort as it sinks. The clear wort passes to the coolers, the usual form of which consists of a series of horizontal copper pipes arranged in a vertical frame; through these cold water flows while the wort trickles down the outside from top to bottom, its temperature being reduced to a little below 60° F. It is then ready for the fermenting vats, which are rectangular wooden vessels carefully covered and contained in a room kept as free as possible from dust, while all chance splashes of wort are equally scrupulously avoided, for the wort is now an excellent medium for the cultivation of low organisms, and it is highly desirable to prevent the access of any but yeast. At Messrs. Worthington's yeast selected as being free from foreign growths is added, and fermentation allowed to proceed from forty to forty-eight hours, after which the beer is cleared from the scum resulting from the propagation of the yeast by a process peculiar to Burton and called the "union" system.

This method, which appears to have had its origin in the elementary plan of filling the barrels intended for distributing the beer with the turbid liquid, and allowing the lighter frothy yeast to ooze from the bunghole, replacing it by beer as the action progressed, is carried out in a long room fitted with two double rows of large barrels extending from end to end. Each barrel is fitted with a tinned copper tube rising from the bunghole, and terminating in a goose neck, directed downwards into a long trough. The barrels being filled from a common supply pipe, the yeast finds its way up the copper tube, and drips slowly out of its downward curved end into the yeast trough; at the same time provision is made for replacing it by beer, so that the barrels remain full. The temperature in the yeast trough, as well as in the barrels, is controlled by suitable water-pipes running through them. When the yeast has all found its way out, the contents of the barrels are allowed to flow out from a stop-cock on the lower side, which projects some six inches within the barrel, thus permitting any sediment to remain behind. The contents of the yeast trough, freed from beer, is taken to the "barm press-room," and there filter-pressed, the resulting yeast being sold, though it is now rather a drug in the market; a small quantity of it is, however, not pressed, but used for the ordinary requirements of the works.

The finished beer is now fit for the cask, and a good deal of its chance of approval by consumers depends on that vessel. A few brewers make their own, but it appears more usual to keep the industries distinct, and accordingly evidence of the cooper's trade is not wanting in the town. Plainly, the first essential of a cask is that it shall be tight, and its compliance with this requirement is ascertained by subjecting it to steam pressure. Each cask is brought under a conical brass nozzle, connected at right angles with a steam pipe, which rocks on a pivot at its other end; the said nozzle is then forced into the bunghole, steam turned on, and any leaks at once detected by escaping jets. The cask, if approved, is further examined by thrusting a lighted gas-jet within it and scrutinizing its interior, then washed out with hot water and dried by placing it over a jet from which hot air issues. In all things connected with a brewery, cleanliness is of the first importance, and disinfectants, particularly calcium bisulphite, are largely used; but in the case of a cask which has once proved itself unreliable and earned the right to be called, in the expressive argot of the place, "a stinker," it is found cheaper to condemn it altogether and not entrust it with the duty of beer-holding again. The bunging is a matter of some little moment, and Messrs. Worthington's are now fitting their casks with brass brushes, recouping themselves for the first outlay by avoiding the necessity of replacing the central stave of the cask at intervals, on account of the edges of the bunghole becoming worn and splintered; the wooden bungs are turned upon the premises.

Although the actual sequence of the visits was somewhat different from that given above, it has been thought well to preserve the continuity of description of the process of brewing by deferring the description of what was perhaps the most interesting part of all, until now. Up a formidable flight of steps is found the brain of the works, in the shape of an admirably appointed laboratory. It is here that the beer comes up for judgment and sentence, its very destination being determined from the data here obtained. Passing through the laboratory proper, where by the way was noticed a capital form of glass worm condenser, in which the corks, often troublesome and leaky, were dispensed with, and the supply and exit tubes for the cooling water, as well as the glass worm itself, were all sealed with the outer body, the balance room is reached, and beside the instruments from which it takes its name was one of equal importance to the brewer's chemist—the microscope. It is by its means that the soundness and keeping qualities of the beer are judged, the method adopted being briefly this:—Samples from each brewing are taken and placed in small glass flasks furnished with side tubes that turn downwards like the side-tube of a fractional distillation flask; the flasks are then closed and the ends of the side tubes allowed to dip into small beakers, thus sealing them. The entire set of flasks stands on a large copper water tray, the temperature of which is so regulated that the contents of the flasks are kept at 72° F.: this is effected by enclosing a thermostat in another small flask of the same size as the test flasks, and adjusting it until a thermometer dipping in the water contained in it registers that temperature. The samples are kept thus for three weeks, at the end of which time they are examined, and the sediment that may have formed put under the microscope. If other growths than yeast are visible to any notable extent, the beer, though at present sound, will not keep as long as it otherwise would, and should be brought into immediate consumption. In the contrary case it may be considered safe for keeping or export. By this forcing process the alterations that might take place only after weeks or months during which purely normal conditions prevailed, or after shipment to some tropical port, declare themselves sufficiently early to allow of steps being taken to avoid disappointment on the part of the consumer and loss of credit by the firm. Besides the control thus exercised over the finished product, one of the most important conditions of successful manufacture is secured by the aid of the chemist. Yeast proposed to be used in the ordinary process of fermentation is from time to time submitted to examination and its freedom from foreign organisms ascertained. Messrs. Worthington have tried the plan of cultivating an absolutely pure yeast and using that exclusively, and the experiment was carried out on a working scale, some hundreds of barrels being brewed therewith; but the method was abandoned, it being thought that a better flavoured beer resulted from the action of healthy though not absolutely homogeneous yeast. It seems that this is generally true of English beers, and it is even said that a little judicious mixing of yeasts is sometimes an advantage, in spite of the fact that on the continent pure cultivations are largely and successfully used.

The laboratory of a brewery bears the impress of the special character of its work very clearly; scrupulous cleanliness, at all times a goddess whom the chemist devoutly worships, has here her staunchest devotees, for it is well said that a vessel may be chemically clean and yet not histologically clean, and the bacteriological side of the work of a brewer's chemist makes him a stickler for a purity almost fastidious. Another outcome of his special requirements is to be found in the universal presence of the appliances necessary for photo-micrography. Thus equipped and dealing with instruments and methods too often ignored by the less progressive members of the profession, it is not surprising that among brewers' chemists we should reckon such names as O'Sullivan, Horace Brown and Morris.

After having thus made their tour of inspection and had their curiosity abundantly satisfied by the lucid explanations of the guides, the party proceeded by special train—in the form of a couple of trucks provided with chairs—round Burton to gain an idea of the place as a whole, all places of interest, the other large breweries and public buildings being pointed out by the obliging cicerones. For this purpose the unique way in which Burton is intersected by works' lines offers special facilities, and the trip was thoroughly enjoyable. While thus engaged other parties similarly conducted were met and hilarious greetings were interchanged. At about two o'clock the whole company arrived by detachments at St. Paul's Institute, a handsome building near the Midland Station, and sat down to enjoy the hospitality of the firms whose guests they were at an excellent luncheon. After the discussion of a *récherché* repast, Mr. O'Sullivan welcomed the members of the Society to Burton, and trusted that they would carry away with them none but pleasant recollections. After Mr. Ludwig Mond, of the firm Brünner and Mond, had replied on behalf of the Society and thanks had been returned for the reception and entertainment at the hands of the representatives of the firms who had so liberally thrown open their breweries for their benefit, the meeting broke up and the return journey was made to Nottingham.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At the last meeting of the Council of the London Chemists' Assistants' Association the following delegates were chosen to represent the Association at the forthcoming British Pharmaceutical Conference to be held at Leeds:—Messrs. T. A. Ellwood, C. W. Seccombe, A. C. Stark, C. J. Strother, and W. Lloyd Williams.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Photographic Image.*

BY PROFESSOR RAPHAEL MELDOLA, F.R.S., M.R.I.

The history of a discovery which has been developed to such a remarkable degree of perfection as photography has naturally been a fruitful source of discussion among those who interest themselves in tracing the progress of science. It is only my presence in this lecture theatre, in which the first public discourse on photography was given by Thomas Wedgwood at the beginning of the century, that justifies my treading once again a path which has already been so thoroughly well beaten. If any further justification for trespassing upon the ground of the historian is needed, it will be found in the circumstance that in the autumn of last year there was held a celebration of what was generally regarded as the jubilee of the discovery. This celebration was considered by many to have reference to the public disclosure of the Daguerreotype process, made through the mouth of Arago to the French Academy of Sciences on August 10, 1839. There is no doubt that the introduction of this process marked a distinct epoch in the history of the art, and gave a great impetus to its subsequent development. But while giving full recognition to the value of the discovery of Daguerre, we must not allow the work of his predecessors and contemporaries in the same field to sink into oblivion. After the lapse of half a century we are in a better position to consider fairly the influence of the work of different investigators upon modern photographic processes.

I have not the least desire on the present occasion to raise the ghosts of dead controversies. In fact, the history of the discovery of photography is one of those subjects which can be dealt with in various ways, according to the meaning assigned to the term. There is ample scope for the display of what Mr. Herbert Spencer calls the "bias of patriotism." If the word "photography" be interpreted literally as writing or inscribing by light, without any reference to the subsequent permanence of the inscription, then the person who first intentionally caused a design to be imprinted by light upon a photo-sensitive compound must be regarded as the first photographer. According to Dr. Eder, of Vienna, we must place this experiment to the credit of Johann Heinrich Schulze, the son of a German tailor, who was born in the Duchy of Magdeburg, in Prussia, in 1687, and who died in 1744, after a life of extraordinary activity as a linguist, theologian, physician and philosopher. In the year 1727, when experimenting on the subject of phosphorescence, Schulze observed that by pouring nitric acid, in which some silver had previously been dissolved, on to chalk, the undissolved earthy residue had acquired the property of darkening on exposure to light. This effect was shown to be due to light and not to heat. By pasting words cut out in paper on the side of the bottle containing his precipitate Schulze obtained copies of the letters on the silvered chalk. The German philosopher certainly produced what might be called a temporary photogram. Whatever value is attached to this observation in the development of modern photography, it must be conceded that a considerable advance was made by spreading the sensitive compound over a surface instead of using it in mass. It is hardly necessary to remind you here that such an advance was made by Wedgwood and Davy in 1802.† The impressions produced by these last experimenters were unfortunately of no more permanence than those obtained by Schulze three-quarters of a century before them.

It will, perhaps, be safer for the historian of this art to restrict the term photograph to such impressions as are possessed of permanence: I do not, of course, mean absolute permanence, but ordinary durability in the common-sense acceptation of the term. From this point of view the first real photographs, *i.e.*, permanent impressions of the camera picture, were obtained on bitumen films by Joseph Nicéphore Niepce, of Chalons-sur-Saone, who, after about twenty years' work at the subject, had perfected his discovery by 1826. Then came the days of silver salts again, when Daguerre, who commenced work in 1824, entered into a partnership with Niepce in 1829, which was brought to a termination by the death of the latter in 1833. The partnership was renewed between Daguerre and Niepce de St. Victor, nephew of the elder Niepce. The method of fixing the camera picture on a film of silver iodide on a silvered copper plate—the process justly associated with the name of Daguerre, was ripe for disclosure by 1838, and was actually made known in 1839.

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* Read at a weekly evening meeting, Friday, May 16.

† "An Account of a Method of Copying Paintings upon Glass, and of making Profiles by the Agency of Light upon Nitrate of Silver. Invented by T. Wedgwood, Esq. With Observations by H. Davy." 'Journ. R. I.' 1802, p. 170.

The impartial historian of photography who examines critically into the evidence will find that, quite independently of the French pioneers, experiments on the use of silver salts had been going on in this country, and photographs, in the true sense, had been produced almost simultaneously with the announcement of the Daguerreotype process, by two Englishmen whose names are as household words in the ranks of science—I refer to William Henry Fox Talbot and Sir John Herschel. Fox Talbot commenced experimenting with silver salts on paper in 1834, and the following year he succeeded in imprinting the camera picture on paper coated with the chloride. In January, 1839, some of his "photogenic drawings"—the first "silver prints" ever obtained—were exhibited in this Institution by Michael Faraday. In the same month he communicated his first paper on a photographic process to the Royal Society, and in the following month he read a second paper before the same Society, giving the method of preparing the sensitive paper and of fixing the prints. The outcome of this work was the "Calotype," or Talbotype process, which was sufficiently perfected for portraiture by 1840, and which was fully described in a paper communicated to the Royal Society in 1841. The following year Fox Talbot received the Rumford Medal for his "discoveries and improvements in photography."*

Herschel's process consisted in coating a glass plate with silver chloride by subsidence. The details of the method, from Herschel's own notes, have been published by his son, Professor Alexander Herschel.† By this means the old 40-foot telescope at Slough was photographed in 1839. By the kindness of Professor Herschel, and with the sanction of the Science and Art Department, Herschel's original photographs have been sent here for your inspection. The process of coating a plate by allowing a precipitate to settle on it in a uniform film is, however, impracticable, and was not further developed by its illustrious discoverer. We must credit him, however, as being the first to use glass as a substratum. Herschel further discovered the important fact that while the chloride was very insensitive alone, its sensitiveness was greatly increased by washing it with a solution of silver nitrate. It is to Herschel, also, that we are indebted for the use of sodium thiosulphate as a fixing agent, as well as for many other discoveries in connection with photography, which are common matters of history.

Admitting the impracticability of the method of subsidence for producing a sensitive film, it is interesting to trace the subsequent development of the processes inaugurated about the year 1839. The first of photographic methods—the bitumen process of Niepce—survives at the present time, and is the basis of some of the most important of modern photo-mechanical printing processes. [Specimens illustrating photo-etching from Messrs. Waterlow and Sons exhibited.] The Daguerreotype process is now obsolete. As it left the hands of its inventor it was unsuited for portraiture, on account of the long exposure required. It is evident, moreover, that a picture on an opaque metallic plate is incapable of reproduction by printing through, so that in this respect the Talbotype possessed distinct advantages. This is one of the most important points in Fox Talbot's contributions to photography. He was the first to produce a transparent paper negative from which any number of positives could be obtained by printing through. The silver print of modern times is the lineal descendant of the Talbotype print. After forty years' use of glass as a substratum, we are going back to Fox Talbot's plan, and using thin flexible films—not exactly of paper, but of an allied substance, celluloid. [Specimens of Talbotypes, lent by Mr. Crookes, exhibited, with celluloid negatives by the Eastman Company.]

If I interpret this fragment of history correctly, the founders of modern photography are the three men whose labours have been briefly sketched. The jubilee of last autumn marked a culminating point in the work of Niepce and Daguerre, and of Fox Talbot. The names of these three pioneers must go down to posterity as co-equal in the annals of scientific discovery. [Portraits by Mr. H. M. Elder shown.] The lecture theatre of the Royal Institution offers such tempting opportunities to the chronicler of the history of this wonderful art that I must close this treatment of the subject by reminding myself that in selecting the present topic I had in view a statement of the case of modern photography from its scientific side only. There is hardly any invention associated with the present century which has rendered more splendid services in every department of science. The physicist and chemist, the astronomer and geographer, the physiologist, pathologist, and anthropologist will all bear witness to the value of photography. The very first scientific application of Wedgwood's process was made here by the illustrious Thomas Young, when he impressed Newton's rings on paper moistened with silver nitrate, as described in his Bakerian Lecture to the Royal Society on November 24, 1803. Professor Dewar has just placed in my hands the identical slide, with the Newton rings still visible, which he believes Young to have used in this classic experiment. [Shown.]

Our modern photographic processes depend upon chemical changes wrought by light on films of certain sensitive compounds. Bitumen, under this influence, becomes insoluble in hydrocarbon oils, as in the heliographic process of the elder Niepce. Gelatine mixed with potassium dichromate becomes insoluble in water on exposure to light, a property utilized in the photo-etching process introduced in 1852 by Fox Talbot, some of whose original etchings have been placed at my disposal by Mr. Crookes. [Shown.] Chromatized gelatine now plays a most important part in the autotype and many photo-mechanical processes. The salts of iron in the ferric condition undergo reduction to the ferrous state under the influence of light in contact with oxidizable organic compounds. The use of these iron salts is another of Sir John Herschel's contributions to photography (1842), the modern "blue print" and the beautiful platinotype being dependent on the photo-reducibility of these compounds. [Cyanotype print developed with ferricyanide.]

Of all the substances known to chemistry at the present time, the salts of silver are by far the most important in photography, on account of the extraordinary degree of sensitiveness to which they can be raised. The photographic image, with which it is my privilege to deal on this occasion, is that invisible impression produced by the action of light on a film of a silver haloid. Many methods of producing such films have been in practical use since the foundation of the art in 1839. All these depend on the double decomposition between a soluble chloride, bromide, or iodide, and silver nitrate, resulting in the formation of the silver haloid in a vehicle of some kind, such as albumen (Niepce de St. Victor, 1848), or collodion on glass, as made practicable by Scott Archer in 1851. For twenty years this collodion process was in universal use; its history and details of manipulation, its development into a dry plate process by Colonel Russell in 1861, and into an emulsion process by Bolton and Sayce in 1864, are facts familiar to every one.

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* For these and other details relating to Fox Talbot's work, necessarily excluded for want of time, I am indebted to his son, Mr. C. H. Talbot, of Lacock Abbey.

† *Photog. Journ. and Trans. Photog. Soc.*, June 15, 1872.

The photographic film of the present time is a gelatino-haloid (generally bromide) emulsion. If a solution of silver nitrate is added to a solution of potassium bromide and the mixture well shaken, the silver bromide coagulates, and rapidly subsides to the bottom of the liquid as a densecurdy precipitate. If instead of water we use a viscid medium, such as gelatine solution, the bromide does not settle down, but forms an emulsion, which becomes quite homogeneous on agitation. This operation, omitting all details of ripening, washing, etc., as well known to practical photographers, is the basis of all the recent photographic methods of obtaining negatives in the camera. The use of this invaluable vehicle, gelatine, was practically introduced by R. L. Maddox in 1871, previous experiments in the same direction having been made by Gaudin (1853-61). Such a gelatino-bromide emulsion can be spread uniformly over any substratum—glass, paper, gelatine, or celluloid—and when dry gives a highly sensitive film.

(*To be concluded.*)

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The annual excursion took place last Wednesday, when about twenty chemists accepted Mr. Alderman Cox's invitation to spend the day on his yacht "Sissie."

Meeting at Brighton station the party proceeded by train to Ford Junction, where they joined the yacht on the River Arun. When all were on board the yacht steamed up the river, past Arundel to Amberley, the party having had splendid views of Arundel Castle, the Park, etc. At Amberley a portion of the party visited the ancient ruins of the castle, the church, etc., whilst the remainder, utilizing a small boat, pulled up to the village of Houghton, there to see the quaint old church.

On returning the yacht steamed down to the north gate of the park, and the party alighting soon found a suitable place for luncheon.

After luncheon the Mayor of Brighton (Alderman Manwaring) in a few well chosen sentences proposed the health of the host, Mr. Alderman Cox, expressing briefly the feelings of respect and gratitude which were felt by those who enjoyed his hospitality. Mr. W. D. Savage, J.P., also added a few words, and the toast was drunk with musical honours.

Mr. Cox in reply said that nothing delighted him more than to be instrumental in making other people happy; he was very pleased to see them there, and hoped to be able to welcome them for many years to come. Other toasts followed, and the party returning to the yacht proceeded down the river to the town where, at the Bridge Inn, tea had been provided.

At tea, the host, observing that the weather was exceedingly beautiful, invited the party to proceed with him in the yacht down the river and along the coast to Brighton. This invitation was almost unanimously accepted; and at half-past seven the company returned to the yacht, which steaming down the river to Littlehampton commenced a most delightful sea voyage of about twenty miles along the coast. Supper was provided on the deck, and as darkness increased various gentlemen enlivened the journey with songs and recitations. Then putting in at the village of Southwick a rush was made for the last train, and the party arrived home considerably after eleven, having enjoyed a most brilliant day.

Obituary.

Notice has been received of the death of the following:—

On the 5th of April Mr. John Camplin, Chemist and Druggist, late of Norbiton. Aged 37 years.

On the 26th of May, Mr. Isaac William Pym, Chemist and Druggist, Denby, Derbyshire. Aged 54 years.

On the 29th of June, Mr. William Ashton, Pharmaceutical Chemist, Sloane Square, London. Aged 86 years. Mr. Ashton was one of the Founders of the Pharmaceutical Society and was the means of securing a legacy of £500 to the Benevolent Fund.

On the 2nd of July, Mr. William Perry, Chemist and Druggist, Stratton, Cornwall. Aged 80 years.

On the 12th of July Mr. Joseph Adam Clarke, Chemist and Druggist, Gallowgate Street, Glasgow. Aged 42. Mr. J. Clarke was an Associate in Business of the Pharmaceutical Society. In the lifetime of the Glasgow Chemists and Druggists' Association Mr. Clarke was one of its most ardent and active members, and served as office-bearer in various capacities. As Convener of the Price List Committee he worked sedulously in the publication and distribution of the Price List, in which he saw something more than a mere mercenary compact, being persuaded that it might be made the basis of a union of interest and goodwill, and when the evil hour arrived in which the exigency of unfair competition required the sacrifice of the Price List, no one regretted the necessity more keenly than the steadfastly loyal Convener of the Committee. Mr. Clarke's generous public spirit impelled him to take an active part in all civil, political and social movements. Temperance, food reform, Church agencies, and all causes of a practically enlightening and ameliorating character commanded his ready suffrage and earnest advocacy. Mr. Clarke commenced business for himself in 1870, in succession to his father, who for many years before had carried on business as a chemist and herbalist in London Street. About ten years ago Mr. Clarke removed to Gallowgate, where he occupied premises that have been used as a drug shop for a hundred years. Mr. Clarke had been in ill health for some time, the immediate cause of death being a glandular swelling of the neck which finally developed into a malignant growth.

On the 13th of July, Mr. Edward Waller Martin, Pharmaceutical Chemist, High Street, Guildford. Aged 77 years. Mr. Martin was one of the Founders and an active supporter of the Pharmaceutical Society, and for many years acted as its Local Secretary at Guildford.

Reviews.

TERMINOLOGIA MEDICA POLYGLATTA. Concise Dictionary of Medical Terms. Compiled by THEODORE MAXWELL, M.B., B.Sc., F.R.C.S.*

The object of this work is stated to be to assist medical men of various nationalities to read the medical literature of other countries, and it may be at once conceded that this is attained in it to a greater degree than in any previous book within our knowledge. It is a provoking defect of polyglot special dictionaries, as a rule, that they attempt to cover too much ground, and consequently omit just those recondite or novel technical or scientific terms about which it is impossible to find information in the ordinary dictionaries. The present work is, however, confined to medical terms, with the result that within these limits it is very full and inclusive.

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* London: J. and A. Churchill. 1890. Large 8vo. Pp. 459.

In the arrangement of the dictionary, instead of having a separate section for each vocabulary, French has been selected as the key language, the Latin, English, German, Italian, Spanish and Russian equivalents being, as a rule, placed underneath the French word where it occurs in its alphabetical order. In addition Latin, English, German and Italian words occur in their place in the primary alphabetical sequence, but these are there only followed by their English or French equivalents. Except in cases where the word is identical in more than one language, a separate line is devoted to each equivalent, a plan which, although occupying more space than is usually allowed in dictionaries, conduces much to the clearness of the arrangement and consequently to the comfort of those who consult the book.

Apart from the enormous labour involved in compiling a work of this kind, it requires from the compiler that he shall possess a wide and exact knowledge of medical terms in the several languages included. One man, however accomplished in this respect, might well hesitate to cope with the difficulty single-handed, and Dr. Maxwell has been fortunate in securing the co-operation of a number of gentlemen who may well be looked upon as experts in their respective departments, and whose assistance he freely acknowledges. The outcome is a work that so far as we have tested it, answers fully to the purpose for which it has been produced, and which appears to be remarkably free from typographical errors.

MEDICAL LAW FOR MEDICAL MEN: their Legal Relations Shortly and Popularly Explained, with Chapters concerning Dentists, Chemists and Midwives. By PERCY CLARKE, LL.B., Solicitor, and CHARLES MEYMOTT TIDY, M.B., F.C.S., Barrister-at-Law, Professor of Chemistry and Legal Medicine, etc., etc.*

To epitomize the law upon a particular subject, and to put it in a form that can be readily understood by the people, is a task that is more frequently attempted than accomplished. In the book under notice the authors aspire to do this with the law relating to medical men, dentists, chemists and midwives; but after reading the eight-paged section in which they might be supposed to have explained "shortly and popularly" the law relating to chemists and druggists in Great Britain and Ireland, with which only we are particularly concerned, the conclusion arrived at is that the present effort is not one of the successes. Since, however, it might appear presumptuous to challenge the legal dicta expressed concurrently by two authors enjoying between them the qualifications of solicitor, barrister and professor of legal medicine, it will perhaps be as well to quote one or two statements made by the authors respecting the law which obtains in Great Britain and leave our readers to judge for themselves, only premising that the word "chemist" is defined as applying throughout the work alike to pharmaceutical chemists and chemists and druggists, unless the context does not admit of such a comprehensive definition.

On p. iii., the only place in which the dates of the Pharmacy Acts are stated, they are given as 1852 and 1858.

On p. 112, it is stated that "if a person be already registered as chemist, he must, before being registered as a qualified medical practitioner, have his name erased from the Chemist's Register."

On p. 114, in referring to the process to enforce compulsory registration, it is stated that "chemists have, however, an appeal in all cases from the Society's decree to the Privy Council."

On the same page it is stated, without any qualification in the context, that chemists (*i.e.*, according to the definition, chemists and druggists as well as pharmaceutical chemists) "are exempt from serving upon juries, inquests, corporate or other offices, or in the militia."

On p. 115, it is stated that a person "qualified to supply medicine" incurs a penalty "if in the event of the sale of *any poison* he does not place upon the poisonous packet or bottle a label with the name and address of the seller and take down in a book kept for the purpose the date of sale, purpose for which required, address of the purchaser and the quantity and the ingredients of the poison or poisonous compound," etc. In a foot-note a list of the statutory poisons is given, but the only difference in the manner of dealing with them specified is that those contained in the first part of the schedule can only be sold to a person known to or introduced by a person known to the seller.

On the same page it is stated "the list [of scheduled poisons] may be extended by the Pharmaceutical Society of Great Britain and the Royal College of Physicians of Ireland as to their respective districts," no reference being made to the power of the Privy Council to render any resolution in this direction inoperative by withholding its confirmation.

Lastly, on p. 116, the reader is told that "chemists cannot recover for any medicine which should be compounded according to the British Pharmacopœia, if not so compounded, unless specially ordered by a physician to be compounded in the manner actually adopted by the chemist." It is difficult to understand when the obligation arises that a medicine "should be compounded" according to the Pharmacopœia if the prescriber has expressly ordered that it should be compounded in another way.

These are not all the inexactitudes that are to be met with in this short section, and that errors are to be met with also in the other sections is proved by the statement on p. 56 that an "inspector of the Pharmaceutical Society" has the power to enter any shop kept open for the sale of drugs and medicines and take samples.

LISTS OF CHINESE MEDICINES.

A yellow book, one of a series of so many interesting publications on China issued by order of Sir Robert Hart, the Inspector General of the Chinese Customs, has been recently published with this title at Shanghai. The work contains a mass of information concerning the many and often curious substances used as drugs in the far East; and the investigator who wishes to follow in the footsteps of Hanbury and Bretschneider will find a good deal of useful material in its pages. To him we wish to point out the nature and worth of the information to be obtained from the two parts,—of unequal value,—into which the book is divided.

The first part consists of a series of lists, nineteen in number, from the different treaty ports. In these are displayed the names in Chinese of all the medicines that come under the cognizance of the Customs as articles of import and export. Statistics of quantities and values are given for the period of a year. With these the usefulness of this part ceases, as the statements therein concerning the nature of the drugs, their identification and place of production are in too many cases erroneous. The second part of the yellow book, however, affords on these points fairly accurate information. This is a carefully revised abstract of the preceding nineteen lists. The identifications for the most part are correct, and the few errors that have crept in may be attributed to copying from Japanese works. It is well known that the same Chinese name may indicate two different substances in China and in Japan. A very useful piece of work has been done in the compilation of this part of the yellow book, namely, the grouping together under one heading of the synonyms: and cross references have been given from the less known names to the one which may be looked on as the chief or officinal one. As an example, the rhizome of *Coptis Teeta* will be found under no less than eight different names (See Part ii., No. 516).

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* London: Baillière, Tindall and Cox. 1890. Small 16mo. Pp. 157.

Looking over this list, we find that many important drugs, due to the vegetable kingdom, remain unidentified, and others are still doubtful. The missionary or traveller in the interior of China would be performing useful work, if he were to procure herbarium specimens of such of these as come under his observation: and the second part of the publication under review might well be a part of his travelling library. As an example we may quote *San-oh'i* (*Part ii.*, No. 1059), the most famous of all Chinese drugs excepting ginseng. It is the root of a plant cultivated in Yunnan and Kwangsi, which is quite unknown to botanists. Largely exported from Canton it is used throughout the empire as a valuable tonic in cases of injury by wound or bruise. No Chinese military official is ever without a supply of it. *Gynura pinnatifida* is erroneously given on the list as a probable source of the drug. Other interesting unknown plants are the cultivated *aconites* of Szechwan, the *Fritillaria* (No. 993) and *Atractylis* (No. 961) of Chekiang, the various barks known as *Po* or *Hon Po* (No. 1040), etc.

A few substances occur on the list which are not employed as drugs. This is owing to the fact that the term "medicines," as used by the Customs, includes a few miscellaneous articles which pay an *ad-valorem* duty.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE MEETING OF THE TRADE AT PLYMOUTH.

Sir,—In noticing the proposed Pharmaceutical Conference at Plymouth in last week's issue, you have kindly given me credit for more than I have done, though not more than I would have liked to have done, in the matter.

I believe that *union* and *conference* are a pressing and a permanent need for the success of the Pharmaceutical Society which as the chartered incorporation of our faculty represents ourselves in everything that affects us as a class.

I think we are indebted to the gentlemen who this spring were the defeated candidates for the Council, both for the sincerity of their motives and for the conclusive vote of confidence in our present President and Council which they evoked. I trust that the result, though a momentary disappointment, will bring to them and all of us much of what they desired.

In their address they truly said "that their most vital interests were at stake;" "that having fully considered the serious state of things which prevails at the present time, and which is becoming worse year by year, amounting in many cases even to a desperate struggle for existence, we are of opinion that steps should be taken to avert the evil menacing our profession." And after proposing that we should have a member of our own in Parliament, "that the members of our Society in every town should organize themselves in such a way that in every constituency they would be able to exert their proper amount of influence with their Parliamentary representatives.

"We are also in favour of . . . . . securing the combination and co-operation of the whole trade . . . . .

"When the trade sees that the Council is in earnest in studying the welfare of its members confidence will return, the numbers will soon increase, and the Society will become more powerful to remove vexatious grievances, and to obtain from Parliament such measures of trade protection as may be necessary both to create and to secure a continuance of security and peaceful prosperity."

With such words, which I trust are not garbled extracts from their circular, we see how small are the differences that really exist amongst us.

Our President in his masterly addresses has shown how many things that we feel desirable in the way of legal protection have been missed in the past for want of unanimity, or are impossible at present because of the tendencies of the times.

But there are many still to be had from a strong and united policy amongst ourselves; and even more to be gained from a willing—not to say wrung from a reluctant public, as the result of wisely directed concerted action.

It would indeed be hard, if 10,000 members subscribed their guinea, should the Society not be able with such a constituency and such an income to benefit us pecuniarily to the extent of 6*d*. a week per head.

In order to realize such a condition would it be practicable for the Registrar to send out a few carefully selected men to call on all those who do not subscribe and solicit their co-operation, at the same time collecting for the Benevolent Fund?

Of course, personal influence is best, and such action need in no way check it, but few chemists in business have leisure to do much systematic canvassing.

The next thing to claim our attention, perhaps, is our apprenticeship system.

There should be no back door to the Society, every man should have served his apprenticeship and every apprentice should contribute to the funds.

It is a question if the number of apprentices, and the length of the term, should not be settled by the Society; say, the Minor examination to qualify for one apprentice, and the Major for two. That an indenture could not be legal unless the youth had passed his Preliminary, and that the term should be not less than three years.

The present certificate that the applicant for the Minor has spent three years in the practical work of dispensing needs, I think, to be put side by side with the recent judgment about the unqualified sale of poisons and conferred about.

Then there is the curriculum that we should like to hear more about. The apprenticeship should be part of it. Unless the Minor is made much more severe, five months at the Square ought to be sufficient at the end of an apprenticeship in which both parties had mutually fulfilled their covenants, to fit every suitable man to pass creditably.

I have had much satisfaction of late years in inserting a clause in my apprentices' indentures, whenever practicable, giving the option to the apprentice of passing the last six months of his time at the School of Pharmacy, Bloomsbury Square. Something like this I apprehend it is now proposed to make compulsory.

Mr. Leigh's proposal last winter, for examinations to be held in the country, was an attempt in a similar direction. There were technical objections which led to its being set aside. Perhaps in some other form the help towards their studies for our young people which he aimed at may be supplied by the Society.

If you have room for these suggestions in your columns this week I hope to follow them with a few more next, as my contribution towards the many topics upon which thought may be expended in our further "conferences."

ALFRED P. BALKWILL.

THE MEETING AT BRIXTON.

Sir,—The meeting which I had the pleasure of attending at Brixton on the 3rd inst. was so well attended that I see no reason why Local Associations should not be formed in various districts of London. It would not be necessary to meet more than once a month or even once in three months. Trade interests could then be discussed with, I think, good results, and chemists would be brought more in touch and harmony with each other and with the Pharmaceutical Society. The appointment of Divisional Secretaries is a good move and ought to be productive of unity in our divided ranks.

164, *Lambeth Walk, S.E.* J. WELLESLEY DOUGLAS.

EARLY CLOSING IN LIVERPOOL.

Sir,—The spirit and tone of the letter which appears in your last issue from "One of the Dissentients" merit the silence which means contempt, but for a few gross misstatements which occur, and which might lead to wrong conclusions on the part of those who have read them.

In the first place, "Dissentient" has erroneously applied to himself and others a description which was intended to refer to a certain historical representative of our craft, who, although practising at all hours of the night in Mantua, did not get fat on it—I repudiate the imputation of abusing my fellow chemists with hard names.

I deny that men, who consider the time ripe for improving and shortening our hours of labour, are insane, and those who are giving the movement a fair trial will bear me out when I say there is no moral suicidal tendency in it.

Your correspondent's information regarding the relative numbers of those who uphold the movement and those who do not is quite wrong. Among the former are poor men's druggists, as well as those who minister seidlitz powders and tooth pastes to the well-to-do, while the dissentients only number about one-fourth, and they are largely made up of men engaged in a class of business peculiar to the hearts of great cities.

Dissentient arguments in favour of midnight toil are too ridiculously far-fetched to merit reply, even if one had the time and inclination to answer them *seriatim*.

Liverpool. JOHN BAIN.

Sir,—Truly our Liverpool brethren are in woeful plight if the letter of "One of the Dissentients" be a correct statement of their case. "All hope abandon ye who enter here" would seem to be the most fitting motto for inscription over the pharmaceutical portals in that city, in the face of such an exposition of affairs as this dissentient gives. To his inquiry as to "whether the time is ripe for the chemist to commit a moral suicide by politely yet sadly turning his customers into the street every night except Saturday, at 9 o'clock," I would answer that I fail to see where any question of morality is touched by such action; but I can very easily conceive the chemist, slowly it may be, yet surely engaged in an act of physical suicide by keeping his door open until an untimely hour, while encouraging those "young gentlemen who often spend the evening at the house of a friend," or "attend a concert or lecture," in their disregard of other people's health, comfort and convenience. How about the poor chemist who wishes to spend the evening with a friend, or to attend a concert or lecture? Is he not worth a little consideration on the part of these "young gentlemen," or to use the language applied by your correspondent to the Early Closing Association, "have these young gentlemen bestowed a thought on the poor chemist less favourably located?" I trow not, nor are they likely to do so while they find chemists so scrupulously considerate of their convenience as to supply them with their seidlitz powders and cherry tooth paste at any and all hours of the night. Moreover it does not appear that such articles could have been very urgently required by the aforesaid young gentlemen when "the sight of the chemist's shop" (open, I presume) is required to remind them of their wants. I am, sir, myself very much in the position of the "being" described by your correspondent as "the poor man's druggist." But though located amid an exclusively working class population, I do not find it necessary (Saturdays excepted) to continue "standing behind the counter until a late hour." Indeed, as the Thursday half holiday is quite in vogue in our neighbourhood I have, shocking to relate, ventured to "imitate the barbers" and "take an entire half-holiday every week," having even had the temerity to convert it occasionally into a whole one, when my favourite recreation, landscape photography, so prompted me; and this, notwithstanding the fact that I am one of those "unaided by assistant or apprentice," yet knowing by sad experience that to preserve the *mens sana in corpore sano*, needful relaxation must be taken.

Your correspondent describes Mr. Bain's letter as being penned in a desponding mood, failing to see at the same time that the description applies with redoubled force to his own. Note how in prophetic strain he thus pours forth his Jeremiad, "I foresee troublous times for the chemist of the future" (query, are they not already here?) "and believe me it will tax all his strength and energy," and "only by civility, etc., and a readiness to supply the wants of his customers at whatever time most convenient to themselves will he be able to hold his own." This last passage recalls *Punch's* humorous extension of the proverb, that "he who would thrive must rise at five," proceeding thus:—

"He who'd thrive more must rise at four,
Who'd yet more thriving be must rise at three,
He who'd the last outdo must rise at two,
Who'd be out-done by none must rise at one,
But who'd be thriving quite *must sit up all night!*"

And this last seems to me to be the goal aimed at by many of our craft, even in the face of the agitation now going on among "all sorts and conditions of men" for shortened hours of labour. ROBERT J. SHIELDS.

A MODIFICATION OF THE ADAMS COIL IN MILK ANALYSIS.

Sir,—My attention was drawn to an article appearing in the *American Druggist*, by Charles Rice, entitled "An Improved Coil for Milk Analysis," and with a little modification it has succeeded so well in my hands that I have pleasure in recommending it to my fellow pharmacists, who I am sure will prefer it to the more ancient paper coil.

Take a strip of Gamgee tissue, 6 inches by 2 inches, weigh it, split the tissue, and remove enough of the absorbent wool to reduce it by one-third; now reunite the halves of tissue, and roll it up in the direction of its length, when it should be 2 inches long and about ¾ inch diameter, and weigh about 2½ grams.

Cut a piece of thick white blotting paper, about 3½ inches by 2½ inches, and roll the absorbent coil in the paper in the direction of its length and tie the whole with a cotton in two places, ¾ inch from each end. This sized coil should be just under 1 inch diameter, and will fit the smallest Soxhlet's extraction apparatus, and takes 8 grams of milk. It is convenient to keep a number of these coils ready extracted with ether, so that when required they can be dried for an hour in the water oven, when they are ready for use. The fat is weighed in the flask, the exhausted coil is then dried to constancy and weighed; the difference between this weight and the original weight of coil before the milk was poured in will give solids not fat; total solids are best determined by the addition of solids fat, and not fat, as originally recommended by Adams.

Birkenhead. A. F. BROOKES.

THE INFUSIONS OF THE PHARMACOPŒIA.

Sir,—Perhaps some of your correspondents would give me their opinions as to the correct method of making the infusions of the British Pharmacopœia.

Taking "Infusum Buchu" as an example; the official directions are,—

"Take of—
Buchu leaves, bruised . . . . . . ½ oz.
Boiling distilled water . . . . . . 10 fl. ozs.
Infuse in a covered vessel for half an hour and strain."

Now, it is evident, if the above directions be followed, certainly not more than 8 fl. ozs. of infusion will be produced. Yet under the preparations of "Buchu Folia" it gives the strength of "Infusion Buchu" as "1 oz. to 1 pint," which seems to imply that the authorities intended the water soluble matter of 1 part of buchu leaves should be contained in 20 fl. parts of infusion.

Is this so? or are the B.P. directions to be faithfully followed? thereby giving an infusion of varying strength.

I think it would tend to the production of a more definite preparation, if boiling distilled water were, after straining, poured over the marc until 10 fl. ozs. were produced.

London. R. C. HARRISON.

H. Butterworth.—Nothing very definite as to the preparation of the substance referred to has been published, so that the subject is one for experiment.

D. H. Oxen.—Your letter has been forwarded to the advertisement agents, Messrs. Churchill.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Oliver, Brookes, Kawamura, Jacques, Bingley.

AMOUNT OF THEINE IN TEA.

BY DR. B. H. PAUL AND A. J. COWNLEY.

In the March number of the *American Journal of Pharmacy* there was a report of some results obtained by Mr. John Hamilton Small in the analysis of Japanese and other kinds of tea, according to which it was shown that the amount of theine in the Japan tea examined was from 1·79 to 2·30 per cent., while that in the samples of Chinese and Indian tea varied from 2·38 to 3·54 per cent. The method of analysis adopted by Mr. Small was that described by us in this Journal* and the results published by him are in accord with those obtained by ourselves for average tea. However, in a reference to Mr. Small's figures by a writer in a recent number of the *Apotheker Zeitung* it is remarked that the amounts of theine indicated there are "remarkably high," but that since the description of the samples analysed was given in very general terms, and there was no statement made as to the final purification of the theine obtained, further criticism was impossible. Obviously the suggestion was thus conveyed that Mr. Small's analytical results were too high, owing to impurity of the theine weighed, and the writer did not appear to have been aware of the fact that the amount of theine in tea is generally much higher than had been supposed on the bases of the older analyses which were made by methods unsuited for the complete extraction of theine in a pure state. We have, therefore, made a further series of analyses of different kinds of tea for the purpose of obtaining additional evidence as to the amount of theine, and it will be seen from the following table that the conclusion we had previously arrived at as to the presence of theine in greater proportion than had been assumed is fully sustained by the analytical data there given.

TEA.	Price.	Moisture p. c.	Theine.	
			Original Tea. p.c.	Dry Tea p.c.
	Retail.			
29.	2*s.* 4*d.*	7·60	3·54	3·83
30.	2*s.*	6·75	3·66	3·93
31.	1*s.* 6*d.*	6·20	3·12	3·32
32.	1*s.* 6*d.*	6·60	3·06	3·27
33.	1*s.* 4*d.*	5·40	3·42	3·61
34.	1*s.* 8*d.*	8·00	2·82	3·06
35.	1*s.* 4*d.*	6·60	2·74	2·93
36.	1*s.* 6*d.*	7·40	2·92	3·15
37. Ceylon dust	—	8·00	3·58	3·89
	Broker.			
38. China	1*s.* 3*d.*	8·60	3·46	3·78
39. "	11½*d.*	8·40	3·32	3·63
40. "	7*d.*	8·60	3·20	3·50
41. "	4½*d.*	8·98	2·20	2·42
42. Japan Congou.	7*d.*	6·42	2·74	2·93
43. " "	5½*d.*	6·28	2·72	2·90
44. " "	5*d.*	7·64	2·58	2·79
45. " "	4½*d.*	6·92	2·42	2·60
46. Java Pekoe Fl'y	1*s.* 7½*d.*	7·34	3·16	3·41
47. " "	1*s.* 2*d.*	7·92	3·78	4·10
48. " " S'chong	11*d.*	7·04	2·94	3·16

The samples in this table are numbered consecutively with those previously analysed. The first eight samples were ordinary grocers' tea, and the amounts of theine varying from 3·06 to 3·03 per cent., are not much below those given in our previous paper as having been found in samples of Ceylon and Indian tea, though they were probably above the average in point of quality.

Chinese tea appears to be generally inferior in the theine it contains to Indian or Ceylon tea, and in this respect Japan tea resembles it so far as the foregoing analyses indicate. Java tea, on the other hand, approaches nearer to Ceylon tea in the amount of theine.

These analyses have been made by Mr. G. S. Smith, and in several instances the figures given were the results of duplicate experiments made both with magnesia and with lime. As already stated in our original paper the method of analysis there described yields theine in such a state of purity that the weight obtained can be safely adopted as the amount actually present. Other methods that have been adopted for the determination of theine invariably give results that are too low.

One of the samples mentioned in our previous paper is known as flower of tea. It is separated in the process of preparing tea for the market, and consists of the hairs detached from the leaves in that operation. This material was found to contain upwards of 2·5 per cent. of theine. In a paper published in this Journal in 1877 by Mr. Greenish, the presence of theine in tea hairs was disputed, and it was suggested that the theine obtained in the analysis did not really belong to the hairs, but was derived from an admixture of parenchymatous tissue adhering to the base of some of the hairs. We cannot concur in this opinion, for apart from the fact that other observers have found theine in tea hairs, it seems improbable that so large an amount of theine as has been obtained from tea-hair could be accounted for as due only to the admixture mentioned. The untrustworthy nature of a method of sublimation for the separation of theine appears to be a more reasonable explanation of its presence having been overlooked, just as in Stenhouse's experiments with sublimation, he was led to the conclusion that the amount of theine in tea is much smaller than it really is.

From the results now published, relating to samples of tea purchased in the ordinary course at grocers' shops, it will be seen that there is good reason for the opinion that owing to defective methods of determination the amount of theine in tea has been understated. Most of the samples now referred to were probably mixed with Chinese tea to some extent, in accordance with the very general practice of mixing Chinese tea with certain proportions of Indian grown tea. The prices at which these samples were sold at least justify this assumption in their case, and it will be further evident that the amount of theine in tea does not stand in any constant or definite proportion to the price of the article. The same fact is also indicated by the results obtained in the analyses of China, Japan and Java tea. The prices given in these instances are the market prices, to which the amount of duty chargeable has to be added as well as the retailer's profit to make them comparable with the prices given for the other samples of tea purchased retail at grocers' shops.

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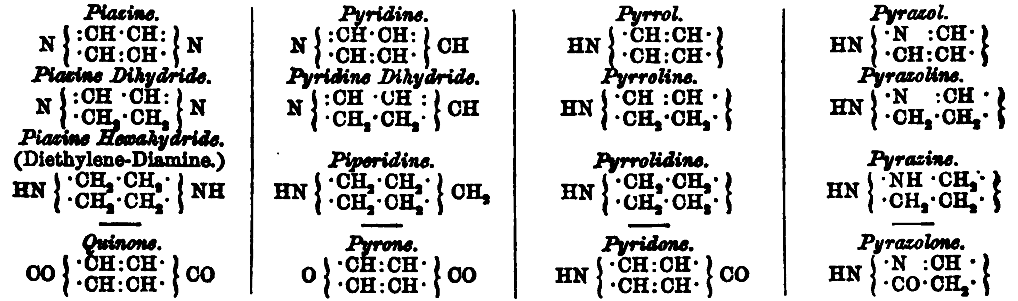
* *Pharmaceutical Journal*, Nov. 19, 1897.

NOTE ON THE CONSTITUTION OF CERTAIN ANTIPYRETICS AND ALLIED BODIES.

BY ALFRED H. ALLEN.

Many of the bodies of which pyrrol is the type have only comparatively recently received the study they deserve. Some of them have not long been discovered, and others have still only a hypothetical existence. As some of the numerous bodies recently proposed as antipyretics are derivatives of pyrrol, it is of some importance to study their constitution, and hence, I believe, the careful inspection and consideration of the following tabulated arrangement of some of the compounds in question will have an interest for others as great as the compilation of the tables has had for myself.



Piazine.
$$\mathrm{N}\left\{\begin{matrix}\mathrm{:CH\cdot CH:}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}\mathrm{N}$$
Piazine Dihydride.
$$\mathrm{N}\left\{\begin{matrix}\mathrm{:CH\ \cdot CH:}\\ \mathrm{\cdot CH_2\cdot CH_2}\end{matrix}\right\}\mathrm{N}$$
Piazine Hexahydride.
(Diethylene-Diamine.)
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH_2\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}\mathrm{NH}$$
Quinone.
$$\mathrm{CO}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}\mathrm{CO}$$

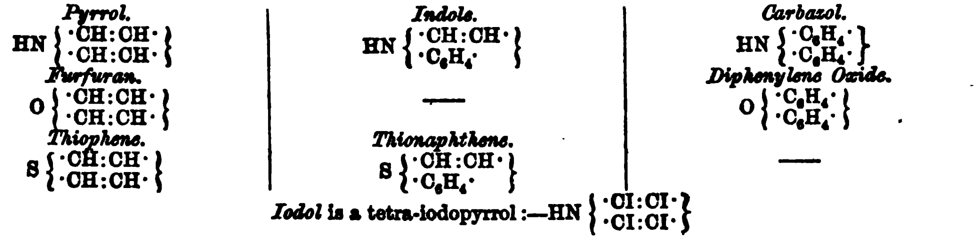
Pyridine.
$$\mathrm{N}\left\{\begin{matrix}\mathrm{:CH\cdot CH:}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}\mathrm{CH}$$
Pyridine Dihydride.
$$\mathrm{N}\left\{\begin{matrix}\mathrm{:CH\ \cdot CH\ :}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}\mathrm{CH}$$
Piperidine.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH_2\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}\mathrm{CH_2}$$
Pyrone.
$$\mathrm{O}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}\mathrm{CO}$$

Pyrrol.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}$$
Pyrroline.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH\ :CH\ \cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$
Pyrrolidine.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH_2\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$
Pyridone.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}\mathrm{CO}$$

Pyrazol.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot N\ \ :CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}$$
Pyrazoline.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot N\ \ :CH\ \cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$
Pyrazine.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot NH\ \cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$
Pyrazolone.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot N\ :CH\ \cdot}\\ \mathrm{\cdot CO\cdot CH_2\cdot}\end{matrix}\right\}$$

Piazine has only a hypothetical existence, and the dihydride is known only through its diphenyl-derivative. Pyrone, pyrazol and pyrazine also are only known by their derivatives.

Pyrrol is closely related to *thiophene*, which itself has the constitution of a *thiofurfuran*. Many of the reactions of pyrrol are common to thiophene, and are also produced by *carbazol*, which has the constitution of an imidò-diphenyl. Indole holds a position intermediate between pyrrol and carbazol. Thus:—



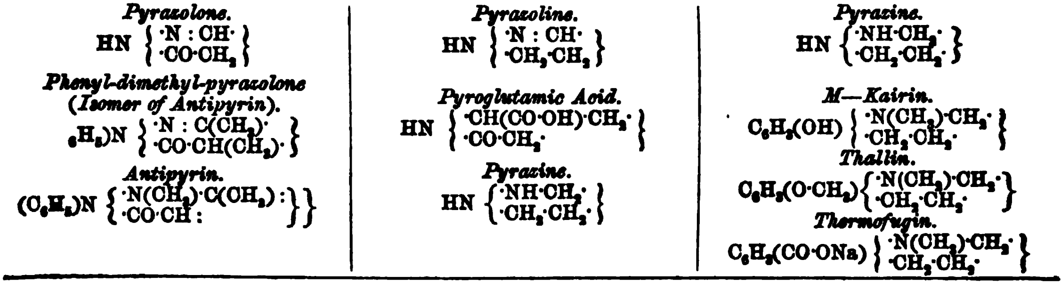
Pyrrol.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}$$
Furfuran.
$$\mathrm{O}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}$$
Thiophene.
$$\mathrm{S}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot CH:CH\cdot}\end{matrix}\right\}$$

Indole.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot C_6H_4\cdot}\end{matrix}\right\}$$
Thionaphthene.
$$\mathrm{S}\left\{\begin{matrix}\mathrm{\cdot CH:CH\cdot}\\ \mathrm{\cdot C_6H_4\cdot}\end{matrix}\right\}$$

Carbazol.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot C_6H_4\cdot}\\ \mathrm{\cdot C_6H_4\cdot}\end{matrix}\right\}$$
Diphenylene Oxide.
$$\mathrm{O}\left\{\begin{matrix}\mathrm{\cdot C_6H_4\cdot}\\ \mathrm{\cdot C_6H_4\cdot}\end{matrix}\right\}$$

Iodol is a tetra-iodopyrrol:—$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CI:CI\cdot}\\ \mathrm{\cdot CI:CI\cdot}\end{matrix}\right\}$

The relationship of antipyrine (now proposed to be added to the Pharmacopœia under the name of *phenylon*), kairine, thalline, and thermifugin to the pyrazol group is shown by the following formulæ:—



Pyrazolone.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot N:CH\cdot}\\ \mathrm{\cdot CO\cdot CH_2}\end{matrix}\right\}$$
Phenyl-dimethyl-pyrazolone
(*Isomer of Antipyrin*).
$$\mathrm{{}_6H_5)N}\left\{\begin{matrix}\mathrm{\cdot N:C(CH_3)\cdot}\\ \mathrm{\cdot CO\cdot CH(CH_3)\cdot}\end{matrix}\right\}$$
Antipyrin.
$$\mathrm{(C_6H_5)N}\left\{\begin{matrix}\mathrm{\cdot N(CH_3)\cdot C(CH_3):}\\ \mathrm{\cdot CO\cdot CH:}\end{matrix}\right\}\Big\}$$

Pyrazoline.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot N:CH\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2}\end{matrix}\right\}$$
Pyroglutamic Acid.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot CH(CO\cdot OH)\cdot CH_2\cdot}\\ \mathrm{\cdot CO\cdot CH_2\cdot}\end{matrix}\right\}$$
Pyrazine.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot NH\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$

Pyrazine.
$$\mathrm{HN}\left\{\begin{matrix}\mathrm{\cdot NH\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$
M—Kairin.
$$\mathrm{C_6H_3(OH)}\left\{\begin{matrix}\mathrm{\cdot N(CH_3)\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$
Thallin.
$$\mathrm{C_6H_3(O\cdot CH_3)}\left\{\begin{matrix}\mathrm{\cdot N(CH_3)\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$
Thermofugin.
$$\mathrm{C_6H_3(CO\cdot ONa)}\left\{\begin{matrix}\mathrm{\cdot N(CH_3)\cdot CH_2\cdot}\\ \mathrm{\cdot CH_2\cdot CH_2\cdot}\end{matrix}\right\}$$

Although in no way allied to the pyrrol group, it may be of interest to add the formulæ of *acetanilide* and the derivatives thereof which have recently been recommended as remedies.

Acetanilide. Antifebrin	. $C_6H_5\cdot NH(C_2H_3O)$
Bromacetanilide. Bromated Antifebrin . . .	. $C_6H_4Br\cdot NH(C_2H_3O)$
Methyl-acetanilide. Exalgine. Methylated Antifebrin.	. $C_6H_5\cdot N(CH_3)(C_2H_3O)$
Acetoamidophenol. Hydroxy-antifebrin . . .	. $C_6H_4(OH)\cdot NH(C_2H_3O)$
Aceto-anisidine. Methacetin. Methoxy-antifebrin	. $C_6H_4(O\cdot CH_3)\cdot NH(C_2H_3O)$
Aceto-phenethydine Phenacetin. Ethoxy-antifebrin	. $C_6H_4(O\cdot C_2H_5)\cdot NH(C_2H_3O)$

The relationship of acetanilide to hypnone and hydracetin (pyrodine) is as follows:—

Acetophenone. Hypnone	. $C_6H_5\cdot (CO\cdot CH_3)$
Acetanilide. Antifebrin	. $C_6H_5\cdot NH\cdot (CO\cdot CH_3)$
Acetphenylhydrazide. Hydracetin	. $C_6N_5\cdot NH\cdot NH\cdot (CO\cdot CH_3)$

Antithermin, though obtained by somewhat similar means to hydracetin has a very different constitution. It is prepared by the action of lævulinic acid on an acetic acid solution of phenylhydrazine, when the two unite with elimination of water to form the "hydrazone" known as antithermin, $CH_3\cdot C(N\cdot NH\cdot C_6H_5)\cdot CH_2\cdot CH_2\cdot CO\cdot OH$.

THE TOXIC PRINCIPLE OF PYRETHRUM FLOWERS.*

BY MESSRS. SCHLAGDENHAUFFEN AND REEB.

The authors having been for some time occupied in a pharmacological and chemical investigation of pyrethrum flowers from different sources have been induced by the publication of Hirschsohn's paper upon the subject (see *Pharm. Journ.*, May 3, p. 892) to make known their results, so far as they apply to the toxic principle.

A quantity of 250 grams of powdered pyrethrum flowers was distilled in a current of steam until 750 grams of aqueous distillate, charged with essential oil, had been collected. After filtration through a moistened filter the filtrate was shaken with ether, the ethereal solution separated, filtered and evaporated at a temperature below 30° C., until there remained in the capsule a small quantity of water and a few small green drops. The aqueous portion, separated by means of a moistened filter, had an odour of black tea, was slightly acid to litmus, but did not appear to incommode insects. The green drops were toxic, but did not contain any alkaloid.

In a second operation the distillate was treated under the same conditions with chloroform, which left upon evaporation an acid and toxic residue.

The same acid compound was also obtained under other conditions. For instance, the powder was submitted to displacement with amylic alcohol, the amylic liquor shaken with water in a separator, the aqueous layer removed, filtered and neutralized with baryta water; then heated on a water-bath to drive off the amylic alcohol dissolved in the water, after which it was filtered and the baryta saturated with sulphuric acid in excess. Finally, the liquid was shaken with ether, and upon evaporation of the ethereal liquid there was obtained a greenish acid residue, partially soluble in water and giving a solution having insecticidal properties. If instead of amylic alcohol ordinary alcohol were used the same result was arrived at.

In another experiment the pyrethrum powder was moistened with alcohol containing a little acid, then dried and afterwards exhausted with ether. The ethereal solution was treated with ammonia water, and the latter separated, filtered and evaporated to dryness. The residue was redissolved in water, and after filtration it contained in solution the ammoniacal salt of the toxic acid of pyrethrum powder. The solution was toxic to insects, and gave with silver nitrate, neutral lead acetate, or neutral lead acetate in alcoholic solution an abundant precipitate; with barium nitrate, calcium sulphate or ferric chloride no precipitate.

In another operation 200 grams of powdered pyrethrum flowers was displaced with a litre of chloroform. The solvent was recovered by distillation, and the residue was worked up with water to free it from an inactive substance. The extract was afterwards taken up with 90° alcohol, and the alcoholic liquid filtered and evaporated. The residue treated with water and ether under suitable conditions yielded the toxic acid as an amorphous and hygroscopic mass. In order to obtain the inactive acid in a pure state the impure acid was taken up with water, and the solution allowed to stand twenty-four hours; then it was shaken with ether to remove a resinous matter, filtered and evaporated. The residue again taken up with water and the solution filtered and evaporated gave the acid in a pure condition.

The acid nature of the active principle having been thus established, it was sought to isolate it by converting it into a lead salt, and for this purpose an alcoholic solution of it was precipitated successively with neutral lead acetate and triplumbic acetate. The two precipitates, well washed, were suspended in alcohol and treated separately with sulphuretted hydrogen; after filtration the solutions were saturated with caustic potash, evaporated to dryness, redissolved in acidulated water and the solutions shaken with ether. In this way were obtained a non-toxic acid, corresponding to the precipitate thrown down by the neutral acetate, and another acid, corresponding to the precipitate by the tribasic acid, which inconvenienced insects only, without killing them. The toxic principle appeared to have escaped during this mode of operating.

Another method was therefore tried, consisting in treating the chloroformic extract first with water to remove the inactive extract, then with five successive quantities of dilute alcohol, increasing in alcoholic strength from one part in ten to five in ten. These alcoholic solutions contained the whole of the toxic principle. They were mixed together, neutralised exactly with caustic potash solution and evaporated carefully to dryness. The residue was taken up with water and the solution filtered, which took some time. The clear liquor was then shaken with a solution of tartaric acid in a separating funnel, and then with ether. The supernatant layer, filtered and evaporated, left an acid and poisonous greenish residue of "pyrethrotoxic acid." The lower layer, which had already been shaken with ether, was again treated with chloroform, which also took up a certain quantity of the toxic principle.

En résumé, the active principle of pyrethrum flowers is an acid soluble in alcohol, amylic alcohol, ether and chloroform, which may be isolated by means of ether after having been converted into an alkaline salt and decomposed by tartaric acid in aqueous solution.

When pyrethrotoxic acid was hypodermically injected into animals, it was observed that the poison produced its effects in two distinct stages. In the first there was an excitement more or less pronounced, proportional to the quantity administered; in the second there was a complete prostration, accompanied always by paralysis of the lower extremities, which might disappear after a time, or be the precursor of a fatal issue, the respiration and circulation being affected only in the latter case.

NOTES ON SOME NORTH AMERICAN MEDICINAL PLANTS.*

BY JOHN M. MAISCH.

Adulterated Star-anise.—The *Répertoire de Pharmacie*, of April 10, contains the following statements:—

"Mr. E. Barral announces in *Gazette hebdomadaire*, of November 29, 1889, a new dangerous falsification of star-anise with the fruit of *Illicium parviflorum*; these fruits, he states, resemble those of the true star-anise, and for several years have been met with in England and Germany. Mr. Barral has studied the effects of the decoction and of the extract of this fruit, and has proved that these preparations contain a toxic principle which produces in dogs vomiting, insensibility, paralysis of the posterior limbs, convulsions, and finally death. The poisonous principle resides principally in the seed, and is probably a glucoside differing from that met with in *I. religiosum*."

The plant mentioned is a shrub indigenous to the southern districts of Georgia and to East Florida, and to some extent cultivated in Europe in botanical gardens. It is scarcely likely that the fruit is collected in Europe for the purpose of mixing it with star-anise; and inquiries made by me in this country have thus far failed to find the fruit in commerce. Mr. E. M. Holmes called attention to this fruit in the *Pharma-*

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* *Journal der Pharmacie von Elsass-Lothringen*, June, p. 123.

* From the *American Journal of Pharmacy*, July.

ceutical Journal and Transactions, December 18, 1880, and described it as consisting of eight short-beaked capsules having a sassafras-like taste, and stated that it and the fruit of *Ill. floridanum* are not met with in commerce.

The two indigenous species have been looked upon with suspicion in their native localities, and the last-named, which is found from Florida west to Louisiana and Mississippi is known sometimes as "poison-bay." This species was histologically and chemically investigated by Henry C. C. Maisch (*Amer. Journ. Pharm.*, 1885, pp. 225 and 278), who isolated from the leaves and the capsules crystals of a glucoside which probably represents the poisonous principle, and differs from the shikimin isolated by Eykman from the capsules of *Ill. religiosum.* The different parts of *I. parviflorum*, to which attention has again been drawn by Barral's communication, deserve to be fully investigated.

Hedeoma is the name of a genus of labiatous plants, comprising about fourteen species indigenous to North and South America. The best known and most widely-distributed species is *H. pulegioides*, which extends from New England to Dakota and southward, being met with in the southern states on dry hills. From the resemblance of its odour and taste to the European *Mentha Pulegium*, Linné, it is known throughout the country as *pennyroyal* or *American pennyroyal.* Most, if not all, the other species of *Hedeoma* have a different odour. *H. piperita*, Bentham, for instance, is peppermint-like, and according to the Mexican Pharmacopœia, is used like and in place of peppermint. Some of the North American species may, perhaps, be locally employed. This is the case with *H. thymoides*, Gray, which grows in Texas on high land, and produces its pink and fragrant flowers in April. In Lavaca country, and possibly in other parts of Texas, the plant has the reputation of being diaphoretic and febrifuge, the infusion being employed. The taste of the plant is aromatic, citronella-like, and scarcely bitterish.

Colorado Cough root.—Under this name a root has been received on several occasions, which is said to be commonly used in some parts of Colorado. It is evidently derived from an umbelliferous plant, and having a lovage-like flavour, may possibly be the root of a *Ligusticum*, of which four species are known to be indigenous to the state named (Coulter, 'Rocky Mountain Botany,' p. 117). But since a large number of species of other umbelliferous genera are likewise peculiar to this region, it is impossible to arrive at a reliable conclusion without botanical specimens. Such were promised, but have not yet been received. The root is masticated, and is also employed in the form of powder as a snuff said to be efficient in catarrh and neuralgic affections.

Peppertree is the popular name of an ornamental tree which is not indigenous to North America, but is cultivated to some extent in California. The leaves as well as the reddish drupaceous fruits, which are of the size of black pepper, have a strong peppery flavour; hence the popular name. The tree belongs to the order of *Anacardiaceæ*, and to a genus of about thirteen species, mostly of tropical America. *Schinus Molle*, Linné, grows from Mexico southward, and in the country named is known as *arbol del Peru*, indicating its South American origin. The bark, leaves, fruit, and the gum-resinous exudation are employed medicinally, the former as a balsamic astringent, the other products for their stimulating properties (see *Amer. Journ. Pharm.*, 1866, p. 503, and 1885, p. 340). When the piperaceous taste is considered, and the fact that the fruit contains enough sugar to warrant its employment for the preparation of an alcoholic beverage and of vinegar, it is surprising that the different parts of the plant have not been subjected to analysis. The bark contains tannin; the gum resin contains about 60 per cent. of resin and a little volatile oil, and the fruit was supposed by Landerer (1862) to contain piperine, which supposition, however, does not appear to have been verified or disproved by later investigations.

ON SOME RELATIONS BETWEEN HOST AND PARASITE IN CERTAIN EPIDEMIC DISEASES OF PLANTS.[*]

BY H. MARSHALL WARD, F.R.S.

Professor of Botany, Royal Indian Engineering College, Cooper's Hill.

(*Continued from page* 50.)

Coming now to the subject of destructive metabolism, we find that it is affected by external factors; in the first place, by whatever affects respiration, and therefore the foregoing remarks apply to metabolism generally. This is especially so in the case of temperature, and the statements already given may serve broadly with respect to metabolism as a whole. A few details are of importance, however. We have spoken of two sets of bodies among the many which are produced during the metabolic processes of the cell—the organic acids and the amide-substances. It appears from the evidence to hand that organic acids are not only formed, but are also subsequently oxidized, in the cell, and it is only to be expected that this process of decomposition of the acids is also promoted by raising the temperature and conversely,[†] and such is the case; these acids increase during the night and diminish during the day, and one important factor in the processes is temperature. The *optimum* of increment of organic acids in the plant occurs at somewhat low temperatures[‡]—*e.g.*, about 10° C. to 15° C.; while the *minimum* coincides approximately with that of respiration (near 0° C.), and the acids cease to increase—or, rather, they are decomposed as fast as, or rather faster than, they are produced—as the temperature rises to 35—40°.

With respect to the effects of light on metabolism, reference may be made as to what has already been said as regards its promoting certain processes of oxidation in the cells,[§] and to what follows on assimilation. The part played by oxygen also has been adverted to; metabolism in the ordinary course of events depends on respiration, and all that affects the latter affects it. In the absence of free oxygen, conditions of intense destructive metabolism are eventually set up, the details of which we need not discuss.[||] If plenty of non-nitrogenous food materials are present, the metabolism goes on for some hours as usual, but soon the starving protoplasm undergoes more and more profound changes, resulting eventually in a loss of proteid substances.

It is important to bear in mind that in the cells containing chlorophyll the free acids diminish in daylight, and increase as the light fades and in darkness, no doubt because there is less oxygen in the absence of that set free by the chlorophyll corpuscles; these acids also decrease in proportion as the temperature rises, and increase as it falls. It is also important to be clear in this connection as to the fact that two processes are going on simultaneously—on the one hand, organic acids are being formed as products of incomplete oxidation in the respiratory processes, and, on the other, they are being further oxidized, and decomposed when the temperature is high and the light bright.[*] Whether at any given moment the amount of acid present is larger or smaller depends on the resultant action of these processes. Anything which interferes with oxidation promotes the accumulation of organic acids; whereas those changes which lead to increased oxidation in the cells are followed by a decrease of acid.

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[*] Croonian Lecture. From the 'Proceedings' of the Royal Society.

[†] See Warburg, 'Unters. aus d. Bot. Inst. zu Tübingen,' vol. 2, Heft 1, 1886, p. 102.

[‡] Warburg, *op. cit.*, pp. 71 and 102, confirming the results obtained by de Vries (literature quoted).

[§] See Pfeffer, 'Ueb. die Oxydationsvorgänge,' etc., pp. 419 and 454.

[||] See, however, Palladin, "Ueber Eiweisszersetzung in den Pflanzen bei Abwesenheit von freiem Sauerstoff" (*Ber. d. Deut. Bot.-Gesellsch.*, 1888, p. 205).

Now a few words as to growth, and its dependence on external factors. Apart from the thickening of the cell-walls, which comes afterwards and depends on the addition of materials formed by the protoplasm,[†] the principal phenomenon that concerns us is the extension of the cellulose membranes. This process is promoted by moderately high temperatures, and retarded by low ones and by very high ones,[‡] in accordance with respiration and the general metabolism of the cell; the curves are not quite the same, because respiration begins at temperatures too low for growth, and goes on rising in intensity to temperatures at which growth begins to decline; still the connection is very close, and the dependence of growth on respiration and metabolism implies this.

Light is usually considered to have a retarding effect on the growth of the cells. Apart from the possibility that there may be a more direct action of light on the extensibility of cell-walls or of cells generally, by its effects on the protoplasm at the spot, one way in which this retarding effect may be brought about is in connection with the turgidity of the cells. Without concerning ourselves with the general discussion of the whole subject, which would be a very long one, it seems, at least, clear that in the ordinary course of events light exercises some retarding action on growth by extension; what, if any, connection exists between this phenomenon and the observed diminution of the organic acids in the cells (and we have seen that their turgidity depends on these acids and their salts) in daylight still needs investigation, and the same may be said as regards the influence of temperature in relation to growth and the production of acids. It is customary to regard the retarding action of light on the extensibility of the cell-wall as a complex phenomenon of irritability,[§] and it is by no means certain that such is not the case; meanwhile we simply accept the facts that in ordinary bright light the extension of the growing parts is retarded, that this is connected with diminished turgidity, which in its turn is dependent on the pressure in the sap of substances capable of retaining the necessary water. If we accept, with de Vries,[‖] that these substances are chiefly the organic acids and their salts, then we may expect the study of influence of light in promoting the decomposition of organic acids in the plant to give more information on these matters. The same remarks apply with regard to the influence of variations in temperatures.

Growth is, of course, impossible without water, and the transpiration current supplies this to the osmotically active cells. In nature the quantity of water at the disposal of these cells varies enormously, not only with the quantities at the disposal of the root-hairs, but also with the rapidity of the transpiration influenced by the atmosphere. On the whole, given favourable temperature, and other circumstances, growth in length is most active in damp weather, when the quantities of water in the cells are relatively very large; it is retarded in hot, dry weather, because the loss of water is sufficiently extensive to diminish turgidity.

Passing now to *carbon assimilation*, I come to the subject which offers most interest for our inquiry. Assimilation is also to some extent influenced by temperature, although in a very different manner from respiration;[*] and the influence of even large variations in temperature may be masked by the effects of small variations in other factors, especially light. Assimilation takes place at low temperatures whenever respiration is possible, but the temperature curve for assimilation in ordinary bright sunlight is steeper than that for respiration, and at higher temperatures (say 30° C. and above) where respiration is not yet most active, assimilation is already beginning to decline. In the blackberry, for instance, whereas assimilation is most active at between 29° and 33° C., respiration goes on becoming more and more energetic to 46° C., at and beyond which its effects are of course dangerous to the plant.[†] On the whole, we may conclude that at low temperatures, say 5° to 10° C., on a bright spring morning, assimilation is relatively more active than respiration, whereas at higher ones—30° to 40°—the reverse is distinctly the case.

The effects of variations in the intensity and kind of light on assimilation have been much studied, and may be summed up generally for our purposes as follows.

With ordinary solar light, as it reaches the plant on a clear day in the open, the activity of assimilation increases nearly in proportion to the intensity[‡] of the light; this is usually expressed by saying, the more light the plant can get the better. There is evidence to show that, as might be expected, light of great intensity concentrated by means of a lens, etc., on to the assimilating apparatus, produces destructive pathological changes; but we may also infer from every day experience with shade-plants (*e.g.*, camellias) that the light may be too intense for normal assimilation to go on,[§] and such is the case.

Another point of importance is the kind of light which reaches the plant. I need not remind you that some rays of the solar light, especially some of the less refrangible (orange and red) rays, are more concerned in the process of assimilation than others, and, although we cannot here stop to discuss this matter in detail, I may point out that, as different rays of light are absorbed or reflected in the atmosphere, we may have variations in this connection of more or less importance to the plant. The experience of photographers shows that the different thicknesses of the atmosphere through which the light has to pass, reflection from a cloud as contrasted with the "blue sky," etc., all exert influence on the composition of the light, and in prolonged cloudy, dull weather or fogs this factor may add its effects to those due to the mere dilution of the light as a whole.

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[*] That the connection with light depends on the access of oxygen set free in carbon assimilation, and not on any direct action of the rays of light, can hardly be doubted (see Warburg, *op. cit.*, pp. 77-92).

[†] For details see Strasburger, 'Ueber den Bau und Wachsthum der Zellhäute,' and 'Ueber das Wachsthum vegetabilischer Zellhäut,' ('Histologische Beiträge,' No. 2, 1889).

[‡] Sach's 'Physiology,' pp. 194 and 553.

[§] See Vines, 'Physiology of Plants,' p. 898; but *cf.* also Wortmann, *Bot. Zeitg.*, 1887, Nos. 48—51, especially col. 808—810.

[‖] 'Unters. über d. mechan. Ursachen d. Zellstreckung,' 1877, and *Bot. Zeitg.*, 1879, col. 848.

[*] See Kreussler, 'Landwirthschaftl. Jahrb.' vol. xvi., 1887, and vol. xvii., 1888.

[†] See Kreussler, *loc. cit.*, 1887, p. 746.

[‡] The word must not be pushed too far as to meaning, in the absence of any satisfactory mode of estimating "brightness," "intensity," "quantity," etc., of light (see Sachs, 'Phys.,' pp. 301—302).

[§] See Famintzin, 'Bull. de l'Académie de St. Pétersbourg,' vol. xxvi., 1880, col. 296—314. Also Reinke, *Bot. Zeitg.*, 1883, No. 42, with literature.

But the fundamental nature of the necessity for a suitable intensity of light of the right composition is best brought out in studying the effects of low intensities of light on the green organs of plants.

As is well known, the general effect of keeping a plant in the dark is to induce a condition known as etiolation.[*] The whole plant becomes pale yellow or colourless, and has a curiously translucent, watery appearance; the internodes are excessively long, while the leaves, on the contrary, are usually small and crumpled. Closer investigation shows that each cell of the internodes is abnormally elongated, its cell-wall thinner than usual, and its chlorophyll corpuscles small and wanting the green chlorophyll. If we examine the vascular bundles, they are found to be deficient in firmness, because the substances which normally go to thicken their walls have not been forthcoming.

Everything about the etiolated shoot indicates tenderness, and as a matter of fact such shoots are very ill-adapted to withstand the ordinary exigencies of plant life. Undoubtedly the chief cause for this weak condition is the absence of the light necessary for the purposes of assimilation; the carbon dioxide may be present and even the fully green chlorophyll could be developed by a few hours' exposure to feeble light, but these do not suffice for the construction of the materials such as glucose, starch, etc., necessary to enable the protoplasm to keep the tissues normal.

Nevertheless, the other functions of the cell are being carried on with remorseless pertinacity. The oxygen of the air enters the protoplasm, establishes its usual combinations, and carbon dioxide and water are given off to the air. The chemical changes known collectively as metabolism proceed, and result in the addition of substances to the cell-sap which were not previously there. To an extent more marked than ever before, the turgid cells may be elongating, and this brings us to note that the key to the condition of affairs is the fact that the dry weight of the etiolated shoot is decreasing: every molecule of carbon dioxide which comes away lessens the dry organic substance of the plant, and no restoration of such substance is possible in the absence of light.

In other words, then, the etiolated plant is growing to death, at the expense of what organic carbon-compounds it possessed at the beginning.

Assimilation is, of course, profoundly affected, like every metabolic process, according to the relative amounts of oxygen and carbon dioxide in the air, and although it never happens in nature that the extremes are approached, nevertheless experiments on this subject have led to interesting results.[†]

The quantity of water present in the plant and its atmosphere and the rapidity of the transpiration current undoubtedly affect the process of assimilation in a high degree. Not only is water needed for the molecular processes concerned in the act of assimilation, and not only does the supply of materials to the protoplasm depend mainly on the transparent current, but, as we have seen, the aëration of the intercellular passages, and consequently the movements of gases generally are affected.

It has long been known that the quantities of carbon dioxide absorbed, and of oxygen evolved, in the process of assimilation, vary with the age of the leaf or other organ concerned, and Kreussler has shown that one reason for these variations is the quantity of water present in the tissues at the time. In fact, an essential cause of variations in assimilation exists in the differences in the water contents of the tissues,[*] and it is no doubt largely due to the want of water that older leaves assimilate so unequally—they are unable to rapidly restore the equilibrium between losses and gains when it is seriously disturbed.

As for transpiration itself, and all the movements of water correlated with it, it is well known that the various factors of the environment affect it profoundly.

Apart from the more obvious relations[†] between transpiration and the temperature of the atmosphere, and the quantity of aqueous vapour in it, it must be borne in mind that many events concur in promoting or retarding it. The stomata, for instance, open widely in bright sunshine and close in the dark,[‡] a matter of great importance in controlling transpiration, as must be concluded from the researches of Garreau and von Höhnel.[§] Other effects are traceable to the influence of the wind shaking the plant, and to the quantities of mineral salts, etc., in the soil, but it would carry me too far to discuss further instances.

The principal effects of obstructed transpiration may be shortly compared with those due to want of light—the watery tissues are strikingly like those of an etiolated plant, and we may look upon a shoot growing in a saturated atmosphere as presenting all the chief features of one growing in darkness.[‖] Its cells are extremely turgid, with watery, soft, thin walls, and acid cell-sap; its vascular bundles feebly developed and hardly lignified; and, as before, it is ill adapted to withstand the exigencies of the ordinary environment.

All such plants or organs are, so to speak, in a permanently young condition.

THE EFFECT OF THE PRECEDING VARIATIONS IN "PREDISPOSING" THE HOST TO DISEASE.

If we put together the results of the preceding discussion, it is evident that a plant may vary within very wide limits of the condition we term health. No doubt this needs no proof to the minds of most of my hearers, but the point I wish to emphasize is that, in some of its deviations from the normal, the plant offers conditions to an attacking parasite which may be at one time favourable, at another not.

Suppose the case of a herbaceous plant growing under the following circumstances in July: the temperature has been high, and the daily supply of solar light abundant during the previous four or five weeks, and everything has been going on admirably, so far. Suddenly the weather changes—the temperature falls, rain sets in, and for many days heavy clouds obscure the sun. If this markedly different, dull cold weather continues, we may have the following condition of affairs more or less realized, as is well-known to those who observe cultivated plants closely.

Transpiration being lowered in activity, the whole plant tends more and more to be suffused with water; the stomata are nearly closed, the cell-walls bounding the intercellular passages and the air in the passages themselves are thoroughly saturated with water and aqueous vapour respectively, and the movements of gases must be retarded accordingly, turgescence is promoted, and the water contents accumulate to a *maximum*; owing to the disturbance of equilibrium between the amounts absorbed by the active roots in the relatively warm soil and those passing off into the cold damp air, much more water is absorbed by the roots in the relatively warm soil than passes off as vapour in equal periods of time. An enhanced wateriness of the whole plant, then, is one result.

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[*] See Sachs (*Bot. Zeitg.*, 1863, supplement, and 1865, col. 117, etc.); G. Kraus (*Jahrb. f. wiss. Bot.*, vol. 7, p. 209); Godlewski (*Bot. Zeitg.*, 1879, col. 81); de Vries (*Bot. Zeitg.*, 1879, col. 852); Godlewski (*Biol. Centralbl.*, 1889).

[†] See Godlewski, 'Abhängigkeit der Stärkebildung in den Chlorophyllkörnern von dem Kohlensäuregehalt der Luft' ('Flora,' 1873, p. 378); also in 'Arb. des Bot. Inst. in Würzburg,' 1873, vol. i., p. 343. Further, Pringsheim, 'Ueber die Abhängigkeit der Assimilation grüner Zellen von ihrer Sauerstoffathmung,' etc. ('Sitzungsber. d. Kgl. Preuss. Akad. der Wiss. zu Berlin,' 1887, No. 38, pp. 763-777).

[*] Kreussler, 'Beobachtungen über die Kohlensäure-Aufnahme und -Ausgabe der Pflanzen," ii. ('Landwirthsch. Jahrb.,' vol. xvi., 1887, especially pp. 728—30).

[†] See the text-books referred to, especially Pfeffer, 'Pflanzenphysiologie,' vol. i., pp. 146—150.

[‡] See Sachs, 'Lectures on the Physiology of Plants,' pp. 248—250, and Strasburger, 'Das Botanische Practicum,' 2nd ed., 1887, pp. 88—90.

[§] See Pfeffer, 'Pflanzenphysiologie,' vol. i., p. 144.

[‖] Vesque and Viet, 'Influence du Milieu sur les Végétaux' (*Ann. d. Sci. Nat.*, 6 Sér. (*Botanique*), vol. xii., 1881, p. 167).

But the low temperature, feeble light, and partially blocked ventilation system have for a consequence a depression of respiratory activity and the absorption of oxygen generally. Enough oxygen gas finds its way slowly into the cells to keep the life-processes going, of course, but not enough to complete the oxidations and decompose the organic acids, at the prevailing low temperature, so rapidly as before,[*] and thus another consequence is a tendency to the accumulation of organic acids. According to de Vries, however, the increase of organic acids must make itself effective in enhancing the turgidity of the cells, and no doubt it does so to a certain extent; beyond a certain point, however, it is more likely to increase the permeability of the protoplasm,[†] and we may even suppose small quantities of the acids to filter out even to the watery cell-walls.[‡]

Partly due to the low temperature and the depressed gas-interchange, but far more owing to the feeble light, the process of assimilation will be less active than previously. This will not be immediately felt if, as will probably be the case, there are large quantities of temporary reserves in the leaves and internodes; but it may react indirectly on the processes of oxidation and respiration, inasmuch as less free oxygen is evolved in the cells than would be the case in bright weather. As the temporary stores of starch disappear, however, the cells become more and more surcharged with glucose, together with organic acids, and it depends on several circumstances, especially on how rapidly growth is going on (*e.g.*, in the parts below ground), whether this glucose in solution passes away, or is used up slowly or rapidly; if it cannot move, or only extremely slowly, then we have the case of tissues surcharged with water containing organic acids and glucose in solution. It may be surmised that the increased amount of organic acids is favourable rather than otherwise to the ferment processes which lead to the conversion of the starch into glucoses.[§] How far the protoplasm will allow the watery solution of glucose to escape, owing to its increased permeability, cannot be determined, but it is at least probable that some may reach the cell-walls. In any case, we have the cells flooded with a dilute solution of organic acids and glucose, and the controlling protoplasm becoming less and less capable of retaining the excess.

The turgid condition of the cells, and the diminished intensity of the light,[*] will favour growth, and, in spite of a comparatively low temperature, the organs may be extending more or less rapidly or slowly. If so, the tendency will be for the very watery cell-walls to become relatively thinner than usual, as well as watery, because the ill-nourished protoplasm does not add to the substance of the wall in proportion. This being so, we have the case of thinner, more watery cell-walls acting as the only mechanical protection between a possible fungus and the cell contents.

But this is by no means all that has to be considered, when the conditions remain as above described. Sooner or later the glucose begins to fail, either because it has been directly employed for the support of the metabolic processes in the protoplasm in the immediate neighbourhood, or (less probably) because it has been re-converted into starch,[†] or other reserve carbohydrates by the leucoplasts in the cells of the roots, tubers, etc., at a distance. Now, as soon as a want of carbohydrates makes itself evident in the destructive metabolic processes accompanying growth, the accumulation of substances like asparagin, leucin, etc., is apt to occur,[‡] as products of the decomposition of the proteids. Under more normal conditions, as we have seen, these amide-bodies would be worked up again with carbohydrates into new constituents of living protoplasm, but they now begin to accumulate.

The net result of the foregoing changes amounts, shortly put, to the following:—Under certain circumstances the parenchymatous tissues of the living plant may be in a peculiarly tender, watery condition, where the cell-walls are thinner and softer, the protoplasm is more permeable and less resistant, and the cell-sap contains a larger proportion of organic acids, glucose, and soluble nitrogenous materials than usual. When the external conditions become more favourable—the temperature higher, the air drier and the sunlight more powerful—increased transpiration and respiration lead to more normal metabolic activity, for which energetic assimilation provides the materials. Of course, all kinds of combinations are possible in detail, but when dull, cold, wet weather prevails for some time, after a period of bright, hot and dry weather in the early summer, we are very apt to have herbaceous plants in such a condition as that sketched.

This being so, I have now to show how the chances of a suitable fungus are increased, if it happens to start its parasitic life on such a host in such a condition.

BOTRYTIS AND OTHER FUNGI AS AGENTS OF DISEASE, AND THEIR DEPENDENCE ON THE CONDITION OF THE HOST PLANT.

Let me first proceed to call your attention to a parasitic disease of a very extraordinary kind, though caused by a fungus belonging to a well-known and wide-spread family. This disease, and the fungus in question, may be met with in nearly every garden and greenhouse all the year round, and is quite common in the open fields and lanes of this country and elsewhere in Europe. In the form generally met with, the fungus has been placed in a separate genus known as *Botrytis*, though, in the few cases that have been thoroughly worked out, it has been proved that the mould-like *Boytrytis* is only the conidial form of certain higher ascomycetous fungi belonging to the

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[*] See Warburg, *op. cit.*, especially pp. 73-77, and 126.

[†] See Pfeffer, 'Ueber Aufnahme von Anilinfarben in lebenden Zellen,' in 'Unters. a. d. Bot. Inst. zu Tübingen,' vol. ii., 1886, pp. 296 and 329, for proof that dilute acids can traverse without permanently injuring the protoplasm.

[‡] Pfeffer showed, for instance, that methyl-orange, after being taken up in the living cell and held there by the protoplasm, can be made to diffuse out again if a little nitric acid is imbibed ('Ueb. Aufnahme,' etc., *op. cit.*, p. 293).

[§] Baranetsky, 'Die Stärkeumbildenden Fermente,' 1878; Brown and Heron, '*Journ. Chem. Society*,' 1879; Detmer, 'Das Pflanzenphysiologische Praktikum,' 1888, p. 198.

[*] So far as the *composition* of the light is altered, it will probably favour growth, because the more refrangible rays are fewer when the light has to traverse a thick atmosphere.

[†] See Schimper, '*Bot. Zeitg.*,' 1880, col. 881; and A. Meyer, '*Bot. Zeitg.*,' 1880, Nos. 51 and 52.

[‡] See Palladin, 'Ueber Eiweisszersetzung in den Pflanzen' ('Ber. d. Deutsch. Bot. Gesellsch.,' 1888, p. 205); and for older literature, Pfeffer, 'Pflanzenphysiologie,' vol. 1, pp. 298–301, and further literature quoted.

Pezizas, and which agree in developing sclerotia. As we are not concerned with the details of the whole life-history of this group, I shall purposely avoid further reference to the higher stages of development, confining our attention chiefly to the *Botrytis* stage.[*]

On dead and dying leaves, twigs, fruits, etc., of plants from all parts of the world, in the open and in greenhouses, in Europe and elsewhere, there is often to be observed an ashen-grey mould, superficially not unlike the *Phytophthora* of the potato-disease. It appears under various slightly different aspects as regards the shade of colour, the length and degree of branching of the conidiophores, and the size and shape of the conidia, and many different species have been figured and described, some good, many bad, according to the variations in colour, size, etc., referred to, and the substratum on which the mould is found growing.

It sometimes happens, however, that this same mould is found spreading more or less rapidly from dead and dying parts of a plant to the assumed healthy organs, and it has been customary to look upon this as a secondary phenomenon due to the "dying-off" of the adjoining parts, the fungus spreading to them as they died. No one questioned the saprophytic nature of the *Botrytis*,[†] and so the matter stood for a long time. Gradually, however, it came to light that various forms of this *Botrytis* appear as phases in the life-history of certain sclerotium-bearing *Pezizas* which were associated in a manner suspicious, to say the least, with epidemic diseases of rape,[‡] clover,[§] hemp,[‖] onions,[¶] hyacinths,[**] (also *Scilla*, *Narcissus*, *Anemone*, etc.), balsams,[††] *Carex*, rice, and many other plants.

Further, this mould was found casually associated with the rotting of many fruits, such as pears and apples,[‡‡] grapes,[§§] cranberries,[‖‖] etc., and on chestnuts.[¶¶] In short, even the forms of *Botrytis* which were most persistently regarded as saprophytic have now been shown to enter living plants and cause parasitic diseases in them,[***] and complaints of such epidemics are occasionally heard from various parts, as a rule, however, the disease is sporadic, and I now proceed to describe its symptoms.

Small reddish-brown spots appear on the leaves, pedicels, ripening fruit, or other organ attacked; these enlarge and spread, and the parts turn brown, shrivel up, and rot off or dry up, according to the state of the weather. In some cases the whole plant gradually turns yellow and dies, more often only a part of it goes,[*] and in many cases the disease is confined to individual organs—leaves, flower-buds, fruit, etc., as the case may be. When the disease occurs amongst stored chestnuts, carrots, parsnips, etc., the tissues become speckled, and in many cases this spreads till they are rotten throughout; and similarly with stored bulbs, corms, and tubers, etc.

Wherever the disease is rampant we find the colourless, septate, branched fungus mycelium in the dead and dying tissues, and usually emitting hyphæ, which grow into the damp air and bear the conitidia in abundance. In some cases, however, these aërial conidiophores have not been observed,[†] and the habit of producing them appears to be lost, though in every other respect the behaviour of the mycelium is the same in all the cases thoroughly examined.

Some very remarkable facts have come to light during the last few years concerning this mycelium and the conidia; and as all the species or forms which have been thoroughly examined agree essentially in their physiological behaviour, I need no longer trouble you with references to any special forms, excepting in so far as the citation of authorities necessitates this.

(*To be continued.*)

CHEMOTACTIC SENSITIVENESS OF ZOOSPORES.

Dr. B. Stange has made a series of observations on the sensitiveness to the presence of various chemical substances of the zoospores of the Saprolegniaceæ and the Ayxamœbæ of the Myxomycetes. The experiments on Saprolegniaceæ were made on a species belonging to the *Saprolegnia ferax* group, grown, with due precautions, on the dead bodies of flies. A careful series of experiments determined the fact that it is the phosphates in the decaying body of the insect or in the nutrient fluid, and not compounds of carbon or nitrogen, that excite most strongly the sensitive movements of the zoospores, although certain other substances also exercise a greater or smaller attractive or repulsive influence upon them. For exercising this influence there is an optimum concentration for phosphoric acid itself and for each of its salts; no other free acid has the same power. Whether the influence is attractive or repulsive depends on the concentration of the solution. Neither the presence of free oxygen nor variations of temperature have any considerable influence on the sensitiveness. The species of Myxomycetes observed were chiefly *Chondrioderma difforme* and *Æthalium septicum*. The results differed materially from those obtained with the Saprolegniaceæ. Phosphoric acid and its salts, citric acid, tannic acid, glycerin, cane-sugar, and other substances, exercised no attractive force on the myxamœbæ of *Chondrioderma difforme*; while, on the other hand, malic and lactic acids and their salts acted powerfully, butyric acid and asparagine with less energy, the action being again attractive or repulsive according to the concentration. With *Æthalium septicum* positive results were also obtained with valerianic and propionic acids. The plasmodes of this species are powerfully influenced by the same chemical substances as the myxamœbæ.

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[*] For further details as to the morphology, etc., *cf.* de Bary, 'Comp. Morph. and Biology of the Fungi,' etc., especially under the heading *Peziza Fuckeliana*.

[†] Of course I am referring to the modern definition of the genus *Botrytis*, after its separation from the totally different Peronosporæ (see *Annals of Botany*, vol. ii., p. 357).

[‡] See Coemans in 'Bull. Acad. Roy. de Belgique,' Sér. 2, vol. ix., 1860, p. 62; and Frank, 'Krankheiten der Pflanzen,' 1880, pp. 531-537.

[§] Kühn, 'Hedwigia,' 1870, No. 4, p. 50; Sorauer, 'Pflanzenkrankheiten,' vol. ii., 1886, pp. 283-288; Rehm, 'Die Entwickelungsgeschichte eines die Kleearten zerstörenden Pilzes,' Göttingen, 1872.

[‖] Tichomiroff, in 'Bull. Soc. Nat. de Moscou,' 1868, 2 (see Hoffmann's 'Mykol. Berichte,' 1870, p. 42).

[¶] See Frank, *op. cit.*, p. 540, and Sorauer, 'Oesterr. Landwirthsch. Wochenbl.,' 1876, p. 147, and Pflanzenkrankheiten,' vol. ii., p. 294.

[**] Meyen, 'Pflanzenpathologie,' 1841, pp. 164-172; and Wakker, in *Bot. Centralbl.*, 1883, vol. xiv., p. 316.

[††] Frank, *loc. cit.*, p. 544.

[‡‡] Sorauer, 'Pflanzenkrankheiten,' vol. ii., p. 298.

[§§] See especially Müller-Thurgau, in Thiel's 'Landwirthsch. Jahrb.,' vol. xvii., 1888, p. 83—160, on 'Edelfäule.'

[‖‖] See especially Woronin, 'Mem. de l'Acad. de St. Pétersb.,' vol. xxxvi., No. 6, 1888.

[¶¶] Kissling, 'Zur Biologie der *Botrytis cinerea*,' Bern, 1889, p. 14 (where also the literature is collected).

[***] *E.g.*, *B. cinerea*, the conidiophores of *Peziza Fuckeliana* (see de Bary, 'Comp. Morph. and Biol. of Fungi,' p. 380), are now known to be capable of producing epidemic diseases in vines, gentians, etc.

[*] A curious fact is sometimes observed—the small brown spot suddenly ceases to spread, and the hyphæ may be found in it in a dried-up dormant condition for weeks. See also *Annals of Botany*, vol. ii., 1888, p. 356, and figs. 51—54.

[†] *E.g.*, in de Bary's *Peziza sclerotiorum* (Lib.). See "*Sclerotinien und Sclerotinien-Krankheiten*" (*Bot. Zeitg.*, 1886, col. 424).

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LEEDS.

THE forthcoming meeting of the British Pharmaceutical Conference at Leeds is already sufficiently near to admit of our calling attention to the fact, and furnishing some information as to the arrangements that are in progress for the entertainment of visitors. We may in the first place remind our readers that the Leeds meeting will be held under the Presidency of Mr. CHARLES UMNEY, on the 1st, 2nd and 3rd of September, and that Mr. F. W. BRANSON, the Honorary Local Secretary, who has charge of the arrangements, will be pleased to receive early intimation as to the lodging accommodation that may be required. The Headquarters of the Conference will be at the Great Northern Hotel, and there, as well as at the Queen's Hotel adjoining the Midland Railway Station, adequate accommodation has been secured at the ordinary tariff rates. Both these hotels are situated within a short distance of the Philosophical Hall, where the reception by the President is to take place on the Monday evening as the opening of the Conference meeting. Tram cars run at frequent intervals from both the hotels above mentioned and past the Philosophical Hall. The sessions of the Conference on Tuesday and Wednesday will be held in the Lecture Theatre of the same building, and the luncheon will be at the Albert Hall, Cookridge Street, somewhat further distant from the hotels, but in the same line of tramcar service above mentioned. On Tuesday evening there will be a reception of the members of the Conference by Principal BODINGTON and other representatives of the Yorkshire College, and on Wednesday evening there will be a smoking concert at the Queen's Hotel. On Wednesday afternoon carriages will be provided after the conclusion of the sitting, at 4.15, to convey members to Roundhay Park, where afternoon tea will be provided in the Mansion at 5 p.m. This is one of the most beautiful parks in the country, 773 acres in extent, and, abounding in picturesque valleys, woods and lakes, it furnishes a most delightful contrast to the normal smoky aspect of Leeds. It was purchased by the Corporation for £140,000.

After the completion of the business of the Conference at the Sittings on Tuesday and Wednesday, it is intended to devote Thursday to an Excursion into Wharfedale, for which the arrangements are as follows. At 9.30 in the morning a special saloon train will start from the Midland Station and reach Embsay at 10.15. From that point carriages will convey the party over Embsay Moor to take advantage of the fine views obtainable from that elevated point and thence through Barden to Bolton Woods, the Strid and other points of Wharfedale. At 1 o'clock luncheon will be provided at the Devonshire Hotel, Bolton Abbey, and the ruins of the abbey will be visited at 2.30. For the return journey the carriages will leave Bolton Abbey for the railway station, and on reaching Ilkley at about 4.45 afternoon tea will be provided in the winter garden of the Wells House Hydropathic Establishment. The special train will leave Ilkley at 6.15 p.m. and arrive in Leeds about 7 p.m.

The central position occupied by Leeds geographically, and the convergence there of the chief lines of railway from all parts of the Kingdom, are in themselves circumstances which make the town especially suitable for a gathering like the British Pharmaceutical Conference or the British Association, which will hold its annual meeting there immediately afterwards. The town itself has also much to interest a visitor, and the immediate neighbourhood of it presents numerous objects of attraction for the antiquary, the naturalist and the lover of picturesque scenery. The population of Leeds is now about 360,000, and within recent years the town has been extended by the incorporation of adjoining villages, on both sides of the river Aire, so that in size as well as commercial importance it ranks as the chief town of Yorkshire and as the fifth in England. The clothing trade of which Leeds is the headquarters was established originally by EDWARD III., who settled Flemish workmen there, and since the beginning of the eighteenth century the town has rapidly advanced in prosperity. The ready-made clothing trade of Leeds now gives employment to a very large number of persons. The other staple trades of the town are cloth, leather, iron and engineering. Glass making and the chemical trades also occupy important positions in Leeds and its neighbourhood, together with linen, thread, worsted, carpet, canvas and sacking factories, dye-works, tanneries, tobacco factories, breweries, corn and seed mills and many other forms of industrial enterprise. The estate of the Art Pottery Works at Burmanstoft covers an area of 115 acres, some 15 of which are occupied with kilns and other buildings. Among other industrial establishments the Leeds Forge is of interest as being a place where water gas is now used on a large scale for metallurgical operations. The chief public buildings in Leeds are the town hall and the adjacent municipal buildings, which comprise an excellent library containing

170,000 volumes, and the Public Art Gallery, recently erected at a cost of £9000. The Mechanics' Institution and Literary Society in Cookridge Street ranks among the best of its kind in England, and the Philosophical Hall in Park Row possesses an excellent museum and library with valuable collections of local interest. Of educational establishments the principal are the Yorkshire College, at the northern extremity of the town, the Grammar School, the higher grade Board School and the Leeds School of Science. The former, which is one of the three Colleges of the Victoria University, was founded in 1874 and comprises about 3½ acres. The buildings, in the early Gothic style, were erected at a cost of about £100,000. The Chemical Laboratory will accommodate one hundred and twenty students. The medical department of the Yorkshire College (formerly the Leeds School of Medicine, founded in 1830) having become inadequate, a site for new buildings has been secured in close proximity to the General Infirmary. In the College special attention is paid to training men for positions requiring practical application of science, and it is perhaps unique in attaching as much importance to this as to the preparation of students for University degrees, so that it combines the functions of a University in the English sense, with those of the Polytechnic as understood on the Continent. The facilities for teaching science in Leeds are rapidly extending, for in addition to the above and other institutions the new chemical laboratory of the Leeds School of Science, recently built by the Mechanics' Institution and Literary Society, has provision for about a hundred students in practical chemistry, and the higher grade Board School, which has been constructed at a cost of some £50,000, also provides laboratory accommodation for more than one hundred students. From these facts it will be seen that Leeds is taking active steps to promote the study of science in connection with technical training, and that important beneficial results may be expected from these efforts. The space at our disposal does not admit of reference to the antiquarian and scenic attractions that will be the features of interest in the excursion that will take place after the business of the Conference is finished, and we must therefore reserve the description of them for a future occasion.

RAILWAY RATES.

An important document in reference to this subject has just been issued by the Board of Trade. It is entitled maximum rates and charges and classification of merchandise traffic applicable to the London and North Western Company and certain other companies connected therewith. A similar document relating specially to the Great Western Railway has also been issued, but as the London and North Western Railway system is so extensive and penetrates to so many parts of the country, the maximum rates which have been adopted by Lord Balfour and Mr. Courtney Boyle in reference to that Company may for the present be taken as typical of those contemplated for other lines of railway. Confining our remarks to this one document it may described as giving in a systematic manner a statement of all the rate clauses and classifications that have hitherto been scattered through a vast number of Acts of Parliament passed during the course of more than fifty years. After a general introduction there is in the second portion of this document a schedule of the maximum rates and charges applicable to different classes of traffic, and the third portion contains the classification of every recognized article of commerce in one of eight classes.

To provide for the case of the dispute between traders and the railway companies in regard to the loading and unloading of goods upon the premises of the railway companies, the Board of Trade has proposed a clause providing that if in the opinion of an arbitrator, to be appointed by the Board, a railway company has in any instance "unreasonably" refused to allow a trader to perform the service of loading or unloading for himself, the company shall not be permitted to make any charge for performing that service for him. In regard to exceptional articles, the Board of Trade requires that a special contract shall be made on the application of the trader, and that it shall be in writing, signed by himself or by his authorized agent.

In regard to returned empties, the original proposal of the Railway Companies was that they should be chargeable in the highest class, but eventually they suggested that empties should be charged for in the same class as the goods with which they had been filled were chargeable. On this point the Board of Trade has provided that the maximum rates chargeable for all empties shall not exceed three-fourths of the sum that would be chargeable for the goods they originally contained. The question relating to the charge for "smalls" is another point in which the Board of Trade has adopted a view in favour of the claims of traders. The railway companies have always hitherto had power to charge exceptional rates for "smalls," or for parcels that are under 500 lbs. in weight, and they have proposed, for the sake of uniformity, to raise the limit of weight from 500 lbs. to 560 lbs., claiming that by doing so and fixing a maximum rate they had really made a concession to traders. But the Board of Trade does not appear to have concurred in this view, for it has now defined "smalls" as not exceeding 3 cwt., and instead of their being chargeable at twice the ordinary maximum rate as has been proposed by the London and North Western Company, or at "such a reasonable sum as the company may think fit," they are to be charged for on the principle of adding to the ordinary tonnage rate a supplementary charge varying from 6*d.* to 2*s.* for each parcel, according to the maximum tonnage rate chargeable. For small parcels of less than 28 lbs. or 14 lbs., the charges are to be the same as for 28 lbs. and 14 lbs. respectively. Parcels containing articles belonging to different classes are to be chargeable with the maximum tonnage charge applicable to the highest of the classes, and if a consignor of a small parcel declines on demand of the Company to declare the nature of its contents, the Company may charge for it as if it were wholly composed of articles in Class 5 of the classification.

In mentioning last week the arrangements that had been made for the Conference of the chemists and druggists of South Devon and Cornwall at Plymouth next week, it was stated that there would be an excursion in the afternoon to follow the meeting at the Athenæum. That arrangement, however, has now been altered, and the programme decided upon is that a steamer excursion will precede the meeting, leaving the Promenade Pier in the harbour precisely at half-past eleven. The Conference will take place at three in the afternoon, and the chair will be taken by Mr. A. P. Balkwill. At the dinner in the evening, at the Grand Hotel, the chair will be taken by Mr. Codd, and the vice-chair by Mr. Sloggett. Application for tickets for the dinner must be made not later than Monday, the 28th inst., to Mr. F. W. Hunt, 106, Old Town Street, Plymouth. We may add that the Conference will be open to all pharmaceutical chemists, and chemists and druggists, as well as to assistants and apprentices in South Devon and Cornwall.

* * *

It would appear from the report published on another page, that the Irish Pharmacy Bill will meet with more criticism while in the House of Lords than while passing through the House of Commons and possibly some modification. On the second reading being moved on Monday last the Marquis of Waterford described the Bill as providing that people who had been breaking the law since 1875 should have a legal status given to them, and expressed the opinion that the Bill ought to be very much amended in Committee. The Duke of Abercorn said the Pharmaceutical Society of Ireland was anxious for the passing of the Bill if certain amendments were made in it, and after some further conversation the Bill was read a second time, and referred to the Standing Committee on General Bills. Notice has since been given by the Marquis of Waterford of his intention to move a large number of verbal amendments, the principal effect of which would be to provide for a Register of "Chemists and Druggists and Registered Druggists," the former title being reserved for persons who were in business at the time of the passing of the principal Act. If these amendments are adopted there would eventually be in Ireland only the two classes of "pharmaceutical chemists" and "registered druggists," the latter being entitled to retail and mix poisons, but not to compound medical prescriptions.

* * *

We have received a letter relating to the Minor examination, in which the writer expresses the opinion that those who have been up for that examination three or four times, and have been "plucked" because they did not obtain the aggregate number of marks for passing, should be allowed to present themselves again for examination only in the subjects on which they have failed. Our correspondent, however, misapprehends the circumstances of the case, and fails to consider that the examination, being for a qualification, must be passed as a whole at one time, and that it would be unfair to other candidates to confer the qualification on the basis of a piecemeal examination. The plan suggested by our correspondent has received consideration by the Board of Examiners and has even been tried, but it has been found impossible to carry it out with due regard to the requirements of the case. It would sometimes be impracticable to admit that a candidate had passed in any one or more subjects, even though he might have satisfied the examiners in those subjects, for the grounds upon which he had done so might be so slender as to require a consideration of the manner in which he had acquitted himself in other parts of the examination, and difficulties would thus be created that would materially detract from the value of the examination as a test of qualification.

* * *

The Report of the Select Committee appointed to inquire into the causes which have led to the decrease in the acreage of land under hop cultivation has been presented. It appears from the statistics quoted that the acreage under hop cultivation has for many years past shown great variation, but that since 1885, when it was 71,300 acres, it has decreased to 57,700 acres in 1889, the decrease having occurred mainly in the locality of Sussex and Kent, where hops of inferior quality are produced. To some extent this falling off has been coincident with a decrease in the quantity of malt and sugar used for brewing, but other causes to which it is attributed have been an economy effected in recent years in the use of hops through the adoption of more scientific methods in brewing, the altered taste of the public, which has required a beer of lighter and brighter character, for which hops of inferior character are unsuited, and the use of hop substitutes. The evidence received upon this last point has been to the effect that the action of the hops is fourfold: (1) to precipitate or render insoluble certain nitrogenous constituents of the wort; (2) as a preservative by preventing a secondary fermentation; (3) to impart a bitter flavour to the beer; and (4) to give it a delicate aroma. The Committee expresses the opinion that only the third function, that of communicating a bitter taste, is performed by any of the advertised hop substitutes, and states that it is admitted generally to be impossible to make beer to suit the public taste without using some hops. It therefore recommends that the sale of beer in the manufacture of which any of these hop substitutes has been used should be accompanied by a declaration to that effect.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Thursday, July 24, 1889.

Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Knight, John Eddy	Folkestone.
O'Dell, John Denis	Hull.
Sadleir, Horace Sutton	Gloucester.

The Report of the College of Preceptors on the Examination held on July 8 was received.

Three hundred and fifty-nine candidates had presented themselves for examination, of whom *two hundred and fourteen* had failed.

The following *one hundred and forty-five* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Adams, Albert Edward	Nottingham.
Akeroyd, Charles Edward	Alnwick.
Allanson, John Thomas	Crook.
Aris, Alfred William	Swanley.
Ashmore, Arthur	Brighton.
Bailey, John Henry	Flamborough.
Barnard, George Bartlett	London.
Barton, Frederick Keal	Liverpool.
Bennett, Alfred Edward	Great Torrington.
Benton, Alfred	Loughborough.
Bishop, Arthur	Leicester.
Blackburn, Albert Edward	Darlington.
Bonthron, John	Glasgow.
Bowland, Arthur	Southport.
Boyle, Joseph	Nottingham.
Bradshaw, Thomas	Boothstown.
Burnett, John	Pickering.
Campion, Sydney Hooper	Cambridge.
Clark, Alexander	Norwood.
Clarke, Thomas Joseph	Derby.
Clutterbuck, Benjamin Robert	Cheltenham.
Cooper, Burton Frederick John	London.
Creswell, Harry George	Bromsgrove.
Crockart, William	Montrose.
Cumber, Perry	Guernsey.
Curtis, Edgar	Southampton.
Davies, David	Llandilo.
Davies, David Thomas	Portsmouth.
Davis, Charles	Riverhead.
Davison, John Lyle	Bidford.
Dodridge, Wm. James, Junr.	Woolstone.
Drummond, Wallace	Hawkhill.
Elliott, George Robert	Nottingham.
Evans, John Richard	Brierley Hill.
Evans, Octavius William	Birmingham.
Farrow, Albert Edward	London.
Fell, Sidney	Huddersfield.
Field, George	Cambridge.
Findlay, George	Edinburgh.
Firth, Herbert	New Mills.
Fletcher, Richard Jaques	London.
Fletcher, Samuel Thomas	Horncastle.
Floyd, Charles W. C.	Soham.
Forbes, James	Nairn.
Forrester, Thomas	Edinburgh.
Franks, Charles	Leicester.
Fyfe, John	Stirling.
Gaiger, James Edwin	Winchester.
Gartside, Herbert William	Chadderton.
Goodall, Frederic Charles	Congleton.
Goode, Arthur Frederick	Nuneaton.
Goodenough, Joshua Mann	Somersham.
Gray, Charles Leith Hay	Old Aberdeen.
Greatrex, E. J. McWilliam	Liverpool.
Harrison, Alfred William	Pendleton.
Hawley, Thomas Herbert	Coventry.
Hay, Roderick	Dingwall.
Hendry, Simon	Belfast.
Hesketh, George Frederick	Huddersfield.
Hocken, William Morland	Liverpool.
Hoffmann, Carl Mailund	North Shields.
Howard, Alfred	Hyde.
Hoyle, Frederick William	Leeds.
Hubble, William Barton	Workington.
Hudson, Frank	Eccleshall.
Huxtable, Zebra Charles	Bristol.
Innes, George	Edinburgh.
James, James Llanvair	Llanelly.
Jeanes, Arthur	Cardiff.
Jones, Edward Rees	Oswestry.
Jones, John Beynon	Llanarth.
Jones, William Morgan	Rhydyfelin.
Keene, Hedley Havelock	Bournemouth.
Kemp, Wilfred	Whitstable.
Kerr, Archibald	Dumfries.
Kerridge, Alfred Ernest	Luton.
Lane, George	Wymondham.
Latham, Arthur William	Haydock.
Lee, Charles Theodore	Liverpool.
Lennox, James	Edinburgh.
Lucas, William Thomas	Northampton.
Ludlam, William Henry	Sheffield.
McBryde, Alexr. Hunter, Junr.	Newcastle-on-Tyne.
Mace, Lewis Albert	Winchcombe.
Macfarlane, Thomas	Glasgow.
Mackenzie, John Melville	Edinburgh.
Marie, Louis Xavier	Edinburgh.
Marshall, Arthur Austen	Waltham Abbey.
Marston, Richard Westland	London.
Martin, John	St. Agnes.
Mason, Arthur C. H. Newton	Birmingham.
Mason, Ernest Noel	Bexley Heath.
Mason, Henry Gurney	Ryde.
Morgan, Harold Marston	Ullesthorpe.
Morley, Charles	Lelant.
Morrell, John George	Stockton-on-Tees.
Morris, Samuel Thomas	Carnarvon.
Munton, James Boughton	Stamford.
Newcombe, Thomas	Egremont.
Nicol, William	Fordoun.
O'Brien, Frederick	Liverpool.
Osborne, Harry Edward	Spalding.
Parry, Evan Thomas	Llanarth.
Peck, Harold Robinson	Cambridge.
Pendlebury, James	Manchester.
Penny, Edgar Godfrey	Wateringbury.
Pickard, Herbert James	Exeter.
Pickles, Frank	Grantham.
Pratt, Robert Rowles	Woodstock.
Prior, James Siddall	Manchester.
Proudfoot, William	Glasgow.
Ramage, Thomas Robertson	Edinburgh.
Reid, Alexander	Aberdeen.
Robertson, Joseph	Aberdeen.
Robinson, Charles Holmes	Loftus-in-Cleveland
Rugg, Arthur Vivian	Crewkerne.
Russell, Joseph Frederick	Leeds.
Scott, George Baty	Belford Station.
Sharland, William Cragg	Auckland, N.Z.
Sinclair, James P.	East Linton.
Smalley, John Robert	Preston.
Smithies, William Henry	Bradford.
Stamp, George Harry	Brigg.
Stearn, Ralph Marmaduke	Cambridge.
Steel, Robert Atkinson	Keighley.
Tapper, Charles Albert Hy.	Bristol.
Thomas, John Wilbert	Hebden Bridge.
Tims, Edgar Orlando	Leicester.

Walker, William Henry	Hereford.
Walter, James R.	Kirkwall.
Warner, Percy Robert	Leicester.
Waters, James Bowden	Morpeth.
Waterston, James Albert	Forfar.
Westerman, Thos. Kenworthy	Huddersfield.
Whitelam, John Herbert	Hull.
Wild, Sydney	New Mills.
Williams, John Veale	Helston.
Williams, Leonard Augustus	Llanelly.
Williams, William Trevenna	London.
Willmott, Frank	Cambridge.
Wilson, Harold Oates	Nottingham.
Winn, James Edwin	Bradford, Manchester.
Winsor, William Lionel	Clevedon.
Wood, Ernest James	Tockwith.
Wright, William Bruce	Greenock.

The questions set at this examination were published in the *Pharmaceutical Journal* for July 12, p. 33.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	10	4	6	Jersey	2	0	2
Birmingham	16	5	11	Lancaster	3	0	3
Brighton	2	0	2	Leeds	18	7	11
Bristol	10	3	7	Lincoln	6	3	3
Cambridge	9	7	2	Liverpool	17	9	8
Canterbury	6	1	5	London	43	17	26
Cardiff	6	3	3	Manchester	27	11	16
Carlisle	5	2	3	Newcastle-on-T.	18	5	13
Carmarthen	6	3	3	Northampton	4	2	2
Carnarvon	6	2	4	Norwich	2	1	1
Cheltenham	3	2	1	Nottingham	19	10	9
Darlington	9	4	5	Oxford	3	1	2
Dundee	8	3	5	Peterborough	3	1	2
Edinburgh	26	8	18	Sheffield	7	1	6
Exeter	8	3	5	Shrewsbury	2	1	1
Glasgow	19	7	12	Southampton	7	6	1
Guernsey	1	1	0	Truro	6	3	3
Hull	10	3	7	Worcester	4	2	2
Inverness	5	2	3	York	3	2	1

SCHOOL OF PHARMACY EXAMINATION PAPERS.

SESSION, 1889-90.

CHEMISTRY AND PHYSICS.

SESSIONAL EXAMINATION FOR A SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

PROFESSOR DUNSTAN.

The following questions were set for this examination:—

Part I.—Physics.

July 19, 1890. *Time allowed*—10 *a.m. to* 1 *p.m.*

1. What is known about the relationships of the different forms of energy? How may the principal forms be changed into one another? Mercury is allowed to fall from a height of 100 metres. Calculate what the rise in its temperature will be.

2. What is meant by the boiling point of a liquid? How is this point accurately determined?

3. How is the strength of an electric current measured? Give a full account of the mode of working of two different instruments that may be used for this purpose?

4. Explain the terms "kathode" and "anode."

5. Give an account of the phenomena that are observed when light is transmitted through a crystal of Iceland spar.

6. Explain the construction of the spectroscope. Give examples of the chief varieties of spectra.

Part II.—Chemistry.

July 19, 1890. *Time allowed*—2 *p.m to* 5 *p.m.*

1. A liquid is supposed to be water. Describe the experiments you would make in order to prove that it is.

2. How would you ascertain the presence of hydrogen in each of the following bodies, viz., nitric acid, ammonia and potash? What is the experimental evidence for the formulæ which are usually assigned to these compounds?

3. Classify the elements carbon, lithium, copper, potassium, silicon, silver, bismuth, sodium, phosphorus, nitrogen. Give reasons for your classification.

4. A fermented solution of sugar is stated to contain a liquid having the formula C_2H_6O. How would you proceed to verify this assertion, and also to ascertain the constitution of the compound?

5. Discuss the relationship subsisting between the following pairs of compounds, viz., mannite and dextrose; chloral hydrate and butyl chloral hydrate; benzene and pyridine; pyridine and conine; camphene and camphor; phenol and salicylic acid.

6. Discuss the peculiarities in its behaviour which have led chemists to assign a special place and constitution to the hydrocarbon benzene.

CLASS OF PRACTICAL CHEMISTRY.

SESSIONAL EXAMINATION FOR A SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

PROFESSOR ATTFIELD.

July 21. *Hours*—10 *to* 5.

Books and Memoranda permitted. Standard number of Marks, 100.

The following questions were set for this examination:—

1. Report, qualitatively, on the purity of the following substances:—
   a. "Calcii hydras."
   b. "Pilula Hydrargyri."
   c. "Chloroformum."

2. What three *salts* are present in the accompanying "solution?"

3. Ascertain the melting point of the "fat" supplied to you.

4. Ascertain the boiling point of "the fluid" given to you.

5. Find the percentage of "thiosulphate of sodium" in the sample handed to you.

⁂ In connection with exercises 3 and 4 state the laboratory-number of the thermometer you have employed.

NOTE.—*Manipulation as well as results will be scrutinized.*

Provincial Transactions.

COMPLIMENTARY DINNER TO MR. ALEXANDER BOTTLE.

Taking advantage of his presence at the July examinations in Scotland, the members of the Board of Examiners for Scotland, and some of his former colleagues and friends, entertained Mr. Alexander Bottle, Vice-President of the Pharmaceutical Society, at a complimentary dinner in the Royal Hotel, Edinburgh, on Friday, July 18, to celebrate his professional jubilee as a pharmaceutical chemist. The chair was taken by Mr. J. B. Stephenson, Chairman of the Board of Examiners for Scotland, and Mr. J. R. Young acted as Croupier. Mr. S. R. Atkins, of Salisbury, who happened to be spending a holiday in Edinburgh, was also present.

After dinner, the Chairman announced that congratulatory letters and apologies for unavoidable absence had been received from Messrs. Baildon, Edinburgh; Borland, Kilmarnock; Buchanan, Edinburgh; Frazer, Glasgow; Mackay, Edinburgh, Mackenzie, Edinburgh; Noble, Edinburgh; Storrar, Kirkcaldy; and Watt, Haddington.

After the usual loyal and patriotic toasts had been duly honoured, Mr. J. R. Young proposed the toast of "The Pharmaceutical Society." He sketched the early history of the Society in Scotland, and the various difficulties the branch had to contend with. It was not until they got Mr. Carteighe as President, who thoroughly realized the necessity of the Society having in Scotland a dwelling-place worthy of it, that these difficulties had been overcome. The Pharmaceutical Society had done good work in the past, and he thought it might be even more useful in the future. It was a convenient rallying point, and it was increasingly essential that they should have unity amongst themselves. He rejoiced to see the Vice-President amongst them so hale and hearty, and should have asked him to reply to the toast, but as he would have to reply to the toast of the evening, he would avail himself of the happy circumstance of Mr. Atkins being present with them and call upon him.

Mr. Atkins, after thanking the company for inviting him to be present, went on to confirm what had been said regarding the President and the acquisition of the very suitable and substantial house in York Place. He spoke in complimentary terms of all the members of Council who had been returned from Scotland, Macfarlan, Mackay, Fraser, Borland, Baildon, Watt and lastly Mr. Storrar, by whom he had already been very favourably impressed. He assured the Scottish examiners that the Council had the most absolute confidence in them, and he accounted for the higher percentage of passes in Scotland by the superior early training of Scottish lads both in their general and their professional education. He had known Mr. Bottle for twenty years, and a truer friend no man could desire to have.

The Chairman, in proposing the health of the Vice-President, said they were all aware Mr. Bottle was with them now in the discharge of his official functions as Chairman of the Board, and on an ordinary occasion they would have been glad to honour him by welcoming and entertaining him. But this was very much more than an ordinary occasion, for this was the jubilee year of Mr. Bottle's professional life. They had all felt self reproach that amidst all the congratulations that had been offered to him at Dover, there was not one from Scotland. This had been caused simply by their not being aware of the circumstances, and they now gladly welcomed the opportunity of repairing the omission. They had wished that the gathering should have taken a more general representative character than it had, but at this season of the year and in the limited time they had not succeeded as they could have wished. Mr. Bottle's townsmen had shown their appreciation of his worth by electing him to the highest public office in Dover, but, of course, it was more to his pharmaceutical record that they, as pharmacists, looked. Since the very first Mr. Bottle had been associated with the Society and for many years had been on the Council. He was now fulfilling his fifth term of office as Vice-President, and they had long regarded his name as a household word in all the actings and counsels of the Society, and as synonymous with sobriety of judgment, moderation and sound common sense. In the name of the company he assured Mr. Bottle of their personal respect for him, of their appreciation of his official services, of their hearty congratulations on this auspicious occasion and their good wishes for his continued health and happiness for many years to come.

The toast was drunk with all the honours.

Mr. Bottle, in responding, said he was at a loss for words adequate to express his thanks for the great kindness with which the toast had been proposed and pledged. With regard to the recent meeting in Dover it had been his desire that it should be confined to his friends there. During all his public life it had been his desire to serve his fellow townsmen to the best of his ability, both as chief magistrate and otherwise; and he was glad to find that his efforts had been appreciated. He had been associated with the Pharmaceutical Society from the beginning; in fact, he might say he was one of the founders. He felt it was the right thing to join such a combination, and he had all along done his best to promote the interests of his brother chemists and maintain the dignity of the Society. He agreed with all that had been said by Mr. Atkins as to the men who had been sent to the Council from Scotland. He was very pleased to meet on this occasion his old friend Mr. Ainslie, and his former colleague Mr. Young. He had to thank them all for their kind reception not only there, but also in the examination room, where he had seen with what care and assiduity the examinations in Scotland were conducted. He thought Mr. Atkins had hit the right nail on the head in his remarks on this subject. He had been greatly delighted by the kind letters sent by Scottish friends absent on this occasion, and he had to thank them all for the very cordial way in which they had entertained him.

Mr. Atkins proposed "The Chaiman," who suitably replied.

The evening's proceedings were agreeably enlivened by songs and recitations.

Proceedings of Societies in London.

NORTH KENSINGTON CHEMISTS' ASSOCIATION.

At a meeting at the Leinster Hotel, July 15, at 9 p.m., Messrs. E. Andrews, R. W. Barker, and J. Matthews joined. Among others present were Messrs. Edwards, Horsley, Hyslop, Long and J. W. Smith.

Mr. Long read the following paper on "Early Closing."

As Secretary of the Pharmaceutical Society for the Parliamentary Division or Borough of North Kensington I was appointed the local representative of the Society, and thus enabled to try and develop what has been a principal object with me since I joined the ranks of pharmacy, viz., to try and promote good fellowship, friendship and harmony among my brethren and advance our mutual interests.

In other boroughs, such as provincial towns which are like islands surrounded by the open country, completely isolated, it is easier to agree to and adopt any principles, but in London the continuity to a great extent creates a difficulty as one district merges into another and habits are different. Although I should like to see good habits prevail everywhere, it is a fact that at present work in shops is continued later in some neighbourhoods than in others, and what may be called good neighbourhoods in this respect are connected with others which we in this respect cannot call good, but I see no reason why there should not be reform. A society has been formed by voluntary effort to help all to help themselves, viz., the Early Closing Association.

Now as far as we are concerned there have been many efforts in this direction. In the "Progress of Pharmacy," page 84, there is a record of this kind. After preliminary gatherings a meeting was held, February 18, 1839, to take into consideration the hardships pharmacists suffered on account of their close confinement every day in the week, Sunday included, and the want of that recreation which their bodily health and mental improvement required. It was urged, as an anomaly which demanded effectual remedy, that while they were labouring to provide for the health of the public, they were sacrificing their own, and that while they were engaged in an occupation in which the cultivation of their minds in the study of chemistry and other sciences was essential, their whole time was taken up in the mechanical drudgery of the shop. Many masters advocated earlier closing every day except Saturday, and keeping entirely closed on Sunday. Others thought, however desirable, it was impracticable on account of the impossibility of compelling all parties to adhere to it; and also from the difficulty of making any law applicable to all London, on account of the different habits of the people, some places continuing business after others had closed.

A resolution was passed unanimously recommending the entire closing of shops and discouraging all unnecessary business on Sundays. A committee was formed to carry it out, hand-bills were printed embodying the resolution with a brief statement of the facts which led to it, and were circulated among the trade for distribution to the public to secure their cooperation. It took effect the first Sunday in March. In some instances the adherence to the regulations were but ephemeral; the assistants in several shops complained of the darkness of the place and that their labour was considerably increased by the trouble of opening the door to each customer. They wished the door shutter taken down and so the effort fell through. Again, others violated the regulation without assigning any reason. Of course, as you may expect, their neighbours took offence and the effort proved abortive, except that we read that some adopted it and have continued to close on Sundays and have had no reason to regret it.

Another trade meeting was held July 11, 1854, at the Freemasons' Tavern at 4·45 a.m., Mr. Peter Jones, Norton Folgate, in the chair. I was there; it was well attended and productive of much good.

It was, I think, in 1864 the Early Closing Association came to Kensington and Notting Hill. After the usual preliminary meetings a great gathering took place at the Vestry Hall. Ministers of various denominations attended, and one of the resolutions passed was, "That all respectable people would buy before 8 o'clock, and all respectable tradesmen would close at 8 o'clock." I did for twenty years. In 1876 the Early Closing Association came down here again. I attended the meeting. Mr. Short, in whose small hall it was held, was made Chairman, I Vice-Chairman, and with the Secretary of the Early Closing Association I got the chemists together, and we had many meetings, resulting in a general meeting of the trade in the neighbourhood at the St. John's Hall, Moscow Road, February 15, 1877, when Professor Redwood took the chair, and a meeting of all chemists at 17, Bloomsbury Square, April 18, 1877, with Mr. Sandford in the chair. This was a great success, a large, enthusiastic and unanimous meeting, and locally we agreed to put up shutters at 8 o'clock and the door shutters at 8·30; handbills were also printed for local distribution by chemists to their customers. Here, again, I may say that the usual results followed; many adopted and continued the practice, others begun and fell away, a few stood out altogether, like the parable of the sower. This, I am afraid, is the inevitable result; there are always men—I will not use hard names or try to define them further than as the proverbial "death in the pot"—who do not want anything, the Pharmaceutical Society, or its education, examinations or qualifications. By their selfishness and want of geniality they obstruct all improvement, progress, harmony and the best interests of chemists. I do not see why this should be. In 1839 there was no Pharmaceutical Society, in 1854 it was only a voluntary Association, in 1877 it was the part of the trade which had crystallized out, surrounded by a monster legion of chemists, who appear to be amorphous; but as far as we are concerned, 1876 took more root and did more good than all the rest. I hope the germ is not dead, and that we shall be able to restore it to healthy life. We are under the most favourable circumstances; we are federated with an Association of all the principal chemists of the neighbourhood; on our flank we have open country to the W. N. W., and are not surrounded by any very bad neighbours; besides which I am in perfect touch with all my fellow-secretaries, and as large masses are said to attract smaller we have the pleasure of the membership of fellow-craft from North and South Paddington and South Kensington, and we should have larger meetings if we had early closing. Now is this possible or impossible? Remember we have all the same interests; we are not all educated in one school, certainly, but we all pass the same examinations, have one standard, the British Pharmacopœia, are all supposed to sell the best, and if we are all up to the standard of competence there ought to be also one uniform standard for business, as to opening and closing, and charges. A chemist is entitled to consideration as to his remuneration and hours of work, and as our worthy President said at our last meeting, ought to take a higher view of himself and his work, and certainly not descend to the foolish practices of other traders. There may be a great number of chemists, perhaps more than we want (I think we want fewer and better), but remember even under these circumstances we are unique. We have an Act of Parliament passed for "the benefit of the public," not in our interest at all, which says, "that all persons keeping open shop for the retailing, dispensing or compounding of poisons, should be qualified, and it shall be unlawful for any person unless he is"—and here let me make a slight digression to say that I am firmly convinced we do not want any further Acts except the one that was tried for in regard to higher education. I think we have not satisfactorily cracked that nut, only the external shell and its involucre have received examination as yet, and if the chemists will only unite to enjoy the fruit, they will be in every respect much better off. Take our present position. Lord Chancellor Selborne decided that as every one could before the Act carry on the business, and any corporation might have done it; and as the Act did not say a corporation might not do it, I do not think that is good law, but expressly said that a deceased chemist's business might be carried on by an executor with a qualified assistant, it did not matter about any qualification except in the person who actually did the business; and Justice Hawkins decides that every one who sells poisons for himself or others must be qualified. Now I think here we have certain power in our hands; they must have qualified assistants. Cannot we induce those men who now occupy the position, and are the means of enabling those companies to ruin other qualified, perhaps more qualified men, to support their fellows and cease to countenance such a state of things; but why do men go to such places? I will only give one reason which is apropos to the subject—because of the intolerably long hours of the drug trade. Here I may find an argument to support my appeal for earlier closing; you see it is one of the means of driving qualified men into easier berths, and I am sure much of the present state of things is due to the habit of some chemists who keep open so late, they are looked upon as the indicators of the proper time for a chemist to close; and you must admit that keeping the shop open is an invitation to people to come and do business, and most people think if they come while you are open, it is all right. Now by earlier closing we should begin to educate them on better principles, and eventually we might have reasonable hours. Indeed, we ought to close earlier than other traders, as we are sure to be disturbed after and even in the night, and when we come to discuss prices I shall contend that as mechanics and labourers are paid time and a half after their regular hours so a chemist ought to have regular hours and charge more after that, which, I may say, I think ought to be 7 p.m. I do not want you to do anything heroic or absurd, to close at 4, 5, or 6, as the most respectable part of the community do, and as we make such large profits we certainly ought to be able to do, but only to revert to our last arrangement, shutters at 8, close at 8.30, until we can get better terms from the public. Of course I do not mean to say we are to refuse to supply after we close. I say close and do not go looking out to see if your neighbour shuts shop to the minute. I recommend all to do it and keep to it, and try and keep up the harmony of the cause. Do not go back because your neighbour is a little late one night. Our late arrangement fell through that cause and neighbours are not better friends in consequence. As I have said we have a good combination now, and I have been told by everyone they are willing to close, so let us strike the iron while it is hot and agree to do it.

I am sure the present system is ruinous in every respect; we are not really richer; it injures our health, deprives us of leisure and recreation, ability to have any social enjoyment, and degrades us in public estimation. I endorse Mr. Bain's views, as expressed in the Journal of June 21, and not those of the chemist who writes in last week's. Business is more onerous, complex, irksome, and less remunerative than it used to be.

One of the disagreeables is that your assistant while he remains such—many now have none—stipulates for his leisure; and quite right too, I do not blame him, I blame you; but it results from our late system of business that he goes out when the work is just going to begin, and it does not follow that you are able to leave for the evening in the same comfortable way. I can remember when we could, for business was altogether earlier then. On all grounds late hours are bad and injurious.

And now, gentlemen, I may not have convinced you; I have done my best to confer a benefit on us all and try and elevate the chemist in the social scale and give him his full rights of citizenship, so that he may be able to have a social status and derive more pleasure from his occupation than he now does. We may have too much of a good thing. All work and no play makes Jack a dull boy. The public are tender to signalmen and the working classes. Let us enlist their sympathy, which reasonably will not be denied.

In the discussion that ensued Mr. Hyslop said he thought early closing one of the thorny subjects likely to disturb the harmony of the Association.

Messrs. Baker and Horsley thought early closing desirable where possible.

Messrs. Andrews, Edwards and Matthews already adopted it.

Mr. Smith would do as others did, but should be glad to see earlier hours.

A resolution was passed to close at 9 p.m., provided a general consent could be secured, with liberty to close as much earlier as each individually liked.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Photographic Image.*

BY PROFESSOR RAPHAEL MELDOLA, F.R.S., M.R.I.

(*Concluded from page* 57.)

The fundamental problem which fifty years' experience with silver haloid films has left in the hands of chemists, is that of the nature of the chemical change which occurs when a ray of light falls on such a silver salt. Long before the days of photography—far back in the sixteenth century—Fabricius, the alchemist, noticed that native horn silver became coloured when brought from the mine and exposed. The fact presented itself to Robert Boyle in the seventeenth century, and to Beccarius, of Turin, in the eighteenth century. The change of colour undergone by the chloride was first shown to be associated with chemical decomposition in 1777, by Scheele, who proved that chlorine was given off when this salt darkened under water. I can show you this in a form which admits of its being seen by all. [Potassium iodide and starch paper were placed in a glass cell with silver chloride, and the arrangement exposed to the electric light till the paper had become blue.] The gas which is given off under these circumstances is either the free halogen or an oxide or acid of the halogen, according to the quantity of moisture present and the intensity of the light. I have found that the bromide affects the iodide and starch paper in the same way, but silver iodide does not give off any gas which colours the test paper. All the silver haloids become coloured on exposure to light, the change being most marked in the chloride, less in the bromide, and least of all in the iodide. The latter must be associated with some halogen absorbent to render the change visible. [Strips of paper coated with the pure haloids, the lower halves brushed over with silver nitrate solution, were exposed.] The different degrees of coloration in the three cases must not be considered as a measure of the relative sensitiveness: it simply means that the products of photo-chemical change in the three haloids are inherently possessed of different depths of colour.

From the fact that halogen in some form is given off, it follows that we are concerned with photo-chemical decomposition, and not with a physical change only. All the evidence is in favour of this view. Halogen absorbents, such as silver nitrate on the lower halves of the papers in the last experiment, organic matter, such as the gelatine in an emulsion, and reducing agents generally, all accelerate the change of colour. Oxidizing and halogenising agents, such as mercuric chloride, potassium dichromate, etc., all retard the colour change. [Silver chloride paper, painted with stripes of solutions of sodium sulphite, mercuric chloride, and potassium dichromate, was exposed.] It is impossible to account for the action of these chemical agents except on the view of chemical decomposition. The ray of light falling upon a silver haloid must be regarded as doing chemical work; the vibratory energy is partly spent in doing the work of chemical separation, and the light passes through a film of such haloid partly robbed of its power of doing similar work upon a second film. It is difficult to demonstrate this satisfactorily in the lecture-room, on account of the opacity of the silver haloids, but the work of Sir John Herschel, J. W. Draper, and others, has put it beyond doubt that there is a relationship of this kind between absorption and decomposition. It is well known, also, that the more refrangible rays are the most active in promoting the decomposition in the case of the silver haloids. This was first proved for the chloride by Scheele, and is now known to be true for the other haloids. It would be presumption on my part, in the presence of Captain Abney, to enlarge upon the effects of the different spectral colours on these haloids, as this is a subject upon which he can speak with the authority of an investigator. It only remains to add that the old idea of a special "actinic" force at the more refrangible end of the spectrum has long been abandoned. It is only because the silver haloids absorb these particular rays that the blue end of the spectrum is most active in promoting their decomposition. Many other instances of photo-chemical decomposition are known in which the less refrangible rays are the most active, and it is possible to modify the silver haloids themselves so as to make them sensitive for the red end of the spectrum.

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* Read at a weekly evening meeting, Friday, May 16.

The chemical nature of the coloured products of photo-chemical decomposition is still enshrouded in mystery. Beyond the fact that they contain less halogen than the normal salt, we are not much in advance of the knowledge bequeathed to us by Scheele in the last century. The problem has been attacked by chemists again and again, but its solution presents extraordinary difficulties. These products are never formed—even under the most favourable conditions of division and with prolonged periods of exposure—in quantities beyond what the chemists would call "a mere trace." Their existence appears to be determined by the great excess of unaltered haloid with which they are combined. Were I to give free rein to the imagination, I might set up the hypothesis that the element silver is really a compound body invariably containing a minute percentage of some other element, which resembles the compound which we now call silver in all its chemical reactions, but alone is sensitive to light. I offer this suggestion for the consideration of the speculative chemist.* For the coloured product as a whole, *i.e.*, the product of photo-decomposition with its combined unchanged haloid, Carey Lea has proposed the convenient term "photosalt." It will avoid circumlocution if we adopt this name. The photosalts have been thought at various times to contain metallic silver, allotropic silver, a sub-haloid, such as argentous chloride, etc., or an oxyhaloid. The free metal theory is disposed of by the fact that silver chloride darkens under nitric acid of sufficient strength to dissolve the metal freely. The acid certainly retards the formation of the photosalt, but does not prevent it altogether. When once formed the photo-chloride is but slowly attacked by boiling dilute nitric acid, and from the dry photosalt mercury extracts no silver. The assumption of the existence of an allotropic form of silver insoluble in nitric acid cannot be seriously maintained. The subhaloid theory of the product may be true, but it has not yet been established with that precision which the chemist has a right to demand. We must have analyses giving not only the percentage of halogen, but also the percentage of silver, in order that it may be ascertained whether the photosalt contains anything besides metal and halogen. The same may be said of the oxyhaloid theory: it may be true, but it has not been demonstrated.

The oxyhaloid theory was first suggested by Robert Hunt† for the chloride; it was taken up by Sahler, and has recently been revived by Dr. W. R. Hodgkinson. It has been thought that this theory is disposed of by the fact that the chloride darkens under liquids, such as hydrocarbons, which are free from oxygen. I have been repeating some of these experiments with various liquids, using every possible precaution to exclude oxygen and moisture; dry silver chloride heated to incipient fusion has been sealed up in tubes in dry benzene, petroleum, and carbon tetrachloride and exposed since March. [Tubes shown.] In all cases the chloride has darkened. The salt darkens, moreover, in a Crookesian vacuum.* By these experiments the oxychloride theory may be scotched, but it is not yet killed; the question now presents itself, whether the composition of the photosalt may not vary according to the medium in which it is generated. Analogy sanctions the supposition that when the haloid darkens under water or other oxygen-containing liquid, or even in contact with moist or dry air, that an oxychloride may be formed, and enter into the composition of the photosalt. The analogy is supplied by the corresponding salt of copper, viz., cuprous chloride, which darkens rapidly on exposure. [Design printed on flat cell filled with cuprous chloride by exposure to electric light.] Wöhler conjectured that the darkened product was an oxychloride, and this view receives a certain amount of indirect support from these tubes [shown], in which dry cuprous chloride has been sealed up in benzene and carbon tetrachloride since March; and although exposed in a southern window during the whole of that time, the salt is as white as when first prepared. Some cuprous chloride sealed up in water, and exposed for the same time, is now almost black. [Shown.]

When silver is precipitated by reduction in a finely divided state in the presence of the haloid, and the product treated with acids, the excess of silver is removed and coloured products are left which are somewhat analogous to the photosalts proper. These coloured haloids are also termed by Carey Lea photosalts, because they present many analogies with the coloured products of photo-chemical change. Whether they are identical in composition it is not yet possible to decide, as we have no complete analyses. The first observations in this direction were published more than thirty years ago in a report by a British Association Committee,† in which the red and chocolate-

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[*] I have gone so far as to test this idea experimentally in a preliminary way, the result being, as might have been anticipated, negative. Silver chloride, well darkened by long exposure, was extracted with a hot saturated solution of potassium chloride, and the dissolved portion, after precipitation by water, compared with the ordinary chloride by exposure to light. Not the slightest difference was observable either in the rate of coloration or in the colours of the products. Perhaps it may be thought worth while to repeat the experiment, using a method analogous to the "method of fractionation" of Crookes.

[†] 'Researches on Light,' 2nd ed., 1854, p. 80.

[*] Some dry silver chloride which Mr. Crookes has been good enough to seal up for me in a high vacuum, darkens on exposure quite as rapidly as the dry salt in air. It soon regains its original colour when kept in the dark. It behaves, in fact, just as the chloride is known to behave when sealed up in chlorine, although its colour is of course much more intense after exposure than is the case with the chloride in chlorine. The tube in which the chloride had been sealed up in benzene, gave off a considerable quantity of hydrogen chloride on breaking the point in June.

[†] These results were arrived at in three ways. In one case hydrogen was passed through silver citrate suspended in hot water, and the product extracted with citric acid. "The result of treating the residue with chlorhydric acid, and then dissolving the silver by dilute nitric acid, was a rose-tinted chloride of silver." In another experiment the dry citrate was heated in a stream of hydrogen at 212° F., and the product, which was partly soluble in water, gave a brown residue, which furnished "a very pale red body on being transformed by chlorhydric and nitric acids." In another experiment silver arsenite was formed, this being treated with caustic soda, and the black precipitate then treated successively with chlorhydric and nitric acids: "Silver is dissolved, and there is left a substance . . . . . [of] a rich chocolate or maroon, etc." This on analysis was found to contain 24 per cent. of chlorine, the normal chloride requiring 24·74 and the sub-chloride 14·08 per cent. The Committee which conducted these experiments consisted of Messrs. Maskelyne, Hadow, Hardwich and Llewelyn. 'B.A. Rep.,' 1859, p. 103.

coloured chlorides are distinctly described. Carey Lea has since contributed largely to our knowledge of these coloured haloids, and has at least made it appear highly probable that they are related to the products formed by the action of light. [Red photochloride and purple photobromide and iodide shown.]

The photographic image is impressed on a modern film in an inappreciable fraction of a second, whereas the photosalt requires an appreciable time for its production. The image is invisible simply because of the extremely minute quantity of haloid decomposed. In the present state of knowledge it cannot be asserted that the material composing this image is identical in composition with the photosalt, for we know the composition of neither the one nor the other. But they are analogous in so far as they are both the result of photo-chemical decomposition, and there is great probability that they are closely related, if not identical, chemically. It may turn out that there are various kinds of invisible images, according to the vehicle or halogen absorbent—in other words, according to the sensitizer with which the silver haloid is associated. The invisible image is revealed by the action of the developer, into the function of which I do not propose to enter. It will suffice to say that the final result of the developing solution is to magnify the deposit of photosalt by accumulating metallic silver thereon by accretion or reduction. Owing to the circumstance that the image is impressed with such remarkable rapidity, and that it is invisible when formed, it has been maintained, and is still held by many, that the first action of light on the film is molecular or physical, and not chemical. The arguments in favour of the chemical theory appear to me to be tolerably conclusive, and I will venture to submit a few of them.

The action of reagents upon the photographic film is quite similar to the action of the same reagents upon the silver haloids when exposed to the point of visible coloration. Reducing agents and halogen absorbents increase the sensitiveness of the film: oxidizing and halogenizing agents destroy its sensitiveness. It is difficult to see on the physical theory why it should not be possible to impress an image on a film, say of pure silver bromide, as readily as on a film of the same haloid embedded in gelatine. Every one knows that this cannot be done. I have myself been surprised at the extreme insensitiveness of films of pure bromide prepared by exposing films of silver deposited on glass to the action of bromine vapour. On the chemical theory we know that gelatine is a splendid sensitizer—*i.e.*, bromine absorbent. There is another proof which has been in our hands for nearly thirty years, but I do not think it has been viewed in this light before. It has been shown by Carey Lea, Eder, and especially by Abney—who has investigated the matter most thoroughly—that a shearing stress applied mechanically to a sensitive film leaves an impression which can be developed in just the same way as though it had been produced by the action of light. [Pressure marks on Eastman bromide paper developed by ferrous oxalate.] Now that result cannot be produced on a surface of the pure haloid; some halogen absorbent, such as gelatine, must be associated with the haloid. We are concerned here with a chemical change of that class so ably investigated by Professor Spring, of Liége, who has shown that by mere mechanical pressure it is possible to bring about chemical reaction between mixtures of finely divided solids.* Then again, mild reducing agents, too feeble to reduce the silver haloids directly to the metallic state, such as alkaline hypophosphites, glucose or lactose, and alkali, etc., form invisible images which can be developed in precisely the same way as the photographic image. All this looks like chemical change, and not physical modification pure and simple.

I have in this discourse stoically resisted the tempting opportunities for pictorial display which the subject affords. My aim has been to summarise the position in which we find ourselves with respect to the invisible image after fifty years' practice of the art. This image is, I venture to think, the property of the chemist, and by him must the scientific foundation of photography be laid. We may not be able to give the formula of the photosalt, but if the solution of the problem has hitherto eluded our grasp it is because of the intrinsic difficulties of the investigation. The photographic image brings us face to face—not with an ordinary, but with an extraordinary class of chemical changes due entirely to the peculiar character of the silver salts. The material composing the image is not of that definite nature with which modern chemical methods are in the habit of dealing. The stability of the photosalt is determined by some kind of combination between the sub-haloid or oxy-haloid, or whatever it may be, and the excess of unaltered haloid which enters into its composition. The formation of the coloured product presents certain analogies with the formation of a saturated solution; the product of photo-chemical decomposition is formed under the influence of light up to a certain percentage of the whole photosalt, beyond which it cannot be increased —in other words the silver haloid is saturated by a very minute percentage of its own product of photodecomposition. The photosalt belongs to a domain of chemistry—a no-man's land—peopled by so-called "molecular compounds," into which the pure chemist ventures but timidly. But these compounds are more and more urging their claims for consideration, and sooner or later they will have to be reckoned with, even if they lack that definiteness which the modern chemist regards as the essential criterion of chemical individuality. The investigation may lead to the recognition of a new order of chemical attraction, or of the old chemical attraction in a different degree. The chemist who discourses here upon this subject at the end of the half-century of photography into which we have now entered, will no doubt know more about this aspect of chemical affinity; and if I may invoke the spirit of prophecy in concluding, I should say that a study of the photographic film with its invisible image will have contributed materially to its advancement.

Parliamentary and Law Proceedings.

PHARMACY ACT (IRELAND) (1875) AMENDMENT BILL.

In the House of Lords, on Monday last, the Earl of Erne, in moving the second reading of this Bill, which had passed through the House of Commons, said its object was to provide for the registration of chemists and druggists in Ireland who sold poisons, for the examination of all such persons, and to give them representation on the Pharmaceutical Council that they did not at present possess. There were other provisions which could be better discussed in the Committee.

The Marquis of Waterford, who was allowed to speak seated, said the Bill provided that all persons who had been breaking the law since the passing of the Pharmacy Act in 1875 should be registered, and thus recognized and allowed to continue their trade under the law. He could hardly think their lordships would agree to such a proposal. At all events the Bill ought to be very much amended in Committee. He might mention that since 1875 a large number of men had taken up the trade and were selling poisons indiscriminately all over Ireland. He was informed that the great misfortune in Ireland was that the police did not prosecute people who broke the law in the manner he had spoken of. The Pharmaceutical Society did indeed prosecute; but its funds would only allow of the institution of occasional prosecutions. He hoped that the noble lord would agree to amendments in the directions he had suggested when the Bill came into Committee.

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* The connection between the two phenomena was suggested during a course of lectures delivered by me two years ago ('Chemistry of Photography,' p. 191). I have since learnt that the same conclusion had been arrived at independently, by Mr. C. H. Bothamley, of the Yorkshire College, Leeds.

Lord Herschell said that he had received several letters and telegrams of a rather alarming character about the object and effect of the Bill. One correspondent alleged that the Bill would encourage illegality at the expense of the law-abiding, which was certainly a thing that the Government would not desire to do in Ireland. Another correspondent wrote:—"It is very hard that political services such as have been rendered to the Conservative party by wholesale druggists should be rewarded at the expense of the public morality and by danger to the public safety."

The Duke of Abercorn said that the Pharmaceutical Society of Ireland was anxious that the Bill should become law, with certain amendments to be proposed. He thought the Bill ought to be referred to a standing committee, as the restrictions proposed by the Pharmaceutical Society were only reasonable.

After some remarks from Lord Morris,

Earl Cadogan said that the Bill had received the countenance and support of the Government in the other House, and it was the result of a compromise effected between certain members of the other House last session. As far as the principle of the Bill went the Government was still prepared to support it; but the considerations urged by the noble marquis rendered it desirable that the Bill should be carefully considered in Committee. He therefore thought that the Bill ought to be referred to the Standing Committee on General Bills.

The Earl of Erne said that he agreed to that suggestion.

The Bill was then read a second time, and referred to the Standing Committee on General Bills.

Reviews.

FOOD IN HEALTH AND DISEASE. By J. BURNEY YEO, M.D., F.R.C.P., Professor of Clinical Therapeutics in King's College, London; and Physician to King's College Hospital.*

This volume is one of a series of the blue bound clinical manuals now being issued by Messrs. Cassell and Co.; but although designed primarily for the medical profession, its perusal cannot fail to be productive of great benefit to all who may read it. Indeed, we would commend it without reserve to the general public, feeling sure that a knowledge of the principles which underlie the everyday question of food should be acquired by the heads of households. The key-notes of the whole work are thoroughness and conciseness, and while sufficiently accurate and modern to satisfy the requirements of physiologists and physicians, yet it is so clear as to be well within reach of the lay understanding.

The book, as its title suggests, naturally falls into two parts "Diet in Health," and "Diet in Disease." All authors of any repute on these matters have been laid under contribution, prominent amongst them being the names of Park, Pavy and Sir William Roberts, to the latter of whom the book is dedicated.

In the first two chapters the nature, origin and purpose, together with the nutritive values of various foods, are treated of. On page 8 an analysis of proteids is given, in connection with which there is a foot-note containing a curious and evidently incorrect hypothetical formula. It is intended to represent an albuminoid as a compound of cellulose plus ammonia minus water, and does so as follows:—

$$C_{12}H_{17}N_5O_4 = 2(C_6H_{10}O_5) + 3NH_3 - 6H_2O$$

Albuminoid = Cellulose + Ammonia - Water.

Gautier has also advanced the view that the albuminoids are built upon the cyanogen compounds as a sort of chemical base; and that in the body these cyanogen or toxic compounds are eliminated as useless or dangerous in the form of leucomaines or ptomaines.

The absolute necessity of sufficient nitrogen in the food to replace the wear and tear of protoplasm is duly insisted upon, and we are pleased to note that the observations on the origin and destinies of fat are quite up to date. It is shown that fat can be formed from proteids, but a certain amount of fat in the food is necessary since it tends to diminish the wear and tear of protoplasm. This probably explains the fact that it is possible to eat a large amount of lean meat and yet grow thinner, since the lean meat alone simply stimulates the cells of the organism to increased and degenerative activity. The supporting influence of fat under conditions of great muscular fatigue is said to be so great that "the late Emperor William in the war of 1870, by the advice of his surgeons, ordered each soldier to have 250 grams or 9 ozs. of fat bacon served out daily." Those who are troubled with obesity should take the converse to heart and abjure fatty and starchy foods and eat a large amount of meat daily.

The ancient legend of fish being a food of special value to those of intellectual pursuits is rudely dispelled by the author. He remarks: "Much of the reputation of fish in this respect is probably due to its being readily digested by persons of studious and sedentary habits." Further Dr. Yeo observes that the crustaceæ, such as crabs and lobsters, should not be eaten by people of gouty or rheumatic habit, on account of their tendency to give rise to attacks of skin eruptions. Many pages are devoted to the consideration of milk, cheese and eggs, which are well worthy of attention.

Chapter III. on the various kinds of meat is interesting, and the difference between veal as eaten in England and on the continent is said to be that at home the calf is killed younger and bled more thoroughly. A four-year old animal yields the best beef and the flesh of the cow is superior to that of the male.

Chapter IV. dwells on the constituents of the various kinds of cereals, fruits, vegetables, and fungi. Dujardin-Beaumetz attributes the fine muscular development of the Highlanders to their large consumption of oatmeal in childhood. We are inclined to think it due rather to exercise in the bracing air of the Highlands. The paragraphs on page 80 are interesting on the subject of "whole meal" bread. "It has been advocated on account of the richness in nutritive constituents of the outer coat, but the bran cells are exceedingly hard and indigestible, and if whole meal be used it should be ground very fine, as the harder outer coats are very irritating, especially where there is any tendency to gastric inflammation or diarrhœa." In speaking of tea, China tea is preferred to Indian tea on account of its yielding much less tannin. On this subject the important observations of Dr. Hale White are done full justice to. Page 111, on the methods of making tea, may be commended without fear of offence to all good house-wives. A storm of controversy has raged around the use of alcohol, and it is said on page 123 to be a useful food an agreeable stimulant, or a narcotic poison, according to the doses in which it is taken or the susceptibilities of the individuals to whom it may be administered. The three properties of alcohol, alimentary, heat-lowering and sedative, render it a most powerful remedy in febrile diseases. In health, in small quantities, it promotes appetite by stimulating the secretion of gastric juice, but in large quantities it has the opposite effect and is a retarder of digestion. This may to a certain extent be prevented by drinking alkaline waters at the same time. But intellectual or sedentary workers, especially in large towns and confined rooms, will study their own interests best by the systematic avoidance of alcohol. Let them seek appetite and restoration of tissue by a sufficient amount of exercise in the open air and not be tempted by the delusive sense of *bien-être* which alcohol gives.

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* London: Cassell and Co., 1889. 8vo., pp. 585.

Chapter VII., on the "Cooking, Preparation and Preservation of Food," is full of useful hints. Sir Henry Thompson, in this connection, has called attention to the neglect in England of the method of braising meat in cooking. It is said to be superior in some respects to "stewing." The remarks on the report of the Committee appointed to inquire into prison-life will be good reading to those who are kept at the expense of the peaceful community. From the moment the prison gates close behind the law-breaker, the tendency is to lessened waste of tissue; he lives less rapidly than before.

"He is insensibly subdued
To lessened quiet,"

and finds in many instances a peace and repose to which as a law-abiding citizen he was perchance a stranger. But the Committee kept this point in view, and recommended that the shorter the term of imprisonment, the more strongly should the penal element be manifested in the diet.

Colonel Burnett's efforts in the improvement of soldiers' diet without increase of cost are quoted *in extenso*, and are full of practical interest.

Diet when in training, school and hospital diet, all receive a full share of attention, and hardly-pressed, busy men may be recommended to study well chapter X. on the "Order and Frequency of taking Food."

The latter half of the book, from page 355, on "Food in Disease," will be of interest only to medical men or to sufferers from gout, diabetes, etc. But sufficient has been said to indicate how praiseworthy is the attempt of Dr. Yeo to inculcate sound principles of plain and healthy diet.

Practical Chemistry for Medical Students. By **Samuel Rideal**, D.Sc. (Lond.), F.I.C., F.C.S.*

This is a small publication intended to provide the medical student with the means of cramming himself with just sufficient knowledge of practical chemistry to enable him to pass the first examination of the Conjoint Board. The limited number of metals, acids, etc., included in the syllabus of this examination have been picked out and their appearance and two or three of their reactions described, these reactions being generally the ordinary group test and one or two confirmatory ones. Some of the formulæ are badly written, *e.g.*, $2NH_4ClPtCl_4$, which as written would mean two molecules of $NH_4ClPtCl_4$, the platinochloride of potassium being written in the same way. Some of the statements want a little qualification, as, for instance, that the nitrates of mercury are soluble in water. The substitution of arseniate for arsenite on page 4 is an obvious printer's error. There is nothing to be said in favour of such a book, except that it supplies a demand which unfortunately exists for the means of obtaining a smattering of a subject with a few hours' work.

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* London: H. K. Lewis. 1890. 16mo. Pp. 55.

Obituary.

Notice has been received of the death of the following:—

On the 17th of July, Mr. Richard Smith Potts, Chemist and Druggist, Robin Hood's Chase, Nottingham. Aged 83 years.

On the 17th of July, Mr. David Joshua Thomas, Chemist and Druggist, Newcastle Emlyn. Aged 68 years.

BOOKS RECEIVED.

Ueber Feuerbestattung. (Cremation.) By Prof. Dr. **Friedrich Goppelsroeder.** Mülhausen: Wenz and Peters, 1890. From the Author.

Defective Sight and its Optical Correction. By W. D. **Mason**, A.P.S. Boston. From the Author.

Principles of General Organic Chemistry. By Professor E. **Hjelt.** Translated from the Author's German Edition by J. **Bishop Tingle**, Ph.D., F.C.S. London: Longmans, Green and Co., 1890. From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmacopœia Infusions.

Sir,—In reply to Mr. Harrison, I assume that he would stir his infusion a short time before straining, and that all the liquor present will thus be of the same strength. In the case of the official infusion of buchu, there will certainly be no more than 8 ounces of available infusion; but then, as it has been made in a covered vessel, no loss by evaporation has taken place; and any portion of the liquid will have the strength of one in twenty. (The question of the exhaustion of the leaves is, of course, not under discussion. For present purposes, it is enough to assume that all that is wanted from half an ounce of the leaves has passed into the half-pint of liquid.) The excellence of the official method consists largely in the fact that whether prepared in pints or gallons, the strained product is of the same strength in each case. There being no necessity to make up to a definite volume, the convenience to the dispenser is obvious.

In cases of decoction, the amount of product *must* be adjusted, as it would vary with the kind of heat employed, with the conformation of the containing vessel, and with the diligence used in stirring. J. **Dickson.**

Digitalis Purpurea.

Sir,—I wish to call the attention of pharmaceutical students and others interested in botany to the vast number of *Digitalis purpurea* at present in flower in the Forest of Dean, which I observed whilst passing through quite recently. A botanical excursion to this charming district would well repay any student both from a botanical as well as a healthful point of view. G. O. **Warner.**

W. Quick.—(1) *Hypericum calycinum.* (2) *Matricaria Parthenium*, fl. pl. (3) *Matricaria Parthenium.* (4) *Hypericum Androsæmum.* (5) *Lotus major.* (6) *Agrimonia eupatoria.*

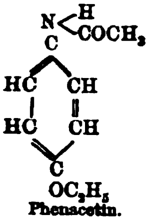
J. Morcombe.—(1) *Eryngium maritimum.* (2) *Euphorbia Paralias.* (3) *Cotyledon Umbilicus.* (4) *Honkeneja peploides.*

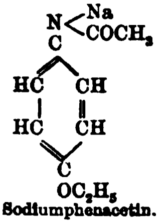
W. J. Shepperd.—(1) *Stachys sylvatica.* (2) *Odontites rubra.* (3) *Prunella vulgaris.* (4) *Melilotus officinalis.* (5) *Crepis virens.* (6) *Polygonum aviculare.*

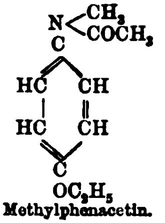
Communications, Letters, etc., have been received from Messrs. Robbins, Kemp and Co., Warner, Hawkins, Bennett.

"THE MONTH."

Methyl-phenacetin. The observation that an anodyne property is developed by the introduction of a methyl group in the place of the residuary atom of hydrogen of the amido group of acetanilide, the product being the compound introduced under the name "exalgine," has led to a similar experiment with phenacetin (oxethylacetanilid or *p*-acetphenetidin). The result is reported to have been favourable when either a methyl or an ethyl group is introduced, both products exercising a narcotic action even in small doses, but the methyl compound being the more powerful of the two (*Pharm. Zeit.*, July 9, p. 427; *Pharm. Centr.*, July 17, p. 420). Methylphenacetin is said to be obtained by adding to a boiling solution of para-acetphenetidin in xylol the calculated quantity of sodium, and treating the resulting sodium compound, which forms under evolution of hydrogen and separates in white needles, with methyl iodide, the products being methylphenacetinsodium iodide and an undescribed compound. The stages of the reaction may be represented as follows:—


Phenacetin.


Sodiumphenacetin.


Methylphenacetin.

The sodium iodide is separated by filtration, the xylol removed by a current of steam, and the residual oil dried and finally distilled either under ordinary pressure or in a vacuum. Between 295° and 305° C. it passes over as a colourless oil, which solidifies on standing. By spreading it upon earthenware plates, or by pressure, the crystalline mass is freed from an adherent oil consisting of the bye-product mentioned, and is then recrystallized from ether or alcohol. Obtained in this way methylphenacetin is described as occurring in colourless crystals, moderately soluble in water and freely in ether.

Specific Gravity of Resins, etc. A convenient method of taking the specific gravity of wax, resin or solid fat is given by Herr Gawalowski (*Pharm. Zeit.*, July 9, p. 427). It consists in placing a weighed piece of the substance, cut or cast into the form of a cylindrical rod about 1 to 1·5 cm. long and 0·5 cm. in diameter, into a dry narrow necked bottle of known capacity up to a mark in the neck. Water is then added from a graduated burette at a temperature of 15° C. until the mark is reached, when the quantity of water required having been noted the specific gravity can be calculated according to the formula—

$$\text{Sp. gr.} = \frac{A}{W - w}$$

where A represents the absolute weight of the substance taken, W the capacity of the bottle and w the quantity of water. Thus in a case where the sample weighed 0·624 gram, the capacity of the bottle 25 c.c., and the water required 24·3 c.c., the equation would be—

$$\frac{0{\cdot}624}{25 - 24{\cdot}3} = \frac{0{\cdot}624}{0{\cdot}7} = 0{\cdot}891 \text{ sp. gr.}$$

Guaiacol Compounds. Benzosol. The use of guaiacol as a remedy for phthisis has caused increased attention to be paid to the preparation of this constituent of wood tar and of its compounds. A short time since a guaiacolcarboxylic acid was mentioned as a powerful antiseptic and antipyretic (*Pharm. Journ.*, [3], xx., 977), and more recently a benzoyl ester of guaiacol has been introduced, under the name "benzosol," as a compound that is slowly saponified by the action of the gastric juice, so that the guaiacol is liberated under conditions that avoid the unpleasant taste of that compound and minimize its local irritation (*Pharm. Centr.*, July 17, p. 427). Benzosol may be represented as pyrocatechin-monomethyl ether, or guaiacol—$C_6H_4(OH)(O \cdot CH_3)$—in which hydroxyl hydrogen is replaced by the benzoyl group—$C_6H_4(O \cdot COC_6H_5)(O \cdot CH_3)$. It is said to be prepared by converting crude guaiacol, separated by fractional distillation from wood tar and boiling between 200° and 205° C., into a potassium compound, purifying this by recrystallization from alcohol, heating it upon a water bath with a calculated quantity of benzoyl chloride, and recrystallizing the resulting benzoyl compound from alcohol. Or the same compound may be obtained by heating guaiacol with benzoic anhydride. Benzosol is described as forming small colourless crystals, melting at 50° C., almost odourless and tasteless when pure, almost insoluble in water, but freely soluble in chloroform and ether, as well as in hot alcohol. Another guaiacol compound that is announced as about to be introduced is a combination with salicylic acid.

Morphine and Derivatives. In a paper communicated to the Royal Society of Edinburgh on July 7, Messrs. Stockman and Dott gave some further information as to the pharmacology of morphine and its derivatives, the compounds principally dealt with being morphine, codeine, acetylmorphine, ethylmorphine, amylmorphine, benzoylmorphine and morphinylsulphonic acid. All these have been found to have qualitatively the same physiological action, which is both narcotic and tetanic, affecting the nervous system, and differing only slightly in details. This action is said to be common to all morphine derivatives formed by displacement of hydrogen in the hydroxyl. In the case of methocodeine, where one methyl group displaces the hydrogen of the hydroxyl of morphine, and another group displaces hydrogen in the nucleus—$C_{17}H_{17}(CH_3)NO_2 \cdot O(CH_3)$—the morphine action no longer exists, the compound not acting as a nerve poison at all, but merely as a muscle poison. The same is the case with chlorcodeine and all derivatives formed by the displacement of hydrogen in the morphine nucleus ($C_{17}H_{18}NO_2$). Apomorphine, which is frequently described as morphine from which the elements of water have been removed, is thought to be probably a much more complicated compound, in which the atoms in the molecule have undergone complete rearrangement. It is a muscle poison only, resembling methocodeine in physiological action.

Methyl Strychnine. Dr. J. Tillie has recently published (*Journ. Anat. and Phys.*, xxiv., p. 509) the results of some experiments on the action of methyl-strychnine as compared with that of curarine. He finds that in the relative order and strength of the paralysing and tetanising action of the former it resembles curarine rather than strychnine. Like curarine it possesses a tetanising action which is delayed and diminished whilst the paralysing action exercised by strychnine on motor nerves is hastened and increased. Thus after the administration of methyl-strychnia to frogs the paralysing action was manifested in a few minutes, whilst the tetanic action did not appear until from one to two hours afterwards, the relative length of the time depending upon the readiness with which the poison can reach the spinal cord, according to the mode of injection.

Codeine Hydrochloride.

Codeine hydrochloride was first prepared by Anderson, by saturating hot dilute hydrochloric acid with codeine (*Annalen*, lxxvii., 348). It was obtained in white stellate-grouped needles, which were described as containing in the air-dried condition two equivalents of water of crystallization, of which only half an equivalent was lost at 100° C., and the remainder only at 121°. At the latter temperature, however, some hydrochloric acid was also given off, the dried residue acquiring an alkaline reaction in consequence. Professor Schmidt reports (*Apot.-Zeit.*, July 9, p. 366) that three commercial samples, from different sources, examined by him to see how far their properties corresponded with Anderson's statement, were all in the form of white crystalline powder consisting of fine needles, which dissolved readily in water to a neutral solution and corresponded in composition to Anderson's formula $C_{18}H_{21}NO_3 \cdot HCl + 2H_2O$. But a remarkable difference was manifested when these compounds were subjected for four hours to a temperature of 100° C. One lost weight equal to 2·5 per cent., corresponding to Anderson's statement; a second lost 5·4 per cent., and the third 3·2 per cent. As the loss in neither case represented the two equivalents of water, which required 9·66 per cent., the experiment was tried whether all the water of crystallization could be eliminated by prolonged drying at 100°, without involving loss of hydrochloric acid. After from ten to fourteen days the weight became constant, the total loss then amounting to 10·51, 10·56 and 10·52 per cent. respectively, and the composition of each sample, according to the result of a chlorine determination, then corresponded to the formula $C_{18}H_{21}NO_3 \cdot HCl$.

Codeine Phosphate.

Codeine phosphate was also first prepared by Anderson, by saturating phosphoric acid with codeine, the product having the composition represented by the formula $C_{18}H_{21}NO_3, H_3PO_4 + 1\frac{1}{2} H_2O$. Two commercial samples examined gave results not agreeing with this formula or with each other, the water of crystallization in one case amounting to 7·71 per cent. and in the other to 2·80 per cent., whilst the formula quoted required 6·37 per cent.; both compounds when heated to 100° C. assumed a grey-yellow colour (*Apot.-Zeit.*, July 9, p. 366). Three other samples were therefore obtained and examined. Sample (A) was a white crystalline powder, which dissolved readily in water and slightly in alcohol, with a faintly acid reaction. It lost 7·60 per cent. of water at 100°, becoming grey, and when anhydrous contained 21·52 per cent. of phosphoric acid, or an excess of the quantity required for an acid phosphate. Sample (B), of similar appearance, lost at 100° C. only 2·27 per cent. of water, becoming less grey than (A) and when anhydrous contained 17·75 per cent. of P_2O_5; it corresponded therefore to the formula $2(C_{18}H_{21}NO_3, H_3PO_4) + H_2O$. Sample (C), also of similar appearance, lost at 100° C. 8·27 per cent. of water, and when dehydrated contained 17·6 per cent. of P_2O_5; it therefore corresponded to the formula $C_{18}H_{21}NO_3, H_3PO_4 + 2H_2O$. A sample was then prepared by adding pure codeine to phosphoric acid until there was only a faintly acid reaction and treating the clear solution with alcohol in excess. The crystalline precipitate, washed with alcohol and dried, corresponded to the formula with two equivalents of water, as it did also when recrystallized from water; but when recrystallized from hot dilute alcohol it was obtained in well-formed colourless transparent prismatic crystals, containing only one equivalent of water to two equivalents of codeine phosphate. It would appear therefore that both these forms occur in commerce, as well as one containing excess of phosphoric acid. As the codeine phosphate prepared under Professor Schmidt's superintendence did not become grey when heated to 100° it is supposed the coloration noticed was due to an impurity.

Pomegranate Root Bark.

The different results following the use of decoctions prepared from three different stock specimens of pomegranate root bark, induced Herr Aweng to make further comparative experiments with these and a sample of fresh bark obtained from Italy (*Pharm. Zeit.*, July 19, p. 417). Maceration decoctions from two of the stock barks, which had proved inert therapeutically, were found to be quite devoid of alkaloid, whilst decoctions from the active stock sample and the fresh bark contained a considerable quantity, and some was detected in the residue. Further experiments showed that not only were some barks almost destitute of alkaloid, but that in others more or less of it was present in a condition which did not favour its removal by water or alcohol; in fact, that a bark might contain a fair amount of alkaloid and yet not yield an active decoction or even alcoholic extract, the patient simply swallowing an undue quantity of tannic acid. The inference drawn is that when a pomegranate bark, from root or stem, is kept, the alkaloidal compounds contained in it first become difficultly soluble and eventually undergo decomposition. The quantities of total alkaloid in different samples of bark were found to be very variable, as were also the proportional relations of the active pelletierine and isopelletierine to the inactive methyl- and pseudo-pelletierine. Herr Aweng thinks a bark of good quality should answer to the following test. Macerate 20 grams of powdered bark twenty-four hours in 190 grams of water, boil until reduced to 29 grams, filter, and when cold add 5 grams of calcium hydrate; after standing an hour filter, acidulate the filtrate faintly with hydrochloric acid and add Meyer's reagent, when a white precipitate should be produced. Wash the residue with 150 grams of water, then add to it 5 grams of calcium hydrate and so much water that after an hour 5 to 10 c.c. can be expressed from it; this when filtered, acidulated and treated with Meyer's reagent should give simply a turbidity.

Antipyrin in Tin Boxes.

Some antipyrin purchased in January in original 250 gram tin cases, when opened in June showed, according to Herr Grüner, wherever the compound had come into direct contact with the tinned sides of the case, a striking reddish-yellow coloration (*Zeit. österr. Apot.-Ver.*, June 10, p. 301). A chemical examination showed the preparation to be otherwise faultless; it was neutral in aqueous solution, odourless, behaved normally towards all reagents and melted at 112° C. The antipyrin in the cases opened in January was without defect and some which had been preserved since that time in glass had remained quite white. Herr Grüner therefore recommends that manufacturers should use glass for packing antipyrin.

Mercuric Chloride Pellets.

Attention is called by Mr. C. J. Bond (*Lancet*, July 12, p. 72) to the convenience and value of pellets, each containing about 4½ grains of mercuric chloride and an equal quantity of sodium chloride, as a means of readily preparing antiseptic solutions. One of these pellets dissolved in a pint of warm water, which requires about three minutes, gives a solution approximately of the strength of 1 in 2000. Mr. Bond prefers to use sodium chloride instead of ammonium chloride, on the ground that it does not cause "milkiness" in the solution when hard water is used, as is sometimes unavoidable in private practice, and because the resulting solution is neutral instead of acid. Further he expresses the opinion that the pharmacopœial preparation should be made with sodium chloride instead of with ammonium chloride.

Solubility of Compressed Tablets.

A statement that some kinds of compressed tablets pass through the body unchanged has induced Herr Dieterich to publish a note on the means for rendering them "soluble" (*Pharm. Zeit.*, June 28, p. 400). Among the substances that require special manipulation in making them up into compressed tablets that will disintegrate in water he mentions salicylic acid, magnesium carbonate, lithium carbonate, bismuth subnitrate, quinine, antifebrin, phenacetin, salol and sulphonal. The simplest means for attaining the object sought is an intermixture of powdered sugar, which suffices in the cases of the bismuth, lithium, magnesia, quinine and salol tablets, but not in those of the others mentioned. In salicylic acid, antifebrin, phenacetin and sulphonal tablets it is advisable to introduce some substance that swells up in water, as, for instance, 10 to 25 per cent. of tragacanth powder. Even this acts slowly with compressed salicylic acid, but in that case disintegration can be ensured by using in addition about 10 per cent. of sodium bicarbonate. Vegetable powders may be compressed either alone or with the addition of a little gum, but it is essential that the powder be as fine as possible. In receiving compressed tablets into stock pharmacists are especially recommended to test their behaviour in water.

Medicated Soaps.

Some practical hints as to the conditions most suitable for ensuring permanence in various medicated soaps are quoted from a pamphlet issued by Dr. A. Gude and Co. (*Pharm. Centralh.*, June 26, p 384). Iodine soap, with free iodine can be kept unaltered only a short time, about eight days. Resorcin can only be kept undecomposed in a neutral soap. In a neutral or an alkaline soap hydroxylamine undergoes progressive decomposition, manifested by continual evolution of gas; it requires an acid soap for its preservation. Chrysarobin is not soluble in a neutral soap, but is readily soluble in one that is alkaline. For this reason Unna uses an alkaline extract of rhubarb. Thiol, peru balsam, and tar give with liquid soaps very permanent mixtures. Soft neutral soaps, of ointment consistence, are suitable for insoluble substances, which are readily deposited from liquid soaps. For the removal of neutral and superfatted soaps from the skin hot water should be used, in order to completely dissolve the soap.

Glycerinum Saponatum.

In a recently published work on skin diseases, Professor Hebra describes a substance that he calls "glycerinum saponatum," which is used as a basis for the topical application of various remedies to the skin (*Pharm. Zeit.*, July 19, p. 449). It consists essentially of a neutral soda soap made by mixing intimately with cocoa-nut oil or melted tallow a quantity of caustic soda solution, sp. gr. 1·349, and absolutely free from carbonate, exactly sufficient to neutralize the fatty acids, then letting the mixture stand in a covered vessel twenty-four hours. Saponification takes place as the result of the spontaneously developed heat, and if care has been taken to ascertain previously the exact quantity of alkali required to neutralize the acid in the fat used, the product is a neutral soap, free from caustic or carbonated alkali, but containing mixed with it the liberated glycerine and the water from the soda solution. This is cut into thin shavings and dried at a temperature of 80° to 100° C., after which the shavings are heated on a water bath with chemically pure glycerine until dissolved and the solution filtered while hot. Upon cooling the glycerinum saponatum is obtained as a faintly yellowish more or less elastic mass, which is perfectly odourless and melts at the body temperature. It is claimed to be, as it stands, a very pleasant preparation for the hands, besides being a valuable ointment basis, since it is freely soluble in water and readily takes up other substances. In the preparations mentioned, the basis used is one containing 80 per cent. of glycerinum saponatum. Of these there is one containing 95 parts of basis and 5 parts of salicylic acid; a second is made by adding to 90 parts of melted basis 5 parts of salicylic acid, and then stirring in 5 parts of resorcinol at the lowest temperature practicable; a third is made from 90 parts of basis, 5 parts of salicylic acid, and 5 parts of creasote; and a fourth is made from 87 parts of basis, 3 parts of salicylic acid and 10 parts of pix liquida.

Croton Oil.

Still another contribution to the chemistry of croton oil has been published by Herr Reuter (*Apot.-Zeit.*, July 5, p. 362). Some samples of croton oil prepared by himself from seed having been shaken with water, the aqueous liquor, perfectly free from oil, upon being evaporated carefully upon a water-bath left a yellowish residue, which when again treated with water gave up the coloured constituent, leaving a white insoluble substance as a residue. The clear aqueous solution gave a precipitate with potassium iodoiodide; it also reduced Fehling's solution, though not until it had been boiled some time with hydrochloric acid, which also produced an intense cherry-red coloration. The constituent of the residue soluble in water was therefore a glucoside. The insoluble white substance, after washing with water, gave with hydrochloric acid no colour reaction, but with soda solution and cupric sulphate it gave an intense violet-blue biuret reaction; it did not reduce Fehling's solution. From these reactions the white body would appear to be an albumenoid, and Herr Reuter thinks very possibly it is the same as was separated by Stillmark and Kobert from croton and castor oil seeds, as its occurrence in a pressed oil would be easily explicable. Herr Reuter thinks that the presence of even minute quantities of an active albumenoid ferment might cause the splitting up of the crotonic glyceride, with the liberation of free crotonoleic acid, which is said to take place in an oil that is kept. He is in accord with previous writers as to the desirability of using a neutral oil for medicinal purposes, and suggests that such an oil might be conveniently prepared by treating crushed croton seeds with an equal volume of absolute alcohol to remove free crotonoleic acid and then exhausting them with petroleum ether.

Antiseptics and Antipeptics.

The results of some interesting experiments as to the antipeptic influence exercised by certain antiseptic substances were communicated recently to the Academy of Sciences by M. Ferranini (*Compt. Rend.*, cx., 1284). The peptonizing agent used was an infusion made by digesting the mucous lining of a pig's stomach for twenty hours at a temperature of about 38° C., with 500 c.c. of water acidulated to the extent of 5 grams of HCl per litre and filtered. A very active liquid was thus obtained which could be diluted with twenty times its weight of water without abolishing its peptonizing activity. It was found that this liquid was rendered antipeptic, or prevented from converting blood fibrin into peptone, by the presence of 1 part per 1000 of mercurous chloride, mercuric chloride or phenol; and by 30 parts per 1000 of α-naphthol, thymol, chloral or resorcin; but it was not rendered antipeptic by the presence of 50 parts per 1000 of iodoform, boric acid, quinine sulphate, terpin, iodol, or β-naphthol. When the normal liquid had been diluted to 1 in 20 it was rendered antipeptic by 10 parts per 1000 of thymol or saccharine; and by 50 parts per 1000 of salol or salicylic acid; but not by 50 parts per 1000 of quinine sulphate, menthol, terpin, iodoform, boric acid or β-naphthol. In another series of experiments it was ascertained that the antipeptic property of the alcohols increases with the molecular weight. Thus in the proportion of 100 grams per litre butylic, amylic, or propylic alcohol prevented the peptonization, but the same proportion of methylic or ethylic alcohol produced no effect. Beer or white wine did not disturb the digestion when the peptonizing liquid was diluted to 1 in 20; but the action of this dilute liquid was paralysed by 500 grams per litre of red wine or 200 grams per litre of marsala wine. Coffee, tea or sodium chloride did not affect the action of the dilute liquid in the proportion of 200 grams per litre. Another interesting observation made was that 5 parts per 1000 of HCl added to a very dilute solution of the artificial gastric juice rendered it nearly antipeptic, whilst the same quantity added to a liquid rich in pepsin intensified its digestive action.

Ether in Medication by the Skin.

After considerable experience Sir James Sawyer has come to the conclusion that ether is the best menstruum for the solution of many substances designed for epidermic application (*Lancet*, July 12, p. 67). The advantages claimed for it are its diffusion power, and its capacity as a solvent of many drugs or their active principles, as well as of the fatty constituents of the sebaceous secretion of the skin. A short time since (*Pharm. Journ.*, [3], xx., 979), he recommended an ethereal tincture of capsicum as a very active rubefacient, and he now suggests in addition ethereal preparations of belladonna, iodine and menthol to be used as liniments. The ethereal tincture of belladonna he proposes should be made from belladonna root, with camphor, of the same strength as linimentum belladonnæ, B.P., using the official pure ether instead of rectified spirit. The product is described as a "bright tincture of a brilliant apple green colour," useful as a paint for the skin in cardiac and other cases where the liniment would be employed. The ethereal tincture of iodine is recommended to be made of the same strength as the official tincture of iodine. The menthol preparation suggested is a solution of menthol in pure ether of the strength of one drachm to the fluid ounce. This preparation, which can be readily applied as a paint to the skin, is said to be an efficient means of producing the local therapeutic effects of menthol, especially for the removal of superficial neuralgic pains, the evaporation of the ether producing a grateful sense of coldness, which supplements the analgesic action. For its application a brush of glass has been found most suitable, the meshes of which, when they become clogged with menthol, can readily be cleared by simply dipping them into the solution.

Lead in Bismuth.

At the June meeting of the Aachen Chemical Society Professor Classen, in making some observations as to the determination of the atomic weight of bismuth, said that he had examined specimens of bismuth from the most diverse and best sources, as well as bismuth compounds, and found them, without exception, to contain lead (*Chem. Zeit.*, June 28, p. 855). As the most certain method of detecting traces of lead in bismuth he recommended that it be converted into nitrate and then electrolysed in excess of nitric acid, when, besides lead peroxide, bismuth peroxide separates, but after a time most of it goes again into solution, leaving lead peroxide. The peroxides are brought into nitric acid solution and this is supersaturated with chemically pure sodium hydrate; potassium bichromate is then added to the clear solution, when bismuth chromate, which is perfectly insoluble in soda solution, is precipitated. Any lead chromate, being readily soluble in caustic soda solution, will occur in the filtrate, and can be precipitated by acidulating with acetic acid. In this way, Professor Classen says, traces of lead may be detected even in bismuth triphenyl.

Action of Thallium Salts.

Mr. J. Blake directs attention (*Comptes Rendus*, cxi., p. 57) to the connection which exists between the physiological action of thallic and thallous salts and the valency of their molecules, attributing the difference in their physiological action to the difference in molecular vibrations. M. Rydberg has recently shown that the molecules of electropositive elements are the seat of several systems of harmonic vibrations, which in monovalent elements are limited to a single system. M. Blake has also shown that salts of the same element present a great difference in biological action when the valency of the molecule is increased. In the case of thallium he finds that the thallous salts act on only a single nervous centre, whilst thallic salts, which have several systems of vibrations, exhibit their action on every nervous centre more or less.

Detection of Impurities in Alcohol.

M. E. Mohler, in a note published in *Comptes Rendus* (cxi., p. 187) points out that the reagents usually considered the best for detecting impurities in alcohol, viz., sulphuric acid, bisulphite of rosaniline, acetate of aniline and permanganate of potash are only useful within certain limits. He has made experiments with alcohol containing known quantities of the bodies usually found in it as impurities, which show that sulphuric acid cannot be used to estimate the impurities, and is of use to detect only such of them as give a colour with it. With bisulphite of rosaniline, the reaction obtained will depend much upon the relative proportion of sulphuric acid and bisulphite of sodium in the reagent employed, even pure alcohol being coloured if only a little acid be used, whilst if both the ingredients are present in too large quantity $\frac{1}{1000}$ part of ethylic aldehyde cannot be detected. He recommends the use of a solution of the following strength: 30 c.c. of a solution of fuchsine of 1 part in 1000; 20 c.c. of a solution of sodium bisulphite (34° B.); sulphuric acid 3 c.c.; distilled water 200 parts. It should be used soon after preparation, and in the proportion of 4 c.c. to 10 c.c. of the alcohol to be tested. This solution does not act on alcohols and ether, but will detect various aldehydes readily. It will not, however, serve for quantitative estimation, the coloration not being proportional to the impurity present. Acetate of aniline in acid solution is a good reagent for furfurol, as it does not react with other alcohols, aldehydes and ethers. As small a quantity as 1 milligram of furfurol per litre of alcohol can be detected by this reagent used in proper proportions. With regard to permanganate of potassium in acid solution, it was found to be decomposed by paraldehyd, isobutylic aldehyd and isobutylic alcohol, the reduction being proportional to the amount of aldehyd present. It can be used to distinguish ethylic aldehyd and paraldehyd, only the latter instantaneously reducing the permanganate. In the case of the aniline reagents, the full intensity of the coloration is developed in half an hour.

Stachyose.

From the new vegetable known as "*crosnes*" (*Stachys tuberifera*), so named after the town where it was first cultivated in Europe, a new sugar has been extracted by Drs. von Planta and Schulze (*Berichte*, xxiii., 1692). It is considered to belong to the group of carbohydrates termed by Professor Tollens crystallizable polysaccharides, which includes also melitose, gentianose and lactosine. Stachyose crystallizes from 90 per cent. alcohol in crystals belonging to the triclinic system and containing 3 molecules of water, and is represented by the formula $C_{18}H_{32}O_{16} + 3H_2O$. The aqueous solution has a sweet taste, is neutral and rotates the plane of polarization strongly to the right. It does not reduce Fehling's solution until after warming with an acid, when reduction takes place rapidly. Heated with nitric acid the sugar yields 37·3 per cent. of mucic acid. Heated with resorcinol and strong hydrochloric acid, a deep red coloration is produced. When inverted the chief product is galactose.

Columbian India Rubber.

It appears from the Kew *Bulletin* for July (p. 149) that the India rubber known in commerce as "Columbia virgen," is derived from a Euphorbiaceous plant, *Sapium biglandulosum, Muell. Arg.* The plant possesses the advantage that it can probably be cultivated in a comparatively cool climate, as it grows at a high elevation. The species is a very variable one. The form which grows in British Guiana, on the banks of the Pomeroon River, and is known in the Caribbean language as Touckpong, and in the Arawak as Cumakaballi, has been carefully studied by Mr. G. S. Jenman. The results of an examination made at Silvertown of rubber obtained from this form were on the whole unsatisfactory as regards its utilization for commercial purposes, in consequence of the presence of a resinous substance, which diminishes its value. There is no doubt, however, about the value of the Columbian rubber, so that it would appear that the tree varies in its chemical products as well as in its botanical characters, possibly producing more caoutchouc in one variety, and more resin in another.

Marrubium vulgare.

In the *American Journal of Pharmacy* (July, p. 327) Mr. Morrison reports that in an examination of *Marrubium vulgare*, he found, after the removal of the marrubium of Mein, two other bitter principles, one extracted by ether and the other by chloroform. Both of these give a glucosidal reaction, whereas Kromayer states that marrubiin is not a glucoside. The presence of these two bodies agrees with Hertel's statement that after the separation of marrubiin the fluid extract appeared to be as bitter as before. Mr. Morrison believes marrubiin to be nearly allied to absinthiin, from which it differs in its melting point, that of the former being about 160° C. and of the latter 120°-125° C.

Carex tomentosa.

Pharmacists who take an interest in field botany will be glad to learn that *Carex tomentosa*, one of the rarest British sedges, supposed for some time to have become extinct in the only known British locality at Merston Measey, Wilts, has been rediscovered in several localities near Fairford in Gloucestershire. Mr. G. Claridge Druce points out in the *Journal of Botany* that some mistake must have occurred in attributing the supposed extirpation of the plant to the draining of the "water meadows," where it is said to have been found, since it grows in ordinary pasture fields and by roadsides, although occurring more abundantly in furrows in the fields. It grows on oolite soil, and now that its proclivities are better known there is but little doubt that it may be detected in similar localities in other neighbouring counties and on the same geological formation.

New Potato Disease.

Messrs. Prillieux and G. Delacroix describe a new disease of the potato, due to the presence of a bacillus which they have named *B. caulivorus*. It causes the stem to become of a brown colour and then furrowed or shrunken. The cells of the diseased tissue are found to be full of the bacillus. The gangrene thus produced soon causes the death of the plant. The bacillus also affects the pelargonium in the same way, so that either plant, if diseased, may serve to communicate the disease to the other (*Comptes Rendus*, cxi., p. 208).

The Pharmaceutical Journal.

SATURDAY, AUGUST 2, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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PROVINCIAL CONFERENCES.

THE meetings of chemists and druggists announced in last week's Journal as having been arranged to take place at Exeter and Plymouth have been held, and reports of the proceedings will be found at pages 90 and 94. As the first attempts to carry out in the provinces what had already been tried in the metropolitan districts, it is satisfactory to be able to state that both of these meeting passed off in a most encouraging manner, and that they furnished unmistakable evidence of the need there is for establishing more direct and intimate relations between the chemists and druggists of the provinces and the Council of the Pharmaceutical Society. In both instances the reception accorded to the President and Vice-President, as well as the other members of the party, was most cordial, and the arrangements made for the conferences both in Exeter and in Plymouth were thoroughly well adapted for the occasion. The attendance of members and associates of the Society, as well as chemists and druggists unconnected with the Society, was in both instances very good, and a hearty interest was exhibited by those who were present at the conferences. It will be seen from the reports of the proceedings that notwithstanding the full information now given as to the current work of the Council and as to matters of legislative and legal action affecting the interests of chemists and druggists there is still a very considerable amount of misconception in regard to them in the minds of the trade in the west of England. In all probability the same conditions prevail in other parts of the country, and if that be the case there can be little doubt that it would be of great benefit to the Society and to the trade of which it is naturally the official representative if similar opportunities for direct communication could be afforded in other provincial centres. For a long time past we have held and expressed the opinion that one of the chief requirements of the trade is a greater amount of provincial interest and activity in connection with pharmaceutical politics, and above all a better appreciation of the aims and efforts of the Council in the work it is engaged upon.

Too frequently it happens that what interest and activity exist in particular localities are by reason of misapprehension directed into channels of antagonism, rather than of support, to the organization which should be generally regarded as the means by which united co-operation may be brought about and made conducive to the promotion of the general trade interest. It seems that this misapprehension scarcely admits of being removed from the minds of many in any other way than by personal conference, and it is a pleasing result of the conferences that have been just held at Exeter and Plymouth to be able to state that they have afforded several illustrations of the beneficial efficacy of direct personal communication between members of the trade and the leading officials of the Pharmaceutical Society. The President's forcible explanation of the position and capabilities of the Pharmaceutical Society could not well fail to remove some of the misconceptions that have prevailed. His remarks in reference to the question that has so often been asked, What has the Pharmaceutical Society done for the trade? were calculated to produce in the minds of reasonable men a conviction that any shortcomings there may have been in that respect are attributable to other causes than the indifference to the interests of the trade that is too frequently believed to be the most prominent characteristic of the Society's Council. The fact that the non-exemption of chemists and druggists from liability to jury service is due to the circumstance that when the last Jury Act was passed there was no recognizable means of telling who were chemists and druggists sufficiently accounts for their being now at a disadvantage in this matter as compared with the class of pharmaceutical chemists who had acted upon the recommendation to constitute themselves an organized body soon enough for that position to be useful to them in furnishing means of identification. Again, in dealing with the subjects of bogus companies and the WHEELDON case it was shown, not without satisfaction to many, that the irregular practices carried on by those companies can now be to some extent prevented on the ground of the decision given that the qualification to sell or dispense poison is a privilege of the registered chemist and druggist only, and for that reason he must be content to abstain from the inconsistency of continuing to do what he condemns in the case of those companies. With the reports to which we have referred it will, however, be unnecessary now to deal more at length with any of the particular subjects discussed at the late conferences, but we must not omit to mention that both of these conferences afforded distinct evidence of a latent disposition to regard the Pharmaceutical Society as being necessarily the means by which satisfactory progress is to be made for the general good of the trade. We say a latent disposition, because in some instances its active manifestation is hampered and obscured by special influences due to local conditions of trade, or to the pressure of circumstances that are considered to be grievances mainly because they are not looked at from a sufficiently general point of view. We therefore feel encouraged by the result of these two Conferences to anticipate that they will have been the means of effecting much good by establishing a better understanding and closer union between members of the trade and the Pharmaceutical Society. If that be the case the entire body will be indebted to the chemists of Plymouth and Exeter for the part they have so well taken in the inauguration of a reform so desirable, and especially to Mr. **Balkwill** for giving expression to the happy thought that such a result was within the limits of practicability.

THE BRITISH MEDICAL ASSOCIATION.

On Tuesday last the proceedings in connection with the fourth visit of the British Medical Association to Birmingham were inaugurated by a "general meeting" of the members, held in the lecture theatre of the Midland Institute. The report, however, presented by the Council on this occasion, disclosed conditions vastly more prosperous than those which obtained at either of the previous visits. At the time of the first, in 1834, the Association was yet in its infancy; at the second, in 1856, it was deemed desirable to make a ten shilling "whip" among the members present in order "to place the Association on a satisfactory basis;" while at the third, in 1871, it was thought necessary to make arrangements for an improved system of finance. But now, in 1890, the Association is reported to have a membership of upwards of thirteen thousand and a revenue of more than three thousand pounds in excess of expenditure. On Tuesday the first business was the resignation by Mr. **Wheelhouse** of the presidential chair in favour of Dr. **Francis Willoughby Wade**, and after the Council report had been discussed and adopted, and some other business had been transacted, a large number of the members adjourned to the parish church of St. Martin's, where a special discourse was preached to the Association by the Archbishop of Canterbury.

In the evening the new President delivered his inaugural address in the Town Hall, the subject being the pre-technical education of medical men, the speaker restricting his remarks especially to the preliminary education and general science education of students who are compelled to content themselves with passing the conjoint examination. One problem was therefore stated to be, How to secure for the poor man the greatest possible amount of that knowledge that now falls to the share of the rich man of equal talent; a second problem being, What section of that knowledge is the more important? Referring to the recommendations of the General Medical Council as to the subjects of physics, chemistry and elementary biology the President pointed out that the regulations practically limited the time for the study of these sciences to nine months, and he endorsed the opinion that it would be an imposition on the public to say that this time is sufficient for acquiring more than a mere superficial veneering of these subjects. In two years much better results might be obtained, but two years would not be available for the purpose without a system of compulsory preliminary education. He had found, he said, that Birmingham board schoolboys could pass half the preliminary medical examination at an average age of a little over thirteen years. Fixing then the age of entrance into the profession at seventeen years this would leave four years for the acquisition of the balance of knowledge required, two of which might be devoted to Latin, which he considered time enough for learning the amount of that language actually necessary. The only uses to which the medical man now put his knowledge of Latin was to write his prescriptions in that language, and it might be to translate an easy passage in Celsius. But he submitted that for the former purpose the necessity was of a purely arbitrary and artificial character, which was already crumbling, as the English names of drugs as well the Latin names are given in the Pharmacopœia. The President concluded by suggesting that the Council should initiate an inquiry upon the whole subject of preliminary education, the primary subject of investigation being to decide in what way it can be best ascertained that a boy aged fifteen years is of not less than average capacity, and that he has for ten years been so trained as to have had his intellect generally developed.

Wednesday morning saw the beginning of the work of the sections, of which there are twelve, and in the afternoon the Address in Medicine was delivered by Sir B. W. **Foster**. The Address in Surgery was to be delivered on Thursday afternoon, and at the same meeting the Association Gold Medal for Distinguished Merit was to be presented to Surgeon T. H. **Parke**, of the Emin Relief Expedition.

On Tuesday, in the House of Lords, the report of the Committee for General Bills on the Pharmacy Act (Ireland) Amendment Bill was received, and the Bill was ordered to be recommitted to a Committee of the whole house on Friday. Meanwhile, the Bill is to be reprinted as amended.

* * *

According to a report recently received from Mr. Vice-Consul Rose the cultivation of the poppy for the manufacture of opium in Mozambique, about which high hopes were once entertained, has resulted in a complete failure, and the company that inaugurated it has been voluntarily liquidated. The Indian labour employed proved too expensive, and it is stated that a crop of opium that cost the company nearly £10,000 to raise had dwindled, through loss of moisture and other causes, to the contents of four boxes, each worth about £100, before it had reached the port of shipment.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 15, 16, 17, 18, 22, 23, 24 *and* 25, 1890.

Present on each day—Mr. Carteighe, President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 16th, 18th and 22nd on behalf of the Privy Council.

MAJOR EXAMINATION.

15*th.*—*Eight* candidates were examined. *Two* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Brackenbury, Richard Hayes	Bardney.
Franklin, John Henry	Manchester.
Negus, John Henry	Northampton.
Perks, Alfred	Birmingham.
Whitbread, Howard	Loughborough.
Woodward, Moses Mellor	Nottingham.

16*th.*—*Seven* candidates were examined. *One* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Clark, Alfred Turner Sims	London.
Cranstone, Ernest Haughton	Hemel Hempstead.
Foster, Edgar Denney	Rugby.
Hobson, Edmund	Cheadle.
Lord, William Butler	Lancaster.
Martin, William Morley	Redruth.

17*th.*—*Seven* candidates were examined. *Five* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Prince, Roland	Longton.
Sherlock, Edward Birchall	St. Helens.

MINOR EXAMINATION.

15*th.*—*Twenty-three* candidates were examined. *Sixteen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Addison, Charles Samuel	Hitchin.
Allenby, John Edward	Helmsley.
Bard, Cecil Harry	Exeter.
Bately, Stephen Briggs	Great Yarmouth.
Bates, William	Spalding.
Breese, Charles	London.
Cheers, Samuel	Chester.

16*th.*—*Twenty-four* candidates were examined. *Twenty* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Coles, Charles Nathaniel	Horsham.
Dalgleish, Luther Rous	Lowestoft.
Davies, Herbert	Newtown.
Dawson, Athol Stancliffe	Sleaford.

17*th.*—*Twenty-five* candidates were examined. *Sixteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dickinson, Charles	Llandudno.
Edwards, David Powell	Bishop's Castle.
Evans, Daniel Ashton	Llanbrynmair.
Falkingbridge, Frederick	Kennington.
Fielding, Clement	Elland.
Gartside, Charles	Oldham.
Gaziello, Charles Joseph	London.
Gooseman, Henry Charles	Hull.
Smith, Walter Woodhouse	Doncaster.

18*th.*—*Twenty-nine* candidates were examined. *Fifteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Gribble, Edmund Arthur	Stockwell.
Hanham, Arthur Sydney	Portsmouth.
Harris, George Robert	Bradford.
Hayton, Thomas Irwin	Wigton.
Heap, John Henry	Bolton.
Heaton, John	Rastrick.
Herbert, Sydney Reeves	Cockermouth.
Higgs, Andrew Badgery	Bodmin.
Hill, Joseph Harrison	Birmingham.
Hoit, Alfred Henry	Swansea.
Holgate, Herbert	Catterick.
Hope, Ingham	Hull.
Hunt, John Lambert	Chesterfield.
Hutton, Thomas Walter	Dudley.

22*nd.*—*Thirty-three* candidates were examined. *Seventeen* failed. The undermentioned *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bishop, Ernest	London.
Dwelly, Hedley Egbert	Maidstone.
Jones, Edward	Portmadoc.
Kempston, Theodore	Dublin.
Kitching, Arthur Scott	Beckenham.
Lane, James	Nottingham.
Lawton, Henry Smith	Birmingham.
Lewis, David	Llanrhystyd.
Lloyd, James Herbert	Leicester.
Lucraft, William Henry	Broad Clyst.
McFall, John Edwd. Whitley	Liverpool.
Mackereth, Charles Tyson	Ulverston.
Marshall, George	Spilsby.
Miller, Frederick	Strood.
Millward, Frederick	Cardiff.
Thomas, Alfred Messer	Redruth.

23*rd*—*Thirty-one* candidates were examined. *Eleven* failed. The undermentioned *twenty* passed and were declared qualified to be registered as Chemists and Druggists:—

Lewis, David Griffith	Cardigan.
Lloyd, Walter George	Cardiff.
Morgan, Richard Bonner	Birmingham.
Morris, Edward Herbert	Bedford.
Mould, John Salmon	Louth.
Neeson, Horace John	London.
Nicol, Burton Alexander	London.
Nosworthy, Allan Percy	Yeovil.
Oakeley, Thomas James	Newton.
Owen, Griffith Charles	Carmarthen.
Oxley, George	London.
Pain, Charles Frederick	Dover.
Parker, Christian	Bath.
Partridge, Charles Henry	Clifton.
Pembleton, Frederick Paul	Nottingham.
Pickard, Samuel Norman	Ossett.
Poole, Thomas Brice	Sawbridgeworth,
Pye, Alexander Graig	Atherstone.
Rayner, John	Uxbridge.
Riddle, Thomas Edward	Hexham.

24*th.*—*Thirty-two* candidates were examined. *Sixteen* failed. The undermentioned *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, Hugh Kyffin	Mochdre.
Morris, James Henry	Pembroke Dock.
Rosewarne, Richard	Falmouth.
Rowland, John Llewelyn	Carnarvon.
Sellè, Louis Sherwood	Hull.
Sleggs, George Milner	Liverpool.
Slinn, Harry Edwin	Burton-on-Trent.
Spencer, John Christopher	Manningham.
Stead, William Wilkinson	Bradford.
Sturch, Harry Howes	Kidderminster.
Sturton, Charles Hubert	London.
Sumner, George Thomas	Hawkhurst.

Sykes, Harry	Uppingham.
Tasker, John Henry Anthony	London.
Taunton, Edgar	Sittingbourne.
Williams, Arthur Llewellyn	Pembroke Dock.

25th. — *Thirty* candidates were examined. *Sixteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Charles, David	Llanelly.
Pay, Harry Hilder	Margate.
Smith, Thomas	York.
Tillman, Ernest Augustus	Truro.
Tinker, Henry	Dukinfield.
Travis, Henry Arnold	Manchester.
Twelves, Charles Henry	Whittington Moor.
Wallsgrove, John C. Henry	London.
Walton, Henry Egbert	Idle.
Wells, Arthur John	Lincoln.
Whitehead, Fredk. Nathaniel	Morecambe.
Whitehouse, John Henry	Bridgnorth.
Williams, William	St. Clears.
Wilson, William	Nuneaton.

MODIFIED EXAMINATION.

18th—*Three* candidates were examined, and were declared qualified to be registered as Chemists and Druggists:—

Beech, Elliot Simcock	Birkenhead.
Cugnoni, Alfred Horton Dyne	London.
Moore, David George	Manchester.

EXAMINATIONS IN EDINBURGH.

July 16, 17, 18, 22, 23, 24 *and* 25, 1890.

Present on each day—Mr. Bottle, Vice-President; Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 18th and 23rd, on behalf of the Privy Council.

MAJOR EXAMINATION.

16th.—*Three* candidates were examined and were declared qualified to be registered as Pharmaceutical Chemists:—

Lothian, John	Coldstream.
Millar, James Herd	Edinburgh.
Tocher, James Fowler	Aberdeen.

MINOR EXAMINATION.

16th.—*Eleven* candidates were examined. *Eight* failed. The undermentioned *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bennett, Albert Edward	Leigh.
Bethell, Arthur	Manchester.
Whitaker, William	Accrington.

17th.—*Fourteen* candidates were examined. *Eight* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, William Herbert	Edinburgh.
Brown, William Sims	Caistor.
Burton, Edmund	Totnes.
Cardno, Robert Catto	Aberdeen.
Carré, James Hilary	Guernsey.
Collingwood, Robert	Rochdale.

18th.—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Craven, Walter Joseph	Lichfield.
Day, Charles Frederick	Maidstone.
Donald, John Martin	Perth.
Dunlop, David	Irvine.
Evans, Josiah	Pencader.
Gartside, Fred	Chadderton.

22nd.—*Fourteen* candidates were examined. *Eight* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Golightly, John William	Durham.
Gordon, Alexander	Friockheim.
Johnson, George Herbert	Batley.
Jones, John Ellis	Clynnog.
Liversidge, Joe Sykes	Dumfries.
MacDonald, Donald Ewen	Lancaster.

23rd.—*Thirteen* candidates were examined. *Eleven* failed. The undermentioned *two* passed, and were declared qualified to be registered as Chemists and Druggists:—

MacNair, Robert Hunter	Leith.
Morrison, John McGregor	Edinburgh.

24th.—*Thirteen* candidates were examined. *Six* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Porter, Andrew Bower	Leven.
Price, Herbert Henry Gay	Taunton.
Price, Joseph	Wrexham.
Robinson, William	York.
Sanderson, Joseph	Glasgow.
Smiles, Robert Smith	Edinburgh.
Smith, Robert	Dundee.

25th.—*Twelve* candidates were examined. *Five* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Stark, George Miller	Gatehouse.
Swinglehurst, Josiah	Hebden Bridge.
Thomson, Archibald	Lockerbie.
Turner, Samuel	Buxton.
Walker, Frederick	Newton Stewart.
Wilkie, David Thomson	Lichfield.
Wright, George Victor	Edinburgh.

MODIFIED EXAMINATION.

25th.—The undermentioned was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Littlewood, Joseph Samuel	Salford.

SCHOOL OF PHARMACY EXAMINATION PAPERS.

SESSION, 1889-90.

BOTANY.

SESSIONAL EXAMINATION FOR A SILVER MEDAL AND THREE CERTIFICATES OF HONOUR.

PROFESSOR GREEN.

July 26. *Time allowed*—10 *a.m. to* 1 *p.m.*

The following questions were set for this examination:—

1. Give an account of the development of the ovule up to the time when it is ready for fertilization.
2. What is bark? Give an explanation of the way in which the chief varieties of bark are formed.
3. Give an account of the influence of light on the growth of plants. What features are noticeable in the case of a plant which has been grown in darkness?
4. Give a description of the natural orders of the British Flora which are included in Bentham and Hooker's Cohort *Parietales.*

July 30. *Time allowed*—10 *a.m. to* 1 *p.m.*

1. Make such microscopic preparations as you think necessary to display the structure of the specimen A. Mount them in glycerine.
2. Sketch your preparations and point out in your sketches the points which you consider important.
3. Describe in botanical language the specimen B. Draw its floral diagram and refer it to its natural order.

4. Refer the flowers given you to their several natural orders.

5. Identify the microscopic preparations, C., D., E.

July 30. *Time allowed*—2 *p.m. to* 5 *p.m.*

1. Describe the appearances seen in the transverse section of the stem of an Equisetum. How is reproduction brought about in Equisetum?

2. What modifications of the structure of the stem and leaf are seen in those plants which grow submerged in water?

3. Give an account of the different forms in which reserve materials are stored in seeds.

4. What peculiarities in the staminal whorl are characteristic of the following natural orders:—Ranunculaceæ, Cruciferæ, Leguminosæ, Labiatæ and Cucurbitaceæ?

MATERIA MEDICA.

SESSIONAL EXAMINATION FOR A SILVER MEDAL.

MR. HOLMES.

July 29. *Time allowed*—10 *a.m. to* 1 *p.m.*

The following questions were set for this examination:—

1. Examine under the microscope the official leaves placed before you, and state the histological features by which you recognize them.

2. Ascertain if lycopodium, sugar of milk, woody tissue, or other adulterant recognizable under the microscope, be present in the sample of Euonymin before you, and state the means by which your results are arrived at; also the method by which the percentage of foreign mineral matter present in a given sample of Euonymin may be ascertained.

3. Name the drugs placed before you, and describe in each case the structural characters visible under a lens, and point out the features by which known admixtures or adulterations of these drugs may be recognized.

July 29. *Time allowed*—2 *p.m to* 5 *p.m.*

1. Enumerate the medicinal products obtained from *Zea Mays.*

2. Mention the possible botanical and geographical sources of Podophyllin, state the causes of the variation in colour of the commercial article, and the number and nature of its chemical constituents.

3. Give an account of the constituents of camphor oil, the methods adopted to separate the more important bodies contained in it, and the uses to which they are applied.

4. What is Eucalyptol? Mention the volatile oils in which it has been detected and explain how it can be separated from them.

5. Give as full an account as you can of the cultivation of liquorice root, the differences noticeable in the root obtained from various geographical sources, and the mode of preparation of the commercial extract, and explain how the latter differs from the Extractum Glycyrrhizæ of the British Pharmacopœia.

6. Describe the structure of the Nutmeg fruit and state the commercial sources of the spice.

COUNCIL PRIZES EXAMINATION, 1890.

In framing Answers, Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

BOTANY AND MATERIA MEDICA.

Time—10 *a.m. to* 1 *p.m.*

BOTANY.

1. Describe the development and functions of the hairs of plants, and mention the principal varieties and modifications.

2. Define Root-pressure. Describe briefly its causes and effects.

3. What are elaters? What is their function, and in what natural orders are they found?

4. What are the distinguishing characteristics of the Rosaceæ? Describe the fruits that are found in this order.

MATERIA MEDICA.

1. How is copaiba obtained? Give tests for its purity and describe its constituents.

2. What is tragacanth? Describe its constituents and their properties.

3. State what you know respecting the constituents of *Hydrastis canadensis.*

4. Explain the official process for the preparation of santonin.

5. State what you know respecting the constitution and decomposition products of cocaine.

CHEMISTRY.

Time: 2 *to* 5 *p.m.*

1. Give an account, with examples, of the phenomena, and state the laws of diffusion, (*a*) in liquids, and (*b*) in gases.

2. Trace the analogies and point out the differences between the compounds of iron and aluminium. Describe a process for the manufacture of aluminium, and give the properties of the metal.

3. Give in detail the various processes for the preparation of ethyl and amyl nitrites, and the principal methods for the valuation of the products.

4. What are the formulæ, sources, and methods of preparation of mannite, glucose, and sucrose? How do you account for the development of sweetness and of distinctive flavour during the ripening of fruits?

5. Describe the different processes for the determination of nitrogen in organic compounds. What volume of nitrogen at normal temperature and pressure would one gram of urea yield by Dumas' process?

Provincial Transactions.

MEETING OF CHEMISTS AND DRUGGISTS AT EXETER.

On Tuesday evening the President of the Pharmaceutical Society of Great Britain, accompanied by the Vice-President, Mr. C. B. Allen and Dr. B. H. Paul, met a conference of chemists and druggists at the Clarence Hotel, Exeter. Mr. Henry Gadd, of Exeter, was voted to the chair, and there were also present:—Messrs. J. Hintin Lake (Local Secretary), E. Lemmon, P. S. Rowsell, Harris, W. H. Bulley, F. G. Fouraker, T. C. Milton, David Reid, Tom W. Robson and W. F. Sanders (Exeter), W. Jackson (Crediton), R. Chessall and H. B. Pemberthy (Sidmouth), S. Thornton and W. H. Griffith (Exmouth), Jno. J. Tremeer (Barnstaple), Mr. T. Quick (Lympstone), C. E. Evans (Moretonhampstead), J. Bartlet (Heavitree), E. H. Dyer (Honiton), James Newlyn (Torquay), G. J. Cutcliffe (Dawlish), Seth Harry (Okehampton), William Maunder (Teignmouth), Joseph B. Harris (South Molton), and Frederick Ellis (Topsham).

The Chairman, in opening, said there were three things that would probably come under discussion: first, what the Pharmaceutical Society had done for them; second, what the Society had not done for them; and third, what the Society should do for them. If every registered chemist and druggist were to become a member of the Pharmaceutical Society the Society could present one united front, and it would then be far more likely to secure legislation that would beneficial to their interests than it could at present; but there was the sorry fact to chronicle that a great number of chemists were outside the Society. He trusted that a new Pharmacy Act might be passed which would be of benefit to them in the line in which they were engaged. He then called upon the President of the Pharmaceutical Society to address the meeting.

Mr. Carteighe asked in the first place to be allowed on behalf his colleagues and himself to thank all present very cordially for the opportunity they had given them for this conference. He preferred to regard it as a conference rather than as a general meeting. As members of the Council of the Society in London they had certain responsible duties to perform for the trade at large. Those duties they endeavoured to discharge to the best of their ability, in fact to the best of any man's ability who had to work for a body of men without personal knowledge of such body. They came there to hear criticisms, almost abuse if they liked, in order to have an opportunity of correcting any misapprehensions, because he knew, whether in Exeter, or any other city chemists and druggists would not willingly abuse the Pharmaceutical Society when they knew what were its powers and duties, and when they knew that the officers had done their duty to the best of the powers they had to wield. They knew it was a very common thing to be heard said—"What has the Pharmaceutical Society done for the Trade?" Let them, then, in the first place, consider what the Society had done for the trade. Some people said it had done nothing. He was there in the spirit of the founders of the Society to make friends, not to criticize or carp at the want of enthusiasm, want of energy, or what he was in the habit of calling want of backbone among their friends in the trade. He was sorry to have to make that preface; but that was all he had to say on the point. He would rather look forward and see whether it was worth while to consider any suggestion for removing that condition of lethargy and inactive corporate existence. By corporate existence he meant one great corporate body capable of doing good. Perhaps the answer to the question of "What has the Pharmaceutical Society done for the trade," was best made in the statement of the fact that a number of men occupying good positions in the world associated themselves together to form the Society. He thought they would all admit that the founders could not get any pecuniary benefit out of the Society. They were anxious to found a corporation that should produce good results and good fruits for those who followed after them. Among the illustrious men who founded the Society was William Allen. He mentioned him first, although Jacob Bell was the first ardent organizer and mover in the scheme. Allen was a man of science, respected by all mankind; a member of the Society of Friends, yet respected by members of every religious persuasion in the kingdom; honoured by the friendship of kings, and honoured by the Duke of Kent, who became a personal friend of his in regard to certain philanthropic measures. And William Allen was one who moreover had the privilege and pleasure of nursing our present Queen on his knee. This man—a man of considerable importance in his own country, and a man of very great weight in various parts of the world—was willing to become first President and hold office for two years. This showed that the object of those who associated themselves together was a good one in the broadest sense of the word. In 1841 the Society was founded, and in the following year it obtained a charter. Now a charter, although a very respectable thing, does not confer statutory powers, and in 1852 Jacob Bell went into Parliament in order to get statutory powers, as distinct from voluntary powers, with regard to the trade of chemists and druggists. With all respect to Jacob Bell he was sorry to say that Bell practically failed to do all that he wished to do. He succeeded in getting protection for the title of pharmaceutical chemists; he succeeded in getting the Pharmaceutical Society recognized as a useful public body. That was in 1852. But such was then the condition of Free Trade in this country that in the House of Commons he was unable to get any restriction placed on the sale of poisons and drugs and upon the compounding of prescriptions. He had to modify his Bill and be content with a voluntary measure, which was practically that anyone who wished to become a pharmaceutical chemist within a certain time might do so, and that after the lapse of that time every such person should pass an examination. It did not interfere with the rights of any person in the business at the time to sell poisons and drugs or compound prescriptions. The effect of this legislature from the pure point of view of trade interests was of no avail, except that it stimulated education. Those who knew him knew that he did not undervalue the advantages of education. He attached a very great deal of value to education, especially to their Society. But they would excuse him if he left that subject and dealt with the purely trade aspect of the question, because it was on that side that he was anxious to hear their opinions expressed. Great was the power of Bell, and everyone who knew him knew his indomitable pluck. He spent his money lavishly, and worked hard to gain influence, but he was unsuccessful in getting through the House of Commons in 1852 a comparatively mild measure. In 1868 an Act was passed which practically might be said to have been submitted to the same course of treatment which Bell's met with in 1852. In 1866 the Pharmaceutical Society was in a better position than it ever was for getting a true Pharmacy Bill passed. They would know what he meant by a true Pharmacy Bill—a Bill that covered the whole ground; a Bill that did not only go into the wretched question of selling a few poisons, but dealt with the whole question, and provided that in regard for the education involved and the examination passed there should be a restriction which should be of a definable and tangible character. He was on the Council of the Society at that time, although only a mere boy, and he remembered hearing with delight that the then Home Secretary who was the person in charge of pharmaceutical affairs under the 1852 Act, had promised to introduce that very Bill into Parliament and to do his best with the Government to pass it. He mentioned this, not with the idea of crying over spilt milk, but in the hope that it would enable them to avoid getting into a similar situation in the future. The Council had impressed the Government of the day with the importance of the subject and it had persuaded the Department with which it was directly concerned into concurring with its views. Mark what happened. In a very short time a Society was established. That Society was called the United Society of Chemists and Druggists, and it began opening communications with the Pharmaceutical Society on matters of internal arrangement within the Society itself. When he said internal matters he meant matters of title. The United Society demanded certain things to which the Council could not agree, and it, therefore, determined to resist the Bill. He did not say it was wrong of the United Society of Chemists to get up an opposition, but the result was that it went into Parliament and raised such an opposition to the Bill that the Government declined to interfere in a matter for the public interest where the parties could not agree among themselves. Unfortunately through that fact pharmacy had been put back a century, and he doubted if they would even then get the advantages that would have been obtained in their drafted Bill, of which the Government approved. The United Society continued its activity, and when the Bill was re-introduced in the following year it also brought forward a Bill. The Prime Minister said he knew nothing about the subject, and at his suggestion both Bills were referred to a select committee. The select committee heard the evidence of Sandford and others for the Pharmaceutical Society, and they had also before them several members of the United Society. The Committee, in despair of making out what pharmacy meant, decided that the sale of poisons should be restricted to qualified persons. Therefore, that Bill which in 1866 would have been a true Pharmacy Bill, in 1868 became a Poisons Bill, with only so much pharmacy as they could get into it. It was not then realized that the Pharmaceutical Society was working in the interests of the trade and not merely in the interests of its own special members or associates. He was not there as a special pleader for the Pharmaceutical Society, but he wished them to understand that what it did as a Society could not be of benefit to its members without being at the same time to the benefit of the trade at large. If they would not join he was not there to chide or abuse them; but he hoped to be able to show that if they wished the Society to be a real power they would best obtain their end by becoming members. Although the Bill of 1868 was only a Poisons Bill and not a Pharmacy Bill it had done some good. It had said that no one should keep open and sell unless he was registered. That being so he thought they might say that the Bill created a partial monopoly, and a partial monopoly not in the interest of the trade but of the public. It had created a certain right and property in the interest of the registered chemists and druggists, including those in business before 1868, who actually paid nothing to obtain that right. Since the Act was passed there had been a number of judicial decisions which had affected their position very materially. The question of how far it was safe for corporations to exercise the business or profession of chemists and druggists was contested a long time ago. They knew also the question of how far a servant of a corporation, or even the servant of a qualified man who handed over the poison, was the seller had also been decided. There might be some difference of opinion in the room as to the advantage or disadvantage of these legal decisions; but he would remind them that their calling was a very peculiar one. With the public, and Parliament as simply the representative of the public, personal qualification was all in all. Recent judgments had brought corporations within the provisions of the Act, so that they could not carry on the business of a chemist and druggist without having one or more qualified persons in their service. That being so, was he not right in saying that these corporations were carrying on their business on a nearer approach to equality than they had before? There was another judgment, though not such an important one, in which it had been decided that patent medicines were not exempt from the poison label. It had been pointed out that it was possible and even probable that if the law was carefully thought and fought out by competent men on either side it might be possible to be held that after all the defects in the Act of 1868, a preparation of morphia was still a preparation of morphia and liable to all the conditions imposed by the Act, even though it was called somebody's elixir. He was not sure that the public was not disgusted with the indiscriminate sale of poison, and he knew that the medical profession as a whole was disgusted with the facility with which poisons, or so-called patent medicines, were sold to the public without any restrictions whatever. Since 1868 the number of patent medicines had increased enormously. Just in proportion as the Pharmaceutical Council had carried out its duties under the Pharmacy Act, had the Act been broken by the indiscriminate sale of poisons with a patent stamp put upon them and a label stating that they were good for the belly-ache, etc. If the public once realized this position it would be disposed to go with the Council. However to be successful they must be very careful; and it would never do to be unsuccessful, because if they failed they would practically find the judges saying that somebody else besides the registered chemists and druggists could sell a package labelled poison. He did not want that to occur. He considered that the label was nothing without intelligence on the part of the person who handed the poisons over the counter. The public did not want two classes of persons licensed to sell labelled poisons. Those present might not see the whole of this in the same light as he did; but he would ask them to put their confidence in the Council, whether they belonged to the Society or not, for the Council had their interests at heart. With regard to what they ought to do in the future he admitted that the so-called stores, or companies, more or less bogus, were very objectionable. If a person was found selling poisons and practically carrying on the business of a chemist and druggist, and his attention was called to the fact that he was breaking the law, the man did not go into a court of law; but he paid a penalty and then took his wife, mother-in-law, aunts, sisters, cousins and domestic servant, and managed to get seven persons together and formed a corporation. The recent judgment, to which he had already referred, would have a very important effect upon such bodies. A true corporation in regard to the dispensing of medicines no man in that room would object to; but in regard to these bogus bodies which had been spreading throughout the country, the case was very different. A large number of the chemists who had written to the Society in regard to future work, had asked the Council to stop this altogether, but he was sorry to inform them that in dealing with this question members of Parliament and others were dead against them. They said they did not see why any corporation should not keep open shop. He was afraid they would have to accept the condition of things at present, and he did not think that in the future a legislature would be persuaded to enact that no corporation must dispense poisons. Not only would there be a difficulty in getting such a Bill passed, but he feared that it would be impossible to get members of either house to actually introduce any Bill founded on these lines. This was the experience of the Irish Pharmaceutical Society. The Irish could do anything in these days in social matters; they could get votes of money for railways and for irrigation and all the rest of it. If it were only said that the Irish pharmacists wanted looking after, members of Parliament would listen to almost anything about them; but even the Irish had failed in this point. And not only had they failed, but they had gone so far as to legalise their opponents' position. In recent legislation, the Irish pharmacists, with greater facilities than those in England, and with a smaller number of vested interests to deal with, had absolutely failed in that way. They had drafted a Bill which practically meant the abolition of this form of trading, and neither in one House nor the other could they get a member to introduce it. This applied not only to members but to Government. In going to Parliament on any question the assent of the Government must be gained. No private member would touch any measure affecting the welfare of the British public unless the Government of the day did not object. He knew he had not a chance. When the Society sent a Bill to Parliament it was first examined by experts, who took the broad view that the personal qualification of the vendor was of the greatest consequence to the public, and that the interests of the public were safe if the vendor was qualified. That being so, what were they to go for? He believed the Government was in favour of the restriction of the dispensing of medical prescriptions to registered persons. The public said "restrict your sale of poisons," and the judges said the same thing. The selling of a poison was not in the ordinary sense a sale, and the professional fee for the sale of poisons should be such as to recompense the seller for the care and judgment he placed in the industry. He thought the Government might perhaps be persuaded to agree with the Society in regard to the dispensing of the prescriptions. If they got that one rung of the the ladder they might go a step further, as was suggested some time ago by Mr. Walter Hills, successor to Jacob Bell—whom he was sorry not to see there that evening—in an address at the last election, and say that if the dispenser of a prescription should be a qualified person, so should a compounder. He was sure those present that evening would agree with this, and also that the public would be of the same opinion. It followed, therefore, that the dispenser of the medicines of the British Pharmacopœia should also be qualified. He did not think it would be wise to go in for both at once, but one followed the other. If they could persuade the Legislature that the first was important in the interest of the public, those whose knew the British Pharmacopœia would say the other was equally important. He thought he saw arguments to show the public—who could not understand this question as pharmacists did—that in a not far distant time these two things might be agreed upon with regard to the dispensing of prescriptions of every kind and of the whole of the offical preparations of the British Pharmacopœia. Beyond that he could not go; the public would not go; the State would not go. He could realize as both a member of the public and as a member of their calling that it was just as important that they should have skill in the sale of the common drugs as well as of the most important. But the public could not be got to understand that. It should be realized by the trade that the Society could not do anything in Parliament unless it spoke for the pharmaceutists and everybody like them. Members of the trade who were not members of the Society were very fond of saying "What has the Pharmaceutical Society done for us?" They wrote in this way to the President, and signed themselves "Outsiders." Was not that a most illogical position? He (the President) received heaps of letters from friends, couched in the kindest terms, saying, "if you will only do this and that I will join the Society." He wanted it rather to be, if the chemists and druggists would only come into the fold and follow the Society's Council, if they would only all join the Society, then the President for the time being could go to the House of Parliament, and not only ask for, but almost demand that which he was not now in a position to request. Therefore if the chemists and druggists wanted better times, the onus rested on themselves. They need not ask what the Society had done for he had already told them, and if they asked what the Society could do for them in the future, he would say it rested upon those who did not belong to the Society to say. Upon them rested the responsibility whether in the next year or two their position would be maintained or improved. If they expected the Society to do more for the body politic and for the public than it had done, the first thing they had got to do was to join the Society, so that every future President, whenever he went and knocked at the door of the House of Commons or entered into the room of a minister of State, might say he represented the chemists and druggists of Great Britain. He would have finished with this remark, but would just say supplementarily that the Council had from time to time proposed to make re-arrangements as to titles in the Society such as would make the body as democratic and agreeable as possible. He was not anxious to make the Society a select body. If it were so his speech would be nonsense. He had come there to ask them to come in by their hundreds and thousands. He did not want their money. He was, of course, obliged to ask them for their subscriptions in order that they might be within the Society. He did not want their money, but their support. They all wanted assimilation, and the Council had proposed in one or two Bills that had been placed before them to make entrance into the body as easy as possible, and to give to every registered chemist and druggist the right to become a member, and have all the privileges of the Society. In the olden days the theory was that a man who kept a shop was a pharmaceutical chemist, and that his assistant was an associate. This was copied from the apothecary who kept an open shop and had also an examined assistant. The same thing had been perpetuated more or less in the bye-laws at the present day. Every person now who passed the statutory examination, would be entitled—if the Society could get the chemists and druggists to agree with any of its Bills—to become a member of the Society, and to have all the privileges with the man who had passed the Major examination. He did not think the Society could go further than that. He must apologize to those present for taking up so much of their time, and he would be pleased to answer any questions that might be addressed to him.

Mr. Lemmon asked whether it was the wish of the meeting that the reporters should publish all that took place. He fancied there might be some things that it was not desirable to put in the papers. He did not wish the members of the press to withdraw, but if they remained they might have a hint as to what ought and what ought not to be published.

On the suggestion of the President the meeting then resolved itself into a committee.

The President, in reply to a question, said he was afraid they could not admit managers as eligible for the Modified examination. The Government had been pressing the Society to stop Modified examinations altogether. At the present moment the officers of the Privy Council would like to pass a new Act, absolutely new. It was only fair for him to remind them that persons who had managed a business successfully for years ought, with a little care and reading, to find very little difficulty in passing the Minor examination. The Vice-President had been in Edinburgh presiding over examinations for the past two weeks, and he would bear him out when he said that the position of a practical man in an examination was one of little difficulty as compared with that of a theoretical man. A man who had managed a business practically ought with a little intelligence to be able to get through the theoretical examination. And a man who had successfully managed a business for some years must necessarily be intelligent. If such a man could not by care and attention acquire such knowledge as would enable him to pass the examination he ought not to be registered. In his (the President's) opinion, and in that of the Privy Council, such a man did not possess the requisite skill and knowledge necessary for carrying on the business.

Mr. Lake asked a question as to the attention paid by the Society to dispensing, and the President said dispensing was the application of science to a definite art. A man could not dispense without a knowledge of chemistry and of physics. That was to say he might do it, but only under the rule of thumb. There was no doubt the examination would be divided into two parts before very long. In the Bill of the Society of last year, and in previous Bills, it was proposed so to divide the examination. What the Council wanted to do was to examine a young man at nineteen or twenty years of age in the elementary, and then at twenty-one in the practical part of dispensing.

Mr. Bottle (Vice-President) upon being called upon to address the meeting said he had arrived at the conclusion, as an old supporter of the Society, that if anything was to be done for the chemists and druggists it must be done by the Society. Mr. Lake had remarked that he would like to see a fellowship for the Society. His (Mr. Bottle's) advice was "stick to the pharmaceutical chemist." The public were now beginning to recognize that the pharmaceutical chemist was something more than a chemist and druggist, and if they went in for a fellowship and placed that before the position of pharmaceutical chemist, his impression was that in the next generation the pharmaceutical chemist would be looked upon as holding a higher position than the fellows of the Society.

A resolution was passed to the effect that the Society was deserving of the support of the trade and approving of the proposed Bill.

Dr. Paul and Mr. C. B. Allen also spoke and votes of thanks were accorded the President and his colleagues and also to Mr. Gadd.

MEETING OF CHEMISTS AND DRUGGISTS AT PLYMOUTH.

On Wednesday a conference of the chemists of South Devon and Cornwall was held at the Athenæum, Plymouth, to meet the President of the Pharmaceutical Society, Mr. Michael Carteighe, Vice-President, Mr. Bottle (Dover), Mr. C. B. Allen, a member of the Council and Dr. Paul (Editor of the *Pharmaceutical Journal*). The object of the conference, as set out in a circular, was to promote a better understanding of the aims of the Pharmaceutical Society, and a closer union of members of the trade for the advancement of mutual interests. The chair was occupied by Mr. A. P. Balkwill, of Plymouth, and the large company present included Messrs. G. Breeze, Devonport; A. D. Breeze, Plymouth; H. Pickard, Stratton; J. Parke, Plymouth; R. D. Dobell, Tavistock; W. G. Essery, Plymouth; P. A. Kelly, Morice Town; Lander, Liskeard; Benallack, Plymouth; J. Barge, Plymouth; J. K. Bailey, Plymouth; Rendle, Stoke; Young, Liskeard; J. G. Netting, Plymouth; M. V. White, Devonport; J. Cox, Stonehouse; H. T. Netten, Stonehouse; J. C. Sloggett, Plymouth; F. P. Balkwill, Plymouth; F. Codd, Plymouth; H. D. Davey, Stonehouse; A. D. Davey, Stonehouse; F. Maitland, Stonehouse; J. Martin, Plymouth; W. M. Martin, Plymouth; W. J. Wallace, Plympton; S. D. Skewes, Beeralston; J. Allen, Plymouth; S. G. Starkey, Plymouth; T. J. Williams, Devonport; R. G. Bryan; J. Maurice, Plymouth; H. Woods, Plymouth; C. T. Weary, Plymouth; W. A. Shakerley, Plymouth; R. F. Roper, Plymouth; F. W. Hunt, Plymouth; and C. T. Weary, Plymouth. The morning was very pleasantly spent by a steamer excursion, the party embarking from the Promenade Pier under the Hoe. The conference was commenced shortly after 3 o'clock, and continued until seven.

The Secretary read letters expressing inability to be present from several members of the trade in Devon and Cornwall, all of whom expressed their hearty approval of the conference being held. The chemists of Launceston wrote that being market day it would be inconvenient for them to get away, but submitted certain suggestions which they considered were worthy of the attention of the Council of the Society. These included the following: 1. To endeavour to render the Pharmaceutical Society co-extensive with the registered members of the trade by the following and any other means approved by the Council; (*a*) that the Council should include as eligible for election those who have passed the Minor examination and not necessarily the Major:—(*b*) that the whole United Kingdom be divided into electoral districts for the purposes of such election; (*c*) that the whole of the chemists and druggists in each district should be encouraged to become subscribers by the largest reduction of fee consistent with the efficient conduct of the Pharmaceutical Society; 2. That as the examination stipulated by law requires an adequate acquaintance with the medicines and other preparations included in the British Pharmacopœia, it should be the aim of the Pharmaceutical Society to secure the legislative restriction of the sale of all such articles to the registered members of the trade.

The Chairman in opening the conference then remarked that it was a very great pleasure to him in being placed in the position he occupied that day, and to meet all his friends together. He thought the chemists of the district had been paid a very high compliment by the Pharmaceutical Society in being represented there by the President and Vice-President and a member of the Council, who had come down to meet them in response to their invitation. They had also present gentlemen from distant parts of the country ready to join them in conference, and the chemists of the three towns gave them a hearty welcome. He had an idea that there were a few present who were not in full sympathy with the Pharmaceutical Society. He believed there was nothing like a little healthy opposition. He felt sure that all were exceedingly grateful to those gentlemen who had come to give them some advice, and they would be glad to have their views about the work of the Society, and to receive suggestions how that work was to be carried out better in the future than had been done in the past. He had a large number of subjects indicated as suitable for discussion, and in order to facilitate matters it would be necessary to allow ten minutes to the speakers—after the President and Vice-President had spoken—for introduction of any subject, and five minutes to speakers speaking on each subject. In conclusion he mentioned that he did not know that he had anything more to say at the moment, and he repeated that they extended to their visitors a very hearty welcome, and he hoped they would go away thoroughly encouraged by the sympathy and support which would be shown by those present. He hoped also that they would benefit by the suggestions they would receive at that conference.

The President, who was cordially received, said he took it that the observations of the Chairman in regard to time was meant as a warning to him in any introductory observations he might make. He understood that after suggestions had been made in conference and had been talked over, they would allow him to reply to them as far as he could, and if that was so he hoped that he would be pardoned if he did not say anything on ordinary questions of trade just for the moment. He would say that one of the chief objects for the meeting was to call attention to an important fact, that if future powers were required for the chemists and druggists of to-day that they were only to be obtained by the efforts of the chemists and druggists themselves. The Pharmaceutical Society was the only organized body with powers specially granted to it by statute; it was the only portal through which applications to Parliament for any legislation for the chemists and druggists could take place. Who was to take the initiative? Clearly the Pharmaceutical Society. Who was to take the initiative in any Bill or proposal that might be brought forward later on? And who was to carry that Bill through Parliament? There were two factors in regard to that. One was the Government of the day, but the most important factor was that the whole of those who were engaged in the business should be absolutely at one with the authors of that Bill in wishing it to pass. Therefore, if there were any grievances against the Pharmaceutical Society

—and he had no doubt there were many—he would remind them that some of them were due to one fact. Hitherto when they had approached Parliament for an amendment of the existing law or any modification of it they had been met by those who did not belong to them and by absolute antagonism. No good could come out of the Pharmaceutical Society was the reply certain members of the trade made. He (the President) knew that was largely due to the want of knowledge of the Society's powers, its aims, and all the conditions under which it was compelled by law to carry on the great pharmaceutical machinery, and lastly, that besides being a body that may be termed a legislative body, or existing for the promotion of legislation, it was also an examining body. As President of the Pharmaceutical Society he said if they wanted powers they could not have them without their own united co-operation, and when he said that he said it as a man who was generally regarded to be a fairly strong man, who had a fair amount of enthusiasm, and those who had known him for twenty-five years, knew also that he had done a very considerable amount of work for the Pharmaceutical Society. He also said, as President at the present moment, that if they wanted increased powers from Parliament it was essential that they should go to the House presenting one united front. He suggested the desirability of all members of the trade becoming attached to the Pharmaceutical Society, because in legislating for the benefit of the Society benefit was being conferred upon the whole trade, and under those circumstances it was necessary that all the support that could be got should be obtained, so that greater weight could be brought to bear when any step was being taken in Parliament for the advancement of their interests. He reviewed some of the work that had been accomplished by the Society, including the passing of the Pharmacy Act of 1868, which was brought about through its instrumentality. He appealed to them to consider this important fact as against the arguments that were often used that the Pharmaceutical Society had done nothing for the trade. When they asked him what good the Society could do for the trade more than it had done already, he replied absolutely nothing, except from the point of view of individual merit—nothing from the legislative point of view, unless it had the support of the whole chemists and druggists of the kingdom. Therefore he asked them to consider and think those matters over in their leisure moments, and he trusted that amongst other things the conference would be productive of a large accession to the roll of membership of the Society.

The Vice-President of the Pharmaceutical Society then made a few observations, being cordially received. He said he would only desire to thank them and the friends in Plymouth for the very kind reception they had given them to-day, and he also would desire as the Chairman of the Benevolent Fund Committee to point to the claims which that Fund had upon the sympathies of everyone belonging to the trade. He did feel that the Benevolent Fund had done a great deal of good, not only to members of the Society, but to persons outside the Society, and it would be a very great pleasure to him personally, if his visit to Plymouth had enabled him to offer a little commendation of the Benevolent Fund of the Pharmaceutical Society not only to members, but also to those who were not members of the Society.

Mr. C. B. Allen, in the course of some remarks, said he was sure there was no man alive who was more in sympathy with the provincial chemist and druggists in their difficulties than himself. But he wished he were able to convince the members of the trade of the necessity of attaching themselves to the Pharmaceutical Society and of the direct good which would be likely to accrue to themselves and the trade generally from their adhesion. He was quite sure from the business-like appearance of the meeting and the large number of subjects to be introduced that much good would result from the conference, and that greater strength would be added to the Society.

Dr. Paul then briefly spoke, expressing his personal gratification at the kind way in which he had been received. He was very glad to see the movement which had been inaugurated there for the purpose of directing more attention to individual activity amongst members of the trade in connection with pharmaceutical affairs. It had been somewhat prematurely predicted that British chemists were incapable of acting together in concert for the promotion and protection of their interests, but he believed the movement inaugurated there would show that that was a false prediction, and that they had reason to expect a considerable amount of benefit would follow from that meeting.

The Chairman then announced the subjects that were before the conference, and invited discussion. Questions were asked as to the representation of London on the Council of the Society, and the President replied that out of twenty-one members the metropolis was represented by six.

Mr. Breeze (Devonport) then introduced the question of electoral districts, remarking that it was not a new one, as it had been brought forward on more than one occasion. Seeing that in many cases the class of business in town and country differed widely, it seemed obvious that the legislation required in town and country would be also different, and he thought the establishment of electoral districts would be a wise course to pursue with a view to meeting this difficulty. He believed it would also be to the benefit of the Council if the members were elected on this principle, and it was obvious that such a scheme would ensure the fuller representation of the country on that body.

The Vice-President said that the present system of electoral representation secured a practical representation of all parts of the country, and the only thing he saw was that the west of England probably was perhaps not represented as they would like to see it, but they had hopes that before a very great length of time the Council might include a representative from the important town of Plymouth. He did not think there was real ground for any grievance on the score that they were not represented fairly, and he did not think himself there was any necessity for the establishment of electoral districts.

The President said the reply to Mr. Breeze's observation was that the members and associates of the Society who resided out of London controlled the elections. They in London were returned by the votes of country members, and he did not think they could have a very much better representation than they had at present. If they thought they had any grievances with which they in London could not be acquainted they had the key in their own hands for remedying the matter.

The next question for discussion was the suggestion to reduce the amount of the subscription.

The Chairman said it seemed to him that if they did not have a guinea's worth out of the Society it was not worth having at all. There was a subject he would like to introduce, and that was the withdrawal of Plymouth as a centre of examination. When this came about they were told that it had been found desirable to decrease the number of centres because of the expense which was incurred. It was his opinion that Plymouth was far better suited as a centre than either Exeter or Truro, and at the time it was thought to be rather hard upon them in withdrawing Plymouth as a centre. It seemed to him self-evident that Plymouth might with justice be made a centre again.

Mr. Rendle concurred, and Mr. Roper thought it was one of the concessions which they might reasonably hope for.

Mr. Allen said he was personally in sympathy with the remarks of the previous speakers, for there was a very great gap between Exeter and Truro. He was inclined to believe that there could not have been any very strong manifestation of feeling from Plymouth at the time the withdrawal took place, otherwise it was probable that they would not have been deprived of this privilege. He could inform them that the Council would be pleased to consider any recommendation from them on the subject. He mentioned that it was often the case young men desired to go away from their own town, more particularly for the Preliminary examination, so that people might not know how they had done.

The Chairman said they were informed at the time that it was a general question and not confined to Plymouth. He wrote to the Secretary of the Society, and he received a reply that the question was one of those which were not open to discussion, and so no further action was taken.

Mr. Kelly thought it was additionally advisable to have the examinations held as near home as possible to avoid cases of personation.

Mr. Davey, speaking with reference to the question of the suggested reduction in the amount of the subscription, said it had long been his private opinion and feeling that in any rearrangements which the Pharmaceutical Society may make, and he hoped it would make some very good ones in the near future, that the subscription would be lowered and two scales made. A guinea to a great many small chemists like himself, who had to meet various other subscriptions, was more than they could screw themselves up to, and he had asked himself the question, What shall I get for this guinea? He looked at the *Pharmaceutical Journal* which was sent him, and no doubt it was a capital thing for scientific chemists to be able to luxuriate in and enjoy the scientific articles which appeared in it from week to week, but it so happened that the Journal did not afford much information to dispensing chemists. The thought had struck him what a capital thing it would be if they formed a local Chemists' Association with a good Council, so that they might be able to put themselves in direct communication with the Council of the Pharmaceutical Society and convey their views in regard to matters of legislation that might be contemplated.

The Chairman thought the *Pharmaceutical Journal* was a necessity to their members and very helpful in their business.

Mr. Parke did not think it would be good policy to reduce the amount of subscription. Personally he was fully satisfied with the return he received for his guinea.

The Chairman observed that the subscriptions were what might be called the munitions of war. They wanted the Society to fight for them, but it could not do this if they did not supply it with powder and shot.

The Chairman then introduced the subject of unqualified assistants being unable to sell poisons. He observed this was a very anxious question, a great deal having been said and written about it, and it was therefore thought that it was one that should come up at that conference.

Mr. Roper thought it was one of the most important subjects of the conference. The late decision in the Wheeldon case turned upon this matter, and an entirely new field was opened up, which meant, if it meant anything, that chemists were to be directly responsible for the sale and dispensing of poisons. How could they, with good grace, appeal either to the public or to the powers that be for support or increased powers whilst they themselves failed to carry out the Act in this particular, by which they obtained protection.

Mr. Rendle contended that the case of the Pharmaceutical Society *versus* Wheeldon would have the effect of intensifying the feeling of distrust towards the Society. He took it it was never intended by the promoters of the Act that what had been decided in this case should really be so. He did not know how the Pharmaceutical Society could prosecute in such a case. He was speaking to gentlemen who knew the requirements of the neighbourhood; and when he said that there were only two qualified assistants in his town, he thought he should be conveying a pretty good idea of its requirements. Of course, gentlemen in the west end of London and in the neighbourhood of London ought to bear somewhat with the provincial chemists in this matter. Their prices were very low, consequently they could not afford to pay high salaries, and if they could not keep qualified men they had to employ apprentices or unqualified men. [A voice: "Stick to it."] Some gentleman said "stick to it." He could tell him that many of them did stick to it, from eight to ten, and even later than that. He did think they should know their future position. They wished to be loyal subjects; they did not wish to break the law; but they wished to know how they stood. At present it appeared, according to a recent judgment, that they were infringing the law every day; in fact, they were doing it then by allowing their apprentices and unqualified assistants to be in charge of their businesses whilst they were present at the conference.

Mr. Barge understood the intention of the Act was that when an unqualified assistant served poison, as in dispensing a medicine, the responsibility rested with the principal.

Mr. A. P. Balkwill said the question arose how could anybody go and pass the Minor examination as an accomplished and skilful dispenser if he had had no practice of dispensing at home. If this was the position that no one could dispense until he had passed the examination he did not see how knowledge could be obtained.

Mr. Netting said supposing they went away on a holiday they had to get some gentleman to mind their business. Were they doing wrong if they were to have an assistant who was not qualified, but who might still be a good man, possibly having only failed to pass his examination by want of proficiency in some very slight subject? He had not joined the Society, although he felt many times that he should like to, and he thought with Mr. Davy, what did they get from the *Pharmaceutical Journal* which they had the honour of receiving? They felt that the amount of trade interest in the Journal was *nil*, whilst for half a guinea they could have their *Chemist and Druggist*. He did not flinch from saying so much. It appeared to him that they were paying a guinea, as it were, to have the title of a member of the Pharmaceutical Society. The Journal and belonging to the Pharmaceutical Society were both very good, no doubt, but they wanted something in return for their fee. The Journal appeared to him to be so thoroughly scientific that if he had to give his fiat on it he should say it should be handed to wholesale houses. If the Society wanted them to join it must show the chemists of Devon and Cornwall that it felt with them in their position.

Mr. G. Breeze asked if the decision recently given by the judges in the matter of qualified and unqualified assistants was final, or whether it could be appealed against, and the President replied that the decision was final and was now law.

Mr. Breeze said if he remembered rightly there was a clause in the Pharmacy Act which stated that poison when sold should be labelled with the name and address of the seller. How could they expect the name and address of the assistant to be attached to the label? It appeared to him that such a requirement might be brought to act very injuriously to them as tradesmen, and in this way; that if the person who sold the article was the only person amenable to the law, it would seem that that opened a very wide door for co-operative and other societies of that kind to carry on a trade so long as they had qualified assistants to carry on the business. There was no hindrance whatever put in their way, and it would result in injury to legitimate traders to a very considerable extent.

The Chairman thought the argument of Mr. Breeze somewhat illogical, in the face of the branch businesses that many of them were working.

Mr. Roper said the same thing had occurred to him, but he presumed the wish of the Council would be that some period of grace would be given before the requirements of the law were enforced. He confessed he could not see what position they who had branch shops could possibly take if what Mr. Breeze had drawn attention to was law. If co-operative stores employed qualified assistants, and chemists carried on branch establishments with unqualified assistants, what position did they occupy to the public? They must make their own position secure before they began to tackle other people.

Reference was then made to a letter received from a Redruth chemist complaining of people truly unqualified, trespassing upon the province of pharmacists, and asking the Society to take steps with a view to prosecution of the parties.

Mr. Hunt explained that he had written to the Pharmaceutical Society on the matter, and he thought it ought to move.

The President said he thought it was only due for him to inform them that the Pharmaceutical Society did not make it a business to go about like police, and to find out cases of illegitimate trading.

Mr. Codd then observed that as a late local secretary he had felt very much the invidiousness of his position in giving information to the Pharmaceutical Society as to illegitimate traders. He discovered a case of such trading in their midst, and he wrote to the Pharmaceutical Society accordingly, thinking that he had thus fully discharged his duty. He was informed that it was necessary for him to furnish all the requisite information to sustain a prosecution. That position he could not possibly hold in this or any other town with anything like self-respect, or with expectancy of receiving the respect of the outside public, who would at once by action of this kind credit him with a feeling which he ought not to be credited with, that might be termed trade jealousy against a man who was endeavouring to get a living in the next street, or next door to himself. This case he referred to had occurred within the last twelve or eighteen months, and, as he before stated, on reporting it he was requested to gather information. Now such things ought not, he contended, be required from any member of the trade, either the local secretary, or anybody connected with it. Such information, if the case had been reported, should be gathered by a responsible officer of the Society, and none better than their local solicitor, or such officer as could be selected to undertake the work. He maintained that it was not within the province of any member of the trade of that town, or any other, to be the prosecutor, practically, of an illegitimate trader.

The Chairman agreed with the remarks of Mr. Codd, and thought that an officer should be appointed by the Society to do the work necessary in cases of bringing illegitimate traders to justice.

Mr. G. Breeze suggested that the matter would be met by the Society sending someone to get additional evidence and carrying out the prosecution independently of any member, after the preliminary evidence had been furnished.

The President remarked this was exactly what was done. All the Society required was substantial evidence of illicit trading, and it then undertook the prosecution.

Mr. G. Breeze, in speaking on the sale of patent medicines, said it was a question which he felt very strongly about. He had been in business for over thirty years, and during that time he had seen what he considered to be the ill effects arising from such sales. Some short time ago, when they had their members of Parliament amongst them, he took the opportunity of laying before them the facts connected with it, and he was struck more especially with the great want of knowledge on their part of the whole matter of patent medicines. Of course they were all aware that the public generally looked upon patent medicines as possessing some peculiar virtues or properties of their own, and that by being registered the Government had practically recognized them as being of some good. They all knew that was quite a mistaken idea. He thought the present deplorable condition of the trade was to a very large extent indeed due to their selling these patent medicines. It was from their laxity and want of union and want of combination that they allowed themselves to be compelled to vend these wares. When he looked around and saw other trades and professions combining to protect their interests, he felt very strongly the want of such combination, which was a valuable factor at the present time in the conduct of business. Looking at it in that way, he thought they, as chemists, had made a very great mistake in allowing themselves to be made the simple convenience for selling proprietary medicines, of which in the majority of cases they knew nothing at all, although they may have a general idea what they were composed of. It appeared to him that this registering of patent medicines, which imposed upon them practically the necessity of including them in their stock, was a weak point in the Pharmacy Act. The Act prohibited the selling of poisonous drugs at the present time by unqualified chemists, but it did not prohibit the manufacture of a proprietary medicine containing a poison, which could be made up by any person who was not a chemist or druggist. Was that not a mistake, and should they not strive to get that Act extended? Another result he thought had followed from chemists having allowed themselves to be made what he called a convenience by makers of proprietary medicines, and that was that by so doing they had lowered their position in the eyes of the public. If they went back thirty or forty years they would see what immense progress had been made in the sale of proprietary and patent medicines. Some chemists were content to say that if they made a stand against selling patent medicines they would lose a great deal of their trade, although it was possible that not much profit resulted to them by the sale of patent medicines. He took it that they ought to occupy a little higher platform than that, and as educated tradesmen they should try to educate the public to understand and to have sufficient confidence in them and to be guided by their advice in those matters. He could not but feel vexed when he saw men bearing the title of pharmaceutical chemists, men who had taken gold medals for proficiency in their profession, filling their windows with this rubbish. He thought they must all agree with him that the public after all had to pay for it, because these patent and proprietary medicines were the dearest of all preparations. He therefore thought it would be a public advantage that this sale should be restricted as much as possible, and they as druggists should endeavour as far as possible to sell their own articles and keep other things in the background. In conclusion, he urged those present to combined efforts, by which means only could they hope to remove the injuries that were being done to the trade, and to remove the unjust tax that the present position of things imposed upon the trade and also upon the public.

After a little desultory discussion, the Chairman announced that the next subject on the list was that of the dispensing of prescriptions being restricted to shops of qualified men, and then it was suggested to draw attention to the dispensing in the army and navy. It was thought, and rightly too, that pharmacy should have the same recognition in the army and navy as the medical profession had. Dispensing of prescriptions in these branches of the service he held to be a subject for their consideration, inasmuch as it appeared to be an anomaly; and if it was incumbent upon them to have a proper qualification before they were allowed to dispense their medicines, it seemed only right that medical men should be compelled to possess an equal qualification. And then the question suggested itself whether medical men in the army and navy should not be called upon to employ qualified men in their dispensaries.

Mr. Starkey complained of the Minor men being liable to jury services.

The last subject introduced was by Mr. A. D. Breeze, bearing upon the present qualifying examination of apprentices. He complained that whilst some of the examiners were typical English gentlemen, others acted in their positions something like autocrats, which operated very injuriously with the student presenting himself for examination. He instanced cases which he thought justified his contention, and remarked that failures often resulted, not altogether from want of knowledge, but from the nervousness which the students were made to feel. Then again, the examinations appeared to be held on an unfair basis. Why not let a part of it be written so that all may be treated alike? He advocated the erasure of a portion of the present theoretical work, and the substitution of more practical subjects. He condemned the imposition of the second fee of two guineas on the second entry of students for examination. In conclusion, he said there had been a great falling off of the number of members, and it was to the young people the Society must look for increased membership. He implored them not to overlook the fact. Treat the young men with consideration, so that instead of being irritated, they should look upon Bloomsbury Square as a home, and with feelings ever ready to assist in its welfare. By so doing they would bring into the fold not only the rising new members, but also those at present wandering on the mountain sides.

The President of the Society then replied at length to the criticisms of subjects that had been introduced, and the suggestions that had been made. After a few preliminary observations, he said he would approach them in the kindliest possible way, and he would say broadly that many of the questions asked showed how important it was that they should confer together, and how important it was that each and all of them should follow the course of events. He hoped they would not think him unkind when he said that a large number of questions that had been put showed that they had not followed the reports of proceedings in any of the trade journals whatever, or if they had, that they had very poor memories, or that they had forgotten a large portion of what they had read. Over and over again judgments and statements had been reported bearing upon all these questions, and if he had a volume of the *Pharmaceutical Journal* there, or even a volume of either of the other journals, he thought he could pick out an answer in print to every question that had been put to him. He did not say this complainingly, but he did say that if they took any interest in the trade they ought to follow what he and others did for their benefit. They must not expect them to do the work and they to remain ignorant. Dealing with the questions *seriatim* he first came to that of electoral districts. He had no hesitation in saying that the present system was the best sort of representation they could possibly have for the whole trade. Every voter at the present moment in the provinces could vote for fourteen members, whereas if they divided the country into electoral districts they would only have the opportunity of voting for one. He said that the mode of election of the Pharmaceutical Society was the most democratic of any association that he knew of in the kingdom, without exception. The Council was even nominated by members. It seemed to him, therefore, that the statement that the Council did not in any way represent the country was not perfectly fair. Let them say good-bye to this notion of separation, they were all pharmacists. With regard to the question of those who had passed the qualifying examination being associated with them, raised by the Launceston letter, he might say that the Council had long adopted the opinion that it was desirable this should be done. The feeling that had animated the Council since he had been President was that it would be in the interests of all concerned that those who had passed the qualifying examination should be associated with each other in the Pharmaceutical Society under one title, so that there should be no grade of distinction whatever. As to the reduction of the fee, he agreed with the Chairman that it would be unadvisable to reduce the amount, seeing that the subscriptions provided the sinews of war. Not one of them, he took it, would join the Society, though they made the subscription considerably less or not, unless they came to the conclusion that they were going to do a benefit to themselves and to the whole of the trade by becoming members. He said their future welfare depended upon joining it. Was it worth their while to spend a few pence a week for the purpose of getting an assurance fund? He was glad to tell them that in the new bye-laws they had in the pigeon holes at Bloomsbury Square with reference to the curriculum it was contemplated to have a new composition fee. He certainly did not assent to the proposition that they would get more members by reducing the subscription. With regard to Plymouth being made a centre for Preliminary examination he had no personal knowledge how long since Plymouth ceased to be a centre, but he did know that like many other places it so ceased not from any real complaint, so far as he was aware, but because it was considered the number of centres was too great, and some towns were withdrawn, in doing which regard was paid to railway communication in the districts. He did not believe there was anything more in it than this. With regard to the case of unqualified sellers and the judgment in respect to it, he would first ask them to carefully read that judgment for themselves and to read it by the light of common sense. It was a final judgment and to all intents and purposes it was the law of the land. In the absence of a registered person every sale of poison was unlawful. The true intent and meaning of the Act was that the sale of dangerous things such as poisons should be under qualified supervision, and there was no getting out of that difficulty. It must be faced and he hoped it would be faced with resolution. If any accident arose through a breach of this Act, the principal would be liable to criminal proceedings. After all, when they reflected that they had a value in their qualification could they be surprised that judges should say, "Well, if there is any value in your qualification surely you should protect it and see that the public is well protected from being victimized by any accident that may arise through the sale of poisons. "What did it all come to? It meant that as practical men they could not delegate their qualifications to other persons, and did they not think that it was an advantage that they could not do so. This judgment he looked upon as of the greatest value to the trade—the greatest boon that had been conferred upon them since the passing of the 1868 Act, and he was sorry to find so few had read the literature on the subject. He repeated that it was good for them, and counselled them to face it like men, and they would find that what followed would be that everybody wanted a qualified assistant. With regard to the subject of the Society undertaking the prosecution in cases of illegitimate trading, he would inform them that though corporate bodies like their own could undertake such prosecutions, in doing so they had to be very careful not to send informers around. He promised them that as far as the Council of the Pharmaceutical Society of to-day and twelve months hence was concerned, it would institute proceedings in cases of notorious breaches of law. With regard to what Mr. Netting said as to the responsibility incurred by a chemist leaving his premises, say on a holiday, he would reply that the chemist must take the consequences in case he left his shop in charge of an unqualified assistant. He urged upon them to do their best to assist the Society in bringing bogus companies to justice. It was not likely to do that in a factious or captious spirit, but in order to get the necessary information it was necessary to have the assistance of local people. The Pharmaceutical Society, when it undertook a prosecution, should never fail in any case, and therefore it was incumbent that substantial evidence should be procured. The Council proposed in the Bill which it intended bringing before Parliament that dispensing should be confined to qualified persons, and he emphasized the point that if it were to wrest from a free trade Parliament further privileges it must have their loyal and enthusiastic support. The sales of poisonous patent medicines was a question of considerable importance, and he thought very probably before many months hence a case would be brought in the law courts, the issue of which would no doubt be one of importance to them. He spoke briefly on the questions of exemption from jury service, the dispensing of medicines in the army and navy, concurring with the remarks of the Chairman on the subject; and the qualifying examination of students.

Mr. Codd proposed, Mr. Starkey seconded, and it was carried unanimously—"That this meeting is of opinion that the Pharmaceutical Society deserves the support of the entire trade in its efforts to promote further legislation in the interest of all chemists and druggists of the kingdom."

This concluded the business of the conference. The company subsequently repaired to the Grand Hotel, where the President and other members of the Council, were entertained at dinner. The toast list was interspersed with selections of music by instrumentalists under the conductorship of Mr. Lidiard. The toasts included "The Society," proposed by Mr. A. P. Balkwill, and responded to by the President and Vice-President of the Society. "Our Guests," proposed by the Vice-Chairman (Mr. Sloggett), and responded to by Mr. Allen and Dr. Paul. "Our Visitors," and "The Conference Committee." Conviviality was the order of the evening, and hence the speeches were brief.

W. Moore.—(1) *Œnanthe crocata.* (2) *Apium nodiflorum.* (3) *Chærophyllum temulum.* (4) *Rhinanthus Crista-Galli.*

E. F. Young.—(1) *Parnassia palustris.* (2) *Erythræa Centaurium.* (3) *Œnothera biennis.*

C. B.—We believe it is not.

W. J. T.—The mixture should have a dark olive colour.

Review.

AGENDA DU CHIMISTE. 1890. Par G. SALET, C. GIRARD et A. PABST.*

This is a French equivalent of our 'Chemists' Pocket Books' and 'Laboratory Companions,' differing from them mainly in being re-edited and published annually. It had its origin in the manuscript collection of tables and data used by the pupils of Wurtz, with which were incorporated more technical matters from a work which Messrs. Girard and Pabst were compiling. This was in 1877, and with annual revisions since that time the book has become very complete and perfect. It is divided into three sections, a physical and mathematical, a purely chemical, and a technical. The first of these contains many data of a more purely scientific character than are to be found in English works of a similar kind; among many others it comprises very complete tables for barometric corrections for temperature, capillarity, expansion of brass scale, glass, etc., vapour tensions of various liquids and condensed gases, very complete thermochemical tables and tables of specific rotation of polarized light, solubilities of gases in water and alcohol at various temperatures, and the usual tables of densities, conversion of weights and measures, and thermometric degrees.

The second section, besides a good digest of the chief reactions of chemical substances, and a large number of tables of melting and boiling points, solubilities, etc., has a very complete table of the spectra of the various metals, the position of each line in the spectrum being indicated by the number of its wavelength expressed in millionths of a millimetre, and its comparative brilliancy by affixing marks thus:—Lithium, 670·5!!!!! The third section has a very complete collection of commercial analytical processes embracing most of the operations frequently required by the ordinary analyst, articles of food, waters, soils, manures, etc. In the supplement for the present year are some useful papers, including a notice of Chevreul, by Schutzenberger, an abstract by Salet of Hertz's recent discoveries respecting electro-magnetic radiation, a description by Bordas of the bacteriological analysis of waters, and a review of the progress of artificial colour manufacture during the past twelve years by Trantmann. Taken altogether, this is one of the best books of this description to be met with.

Obituary.

Notice has been received of the death of the following:—

On the 21st of July, Mr. Richard Robinson, Chemist and Druggist, Vicar Lane, Leeds. Aged 69 years.

On the 24th of July, Mr. Robert Wilkinson, Chemist and Druggist, Beckenham Road, Penge. Aged 50 years. Mr. Wilkinson was an Associate in Business of the Pharmaceutical Society.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

EARLY CLOSING IN LIVERPOOL.

Sir,—Mr. Bain, in his reply to my letter of July 12, begins by hurling at me that bugbear "silence which means contempt." These are about the first words that greet my eyes. Now, this is not the way to answer or persuade an opponent. Mr. Bain ought to know that such epithets are not arguments. He may keep "silence" if he likes, and I do not care for his "contempt."

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* Paris: Hachette and Co. Small 16mo. Pp. i-xviii., 1-552.

I am told that I have misapplied his allusion to "the lean and starved apothecary" of Romeo and Juliet. Mr. Bain divided the dissentient chemists into two classes—"black sheep" and "highly respectable business men." Here is a great distinction between the two, and at the same time a very puzzling one, for I cannot tell which is which! I took your correspondent to task for thus arbitrarily dividing his brother chemists, for I do not think he has an iota of right or authority by which to warrant such an invidious classification. Then he concluded his letter by stating "the public will respect us for gradually throwing off," etc., "and showing that we have a spirit above that of the sordid, though still lean and starving apothecary." Why is the Shaksperean apothecary introduced at all? What is intended to be conveyed to the mind of the reader by the allusion? Is it not an inuendo—an implication? I am of opinion that I used the correct word when I said that "by implication," Romeo's cadaverous apothecary was intended to typify the druggist—black sheep or white sheep—who would not agree to close at 9 o'clock.

Mr. Bain says he is amongst the number who consider the time "ripe" for early closing. There I am at direct issue with him. I do not think the present time propitious to the movement, and I backed my assertion by giving three or four cogent reasons, not one of which my opponent notices. I am also told that I made a gross mistake in giving the majority to the dissentients. All I can say is my information came from his side. I was informed that about one hundred and thirty favourable replies were received by the Committee, and that many of our brethren did not reply at all. It is to be hoped the Committee did not class these non-replyers as assenters—I am told they did in some cases—as this would be obviously unfair. Many of those who sent no reply acted thus because they were dissentients. They had no sympathy with the movement, but did not care to commit themselves one way or the other at its inception. I do not deny that the early closers may have had further adhesions since the date of my last letter; but, if so, these may be written off by the secessions which have occurred and are occurring since that period. Now, according to Gore's 'Directory,' for 1890, the number of chemists in Liverpool and suburbs appears to be 284. If I deduct 130 from these, a majority of 54 is given to the dissentients. This is how I arrived at my figures. Mr. Bain, as secretary, has a greater facility to get at the statistics than I, who obtained my information second-hand, as it were, from one of his own party—"the short-timers," as I call them. But after all, a squabble as to which side has the majority is naught but a storm in a tea-cup—"full of sound and fury, signifying nothing." It will not affect the movement, nor bring it to a successful issue; a practical unanimity is a *sine quâ non*, and that is not obtained, and never will be.

Your correspondent is discreetly silent anent my assertion that some of the Committeemen have always hitherto closed their establishments at 9 or even before, and are thus sacrificing nothing. He says nothing about the disconsolate assistants of such members, who must be kept in to answer the bell and attend to every sixpenny customer. He says nothing about the advertisement—ominous of dissolution—inserted in the newspapers by the proprietor of nearly twenty pharmacies, to the effect that the establishments would for the future remain open on Fridays as well as Saturdays until the usual hour. He says nothing even about "the thin end of the wedge" which he flourished so bravely in our faces in his first letter. No, it seems he can "ignore" other things besides "black sheep." I perceive that the veritable thin end in question is now being applied in another fashion, and one which appears to have escaped your correspondent's notice. Some of these so-called adherents to early closing are now keeping open their pharmacies half an hour or so longer than the fixed time, not only on Fridays and Saturdays, but on every evening during the week. They are gradually stealing more and more of the forbidden time, until at last they will reach ten or half past—the usual hour. Now, I would prefer to be a "dissentient chemist" to one of these. It looks marvellously like dishonesty. Are they ashamed or afraid to come over to us? Rather than continue such practices, I would say, come at once! It is only the old experience over and over again. This is just the way in which the early closing movements of thirty or forty years ago—and with which I have been connected—have fallen ignominiously to the ground. In reality, this short time movement ought not to be viewed in a physical and moral aspect alone; there is another which perhaps dominates these two, and which seems always to be kept studiously in the background by the advocates of the new departure. I mean the pecuniary aspect. You may tread on a man's toes, and he may only hop about a little on one leg; but touch his pockets, and see what a storm there will be. Money and time will settle this question; there will be a great expenditure of both before a solution can be attained. Will it pay? will be asked by all, and when it is discovered that it will not, then down it comes with a run. "Dissentient arguments are far fetched," says Mr. Bain. That is his farewell. I fail to see anything new in the arguments advanced by the early closers, or anything very *à propos* in them. They always harp on the same string. I flatter myself I may have brought out a new point or so on our side the question, but such stereotyped formulæ as "physical and mental recreation," "moral advancement," "barbers and provision men closing early, why not we?" etc., hurled at us from the other side, strike me as inadequate and below the standard.

I am aware I am trespassing on your valuable space, therefore will notice your other correspondent's letter very briefly. Mr. Shields does not write with the frothy virulence of Mr. Bain, and deserves a better place—could I give it to him—than the tag-end of my letter. Whereas the latter considers the present time "ripe" for the short time movement, the former asks if the "troublous times" I foretold for the chemist of the future "are not already here." He means to say they are; that therefore gives additional strength to my argument that "ripeness" is not yet attained.

I cannot resist noticing one more point in Mr. Shields' letter, and that is a somewhat remarkable one. He says he sometimes closes all day on the Thursday. "Open confession is good for the soul," and Mr. Shields is a candid man at all events. I wonder what would be thought in Liverpool if the passers-by saw a chemist's shop closed for a whole day. I am afraid the verdict would be that the man had removed, or was dead, or—poor fellow—that he had an execution in the house and the bailiffs were in possession! Mr. Shields—good easy man—has perhaps made a comfortable competence by vending drugs and chemicals, and can afford to do these things; many of us, alas, have still ours to make, and we cannot snap the chain that fastens us to the counter. "Landscape photography" is your correspondent's hobby—and he rides it. I do not find fault with him; I only give him this advice—take care he is not thrown. I have been amused by fancying some pedestrian or other posted in front of Mr. Shields' shop on a Thursday morning at 10 o'clock, and reading a supposititious placard—indeed there might be such a placard for aught I know—stuck on the shutters, somewhat to the following effect: "Important notice. Closed all day, and perhaps to-morrow. Proprietor gone ten miles into the country to photograph a turnip field. Customers will be served by the next druggist round the corner." Pedestrian in question, who has a doctor's prescription in his pocket, turns away, on deadly thoughts intent, and obediently goes to the "druggist round the corner."

This will be my last letter, I hope, on the Liverpool early closing movement. Readers have had the opportunity of becoming acquainted with some of our views. We do not intend to be put down altogether without being allowed a word in defence, and there are amongst us men as well qualified to discuss the question from our point of view as any of our opponents. I have no authority from my dissentient brethren to thus vindicate our position. I have spoken for myself, and in my own defence, and am only sorry that so far a more capable and vigorous pen is not forthcoming to thrash the matter thoroughly out in the pages of the Journal.

ONE OF THE DISSENTIENTS.

Liverpool.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Cripps, W. M. Holmes, Kirkby, Young.

THE NEW GERMAN PHARMACOPŒIA.

ARZNEIBUCH FÜR DAS DEUTSCHE REICH. Dritte Ausgabe. (Pharmacopœa Germanica, editio III.)

Much interest has been excited of late in pharmaceutical circles by the expected publication of the third edition of the German Pharmacopœia. The work, which is now before us, is a well printed and fairly well bound volume of 432 pages of matter, preceded by 12 pages of preface; it is destined to come into force on January 1, 1891.

The title alone indicates of itself the most striking departure that has been made from the second edition, that is, in the language in which the Pharmacopœia has been published: for the first time Germany has a German Pharmacopœia. The change, which has not been effected without due consideration and discussion, will doubtless be hailed with satisfaction by German pharmacists, allowing, as it naturally must do, of an accuracy in modern technical expressions quite unattainable by the use of a dead language, and this must be admitted to be a consideration of paramount importance. The regret that many will experience to whom the German language and especially the Gothic characters are unfamiliar may be tempered by the expectation of the speedy issue of sundry translations.

The Preface is divided into two parts, dealing first with the constitution of the Pharmacopœia Commission and the methods by which the work was accomplished, and secondly, with the general rules laid down for the guidance of members, together with definitions referring to the work itself.

In view of the approaching publication of an Addendum to the British Pharmacopœia and decennial revision of that of the United States, there will be found in the first part much of interest to pharmacists. From this it appears that a decree of the Federal Council in 1887 directed the formation of a standing Pharmacopœia Commission to collect, sift and test all material relating to the revision of the Pharmacopœia and report upon the same to the Chancellor at intervals of two years or thereabout. This Commission was to consist of such members of the Board of Health as occupy positions in the superior medical councils of the various States, together with others, not exceeding twelve in number, to be appointed by the Chancellor. In accordance with this decree twelve representatives of clinical and practical medicine, pharmacology, pharmacognosy and applied chemistry and pharmacy were appointed by the Chancellor, and these, together with eight members of the Board of Health, constitute the Pharmacopœia Commission and remain in office till the close of the year 1891.

As far as can be learnt the twelve representatives appointed by the Chancellor included two pharmacologists, two professors of applied chemistry and pharmacy, two representatives of clinical medicine, one pharmacognost, three pharmacists, and one professor of chemistry (in addition to the chairman, the Director of the Board of Health). It will be remembered that the previous Pharmacopœia Commission consisted of twelve physicians, six pharmacologists, six chemists and six pharmacists, aided by two military doctors and a military pharmacist of superior rank, in all thirty-three members. The constitution of the present Commission appears to rest largely with the Chancellor, he having the right to appoint in the present instance twelve out of twenty members, and differs essentially from that of the corresponding body in Great Britain (the General Medical Council representing medical interest only) or in the United States (where the Convention consists mainly of delegates from the various incorporated medical and pharmaceutical societies and colleges and army and navy services).

The first work of the Commission thus formed was to issue a general invitation for assistance and suggestions and to arrange the material thus collected. By the end of June, 1888, such progress had been made that a Committee was formed of the chemists, pharmacists and pharmacognosts of the Commission, and to this Committee was entrusted the task of discussing all proposals that had reference to the alteration of substances or preparations already in the Pharmacopœia, whilst the remaining (medical) members of the Commission undertook the consideration of the substances proposed for introduction, amounting in number to no less than 1240. The following June (1889) saw the work tolerably complete, and in October, 1889, reports were delivered to the Commission and the proposals to be made to the Federal Council were definitely formulated. It became then apparent that the alterations recommended by the Committee were too numerous and involved changes too radical to be met by the publication of an addendum, and the issue of a new Pharmacopœia became a necessity.

The second part of the preface contains an enumeration of the general rules laid down for the guidance of members of committee in their work and defines certain expressions used in the Pharmacopœia. Thus "parts" means "parts by weight," unless otherwise specified; solubility 1 in 10 means 1 part soluble in 9; water is distilled; temperatures are expressed in degrees centigrade, and when not otherwise indicated are to be applied at 15° C. in test tubes of definite size (20 mm. wide) with 10 c.c. of the fluid to be tested. The sizes of the sieves regulating comminuted and powdered drugs are defined, and from coarsely comminuted drugs up to those passing through a sieve having 10 meshes to a linear centimeter, the finer particles are to be separated. In the making of galenical preparations the directions given under the general headings are to be followed. Maceration is to take place at 15°-20°; digestion at 35°-40°. Chemical formulæ, tables of atomic weights and solubilities have been considered unnecessary, and processes are appended to those preparations only which are usually made in the pharmacy or for the production of which in the form required by the Pharmacopœia only one process is applicable.

Passing to the consideration of the Pharmacopœia proper, the most striking alteration that has been made is, as previously observed, in the language. With the exception of the headings, which remain Latin, the German language and Gothic characters have been substituted throughout for the Latin of the second edition. In each case the Latin name is followed by the German and these are supplemented in Appendix VI. by a list of synonyms with the Latin equivalents. The nomenclature remains practically the same: chlorate of potassium is still kalium chloricum; iodide of potassium, kalium iodatum. Of the few changes that have been effected it may be noted that pyrogallic acid is termed pyrogallol and that sirupus has been preferred to syrupus.

The total number of substances and preparations has been slightly decreased (576 as against 583), the additions numbering 50, the omissions 58.

The additions are as follows:—

Acetanilidum
Acidum nitricum crudum
Acid trichloraceticum
Adeps benzoatus
Æther bromatus
Agaricinum
Albumen ovi siccum
Amylenum hydratum
Antipyrinum
Balsamum tolutanum
Capsulæ
Chininum tannicum
Chloralum formamidatum
Cocainum hydrochloricum
Codeinum phosphoricum
Cortex quillajæ
Cuprum aluminatum
Emplastrum cantharidum pro usu veterinario
Extractum condurango fluidum
Extractum frangulæ fluidum
Extractum hydrastis fluidum
Extractum secalis cornuti fluidum.
Ferrum citricum oxydatum
Guttapercha
Homatropinum hydrobromicum
Hyoscinum hydrobromicum
Keratinum
Liquor ferri albuminati
Liquor ferri iodati
Mentholum
Naphthalinum
Naphtholum
Natrium thiosulfuricum
Paraldehydum
Phenacetinum
Physostigminum sulfuricum
Resorcinum
Rhizoma hydrastis
Rotulæ sacchari
Salolum
Sebum salicylatum
Semen arecæ
Semen strophanthi
Specie diureticæ
Sulfonalum
Terpinum hydratum
Thallinum sulfuricum
Tinctura strophanthi
Unguent acid borici
Vinum condurango

In this list but few will be found that have not also been more or less extensively used in this country. Remarkable, perhaps, as indicating the tendency of the times, is the small proportion of galenical preparations and the comparatively large proportion of chemical substances of definite composition. Of the former, ext. secalis cornuti fluid. appears to be one of the most notable, whilst among the latter we may draw attention to acetanilide, antipyrin, homatropine hydrobromate, salol, sulphonal, thalline sulphate and phenacetin. It will be observed that the authorities have not hesitated to introduce substances that are patented, under their trivial but well known names. A little surprise will, however, probably be experienced at finding lanolin and saccharin missing. The introduction of liquid extracts, and with them the process of percolation, is a startling novelty for a work which is so distinctly conservative. It may be observed that they are made weight for weight in accordance with the generally accepted strength, and under the general heading "extracta fluida" directions are given for their preparation that bear the strongest resemblance to those published in the National Formulary. Though but four fluid extracts have been introduced, the directions for their preparation must be characterized as insufficient, whilst the menstrua appear ill-chosen. Surely German pharmacy has much to learn in percolation. Capsules, both gelatine and amylaceous, have been introduced.

In no case has the standardization either of a crude drug or any preparation been attempted. Minimum strengths remain for cinchona, opium and pepsin; but 10 per cent. as the minimum of morphine in powdered opium is a low standard, and does not justify the statement that preparations containing 10 per cent. of opium contain approximately 1 per cent. of morphine. Spirit of nitre, extract and tincture of nux vomica are at liberty to vary as much as they please. Indeed, so far as it is possible to judge, progress is more evident in the chemical than in the galenical, and if the expression is allowed, more essentially pharmaceutical part of the work.

Among the list of the 58 omissions may be noted aqua and syrup aurant. flor., codeinum, cannabis indica, hydrarg. iodatum, morphinum sulfuricum, natrium benzoicum, rhizoma graminis, summitates sabinæ and zincum sulfocarbolicum.

Ten "general articles" have been introduced under the following headings, Electuaria, Emplastra, Extracta fluida, Granula, Pastilli, Pilulæ, Styli caustici, Suppositoria, Tabulæ.

Under these headings general directions are given for the preparation of unofficial as well as official compounds, thus for instance no specific "granula" are official and but one "electuarium." The description of a plaster would include most preparations and to the dispenser the direction is given that if the weight of plaster to be used is not ordered the thickness of the plaster-layer should not exceed one mm. In making granula the medicament is to be added to the mass before the granules are formed, not to ready-made granules, except in certain cases; pastilli are generally discs and should weigh one gram unless otherwise ordered; as excipient for pills a mixture of powdered liquorice root with the so-called Spanish liquorice with or without the addition of diluted glycerine is to serve. Pills containing substances liable to decomposition in contact with organic matter are to be made up with white clay, whilst to solidify balsams, creosote, etc., melting with one to two parts of yellow wax is ordered. To what extent these directions would satisfy English pharmacists and dispensers we leave our readers to judge. Styli caustici should be dispensed 4-5 centimeters long and 4–5 mm. thick; suppositories should be made to weigh from 2 to 3 grams; pessaries twice that weight, and for the preparation of tablets ("tabulæ") the materials, generally warm, with binding or flavouring additions, are mixed and brought into a flat form.

Tinctures are still prepared by maceration.

There remains but to notice the appendices, seven in number. No. I., the List of Reagents, has been largely altered. It contains volumetric in addition to the ordinary test solutions, and the tendency throughout has been to simplify the tests as much as possible, giving for quantitative purposes the preference to volumetric processes.

No. II. contains a list of Maximum Doses for an adult; No. III., Poisons; No. IV., "Separanda;" No. V., Specific Gravities at temperatures varying from 12° to 25°, to facilitate the work of the reviser; No. VI., a list of official and unofficial German names with their Latin equivalents; No. VII., a list of the official German names with their Latin equivalents.

Notable last of all is the absence of an index. It may be supposed that the alphabetical arrangement according to the Latin names and the list of synonyms renders an index unnecessary.

In a succeeding notice reference will be made to some of the new items in the Pharmacopœia more in detail.

HONEY.*

BY DR. OSCAR HAENLE.

Director of the Chemical Laboratory of the Elsass-Lothringen Beekeepers' Union.

During the last five years the chemistry of honey has been under a cloud. In the text-books it is stated that genuine honey twists a beam of polarized light to the left, and that any honey that twists it to the right has been adulterated and should be condemned. But through a series of fortunate circumstances it happened to me during my student travels to discover natural honey that rotated polarized light to the right. Many experiments and control experiments were made, and all chemists who have occupied themselves with the subject have come with myself to the conclusion that no honey should henceforth be condemned simply upon the ground that it is dextrogyre. This dextrogyre property of some honey has, however, by no means been received with pleasure, since any chemist will at once recognize the considerable difficulty that will henceforth be placed in the way of his recognizing genuine honey, because the ordinary adulterant, starch syrup, is also dextrogyre.

As is known, I have divided all honeys into two classes, "flower honeys," which all rotate polarized light to the left, and "conifer honeys," which all rotate it to the right. But I have also attempted, from a large series of about a hundred and fifty experiments, to establish the normal figures for this right-handed rotation, and I have even constructed a formula for the approximate determination of the amount of added starch syrup. But the conclusion has much of a theoretic character, and all theory requires to be kept in the background if it cannot be carried into practice with certainty and satisfactory result. Search was therefore made for methods based on other grounds, and more certain results were obtained by adopting a process of dialysis before polarization.

Honey consists of grape sugar and fruit sugar, the former constituting the crystallizable portion of the honey and the latter the uncrystallizable or liquid portion. As is known, grape sugar is also made industrially from starch, by boiling it with dilute sulphuric acid, separating the acid by precipitation with chalk, filtering the liquid through animal charcoal and concentrating it to the consistence of a stiff syrup. This is brought into the market as starch syrup, and it is the product to which Swiss honey owes its fine colour and handsome appearance.

This manufactured grape sugar, however, is not quite identical with natural grape sugar. It contains constituents that are not present in natural grape sugar, which occur in the syrup through the incomplete conversion of the starch. Towards these the chemist has directed his attention, but methods of detection based upon polarization, fermentation, or the dextrin reaction, have failed to give satisfactory results. Nevertheless, after experiments extending through five years, I have attained results that enable me to assert in good faith that genuine honey can be distinguished with certainty from adulterated honey, by submitting it to dialysis before polarization.

Dialysis Experiments with Flower Honey.

1. A pure Elsass honey was dissolved in the proportion of 1 : 2, and the rotatory power of this solution was −28°. After being dialysed for sixteen hours the residue upon the dialyser showed a rotatory power = 0.

2. 30 grams of a pure Elsass honey was dissolved in 150 c.c. of water, decolorized and dialysed. After eighteen hours a rotatory power could no longer be detected. Polarization = 0. The liquid upon the dialyser was evaporated to 30 c.c., but did not then possess rotatory power. Evaporated to dryness and placed for two hours in an exsiccator over sulphuric acid, there remained a small yellow residue, which redissolved in water was optically inactive.

3. 30 grams of a pure Elsass honey was dissolved in 250 c.c. of water and decolorized. Polarization = −11°. After sixteen hours dialysis the solution was no longer optically active. The evaporated residue upon the dialyser, after dialysis, was without action upon polarized light.

4. 50 grams of an Elsass honey, of which the polarization (1 : 2) = 26°, was dissolved in 250 c.c. of water, decolorized and dialysed. In five and a half hours rotation was no longer perceptible. The honey was submitted to dialysis for one hour longer, and then evaporated. The polarization again = 0.

5. 30 grams of a natural honey was dissolved in 150 c.c. of water, decolorized and polarized. Polarization = −10°. It was then dialysed and—

After two hours the polarization . . = −5°
" three " " . . = −4°
" four " " . . = −2°
" five " " . . = −0°

As a precaution it was dialysed for three hours more and the residue evaporated to 20 c.c. The polarization again = 0.

6. 50 grams of a forest and meadow honey from Elsass was dissolved in 250 c.c. of water, decolorized with animal charcoal and polarized. Polarization = −5°. After dialysing for six hours the polarization = 0. Evaporated to 20 c.c., the solution still remained optically inactive. After fermentation with yeast the polarization still = 0°.

Dialysis Experiments with Conifer Honey.

7. A pure fir tree honey, from Kuntz, in Hohwald, diluted 1 : 2, had a rotatory power = +33°. A 10 per cent. solution of this honey rotated +9°. The solution having been decolorized with animal charcoal, was submitted to dialysis for sixteen hours, after which the polarization = 0.

8. Another fir tree honey rotated in 10 per cent. solution = +4°. After being dialysed for sixteen hours it had no perceptible action on polarized light.

9. 50 grams of a fir tree honey, 1884 collection, dissolved in 250 c.c. of water and decolorized, rotated = +18° C. After being dialysed for sixteen hours, the action on polarized light was no longer perceptible. The residue, evaporated to 30 c.c., was also optically inactive.

Dialysis Experiment with Starch Syrup.

10. A 10 per cent. solution of starch syrup, which had a dextro-rotatory power = +100°, decolorized and submitted to dialysis for sixteen hours, still retained a rotatory power = +5°. The liquid remaining upon the dialyser was evaporated, and the dextro-rotatory power was found to be in proportion to the degree of concentration.

Dialysis Experiments with Mixtures of Honey and Starch Syrup.

11. 40 grams of a pure honey (solution 1 : 2 = −35°) was mixed with 10 grams of starch syrup. A 10 per cent. solution of this mixture after dialysis showed a dextro-rotatory power = +4°.

12. 30 grams of a pure honey was well mixed with 20 grams of starch syrup, dissolved in 250 c.c. of water, and decolorized with animal charcoal. The polarization = +65°. After being dialysed for forty hours the rotatory power became constant at +14°. The residue upon the dialyser was then evaporated to 50 c.c., the rotatory power of which was +60°. It was evaporated to dryness, and the residue kept in an

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* Lecture delivered at the sixteenth Congress of Beekeepers, held in Strassburg, July 9. From the *Pharmaceutische Zeitung.*

exsiccator over sulphuric acid, when there remained a strongly yellow-coloured residue, which after being dissolved in water and treated with yeast still rotated light = +48°.

13. 50 grams of a sophisticated honey was dissolved in 250 c.c. of water, when the polarization = +95°. After being dialysed for two hours the liquid upon the dialyser was tested at intervals.

After two hours the polarization amounted to +45°
„ four „ „ „ + 33°
„ six „ „ „ + 18°
„ eight „ „ „ + 15°
„ nine „ „ „ + 12°
„ ten „ „ „ + 11°
„ eleven „ „ + 10°
„ twelve „ „ + 10°

After eleven hours the rotation remained constant.

14. 50 grams of 10 per cent. sophisticated honey was dissolved in 250 c.c. of water and decolorized, when the polarization = +12°. After twelve hours the polarization remained constant at +6°.

15. 50 grams of a sophisticated honey, similarly treated, had a polarization = +75°. After three hours dialysis it remained constant at + 8°.

16. A sophisticated honey was submitted to similar treatment, and after twelve hours' dialysis showed a constant rotation = + 9°.

Swiss Honey.

17. The polarization of a "Swiss honey" from Basle = +240°. 50 grams of this "table honey" dissolved in 250 c.c. of water showed, after twenty-four hours' dialysis, a constant rotation = +20°.

Hungarian Honey.

18. A Hungarian honey of a brand that has been awarded various prizes and a silver medal, was recognized as an adulterated article. This honey was white and had a polarization = + 75. As its appearance showed it to be a flower honey this strong dextrorotation indicated a 30 per cent. adulteration. After sixteen hours' dialysis the rotation remained constant at + 4°, which after concentration was raised to + 20°.

It is therefore considered to be demonstrated by the foregoing experiments:—(1) That a honey which after having been dialysed rotates polarized light to the right is adulterated with starch syrup; (2) That a honey which after having been dialysed does not rotate polarized light to the right is not adulterated with starch syrup.

SULPHONAL, PARALDEHYD AND CHLORALAMIDE.

The Therapeutic Committee of the British Medical Association has drawn up a report as to the comparative utility of different hypnotics. The points especially dealt with are (*a*) the dose of the drug given; (*b*) whether sleep is produced with certainty, how soon it comes on, and how long it continues; (*c*) the production of dangerous or other disagreeable effects; and (*d*) whether the drug loses its effect. The following is a summary of results, obtained with sulphonal, paraldehyd and chloralamide:—

Sulphonal.—1. *Dose.*—In thirty-two of the cases recorded, 20 grains was given in eleven instances, once at night. Sleep came on in half an hour to three hours, in one case in five hours, and in another in nine hours. A second dose on the succeeding night in one case produced sleep in five minutes. Sleep lasted in four cases all night; in four cases six hours; and in three cases one to two hours. With 25 grains (four cases) sleep came on in two hours and lasted six hours or all night. With 10 and 15 grains there was less sleep produced, and in a case of pneumonia (15 grains) there was no sleep after the drug. The few cases (seven in all) in which 30, 40 and 60 grains were given, showed that these doses did not possess greater hypnotic effect than a dose of 20 grains. In a case of chronic gout 30 grains had no effect.

Disagreeable After-Effects.—In six out of ten cases in which 20 grains had been given disagreeable after-effects were noted. Drowsiness next day was noted six times; giddiness four times; and headache and inco-ordination of gait each twice. In four cases where 10 grains had been given drowsiness was noted once; in five cases with 15 grains drowsiness was noted twice and giddiness twice; with 25 grains (four cases) drowsiness was noted twice, giddiness once, and headache once. In seven cases, with 30 to 60 grains, drowsiness was noted four times, giddiness twice, headache twice, inco-ordination of gait and vomiting each once.

Whether the Drug Loses its Effect?—Several of the cases showed that a second dose on the succeeding night has a greater effect than on the first night. Thus, in one case, 20 grains produced on the first night two hours' sleep with no bad after effects; on the second, a similar dose produced eight hours' sleep with drowsiness, giddiness, and inco-ordination of gait on the following day. In some cases prolonged use of the drug appears to diminish its effect. Thus, in one case (asthma and bronchitis) 20 grains was given every other night for eight weeks. During the first fortnight sleep came on in an hour and lasted twelve hours each night. The drug was then omitted for a week, when the insomnia returned. In the succeeding five weeks the drug, after three hours, produced six hours' sleep. In a case of phthisis 20 grains was given every other night for twenty-six days, except for five days, when the dose was reduced to 10 grains, but afterwards was increased. During the time the patient was taking 20 grains, after an hour, he slept for four to six hours. The drug was omitted for a fortnight, and, on recommencing it, it produced only drowsiness, and no sleep. In a case of neurasthenia and insomnia, quoted by Mr. Priestley, sulphonal, 10 to 20 grains, did not lose its effect during six months.

Paraldehyd.—Single doses of 40 to 60 minims (fourteen cases) produced sleep in five to fifteen minutes; in two cases in half an hour; in one case in an hour. In most cases the sleep was wakeful and restless, and lasted very varying times, in one case only three-quarters of an hour, in another case there was restless dozing for three hours, in another sleep for two hours; in ten cases sleep lasted from three to six hours, and in one case sleep for twelve hours. These results refer to single doses. Half a drachm every three hours produced within half an hour two hours' sleep; 20 minims every four hours for fourteen days produced better sleep at night, but not during the day.

Disagreeable After-Effects.—Giddiness and drowsiness were noted each once, vomiting three times, and retching and nausea each once.

Tolerance of the Drug.—In a case of mitral stenosis on two nights 40 minims gave two to five hours sleep; on the third night a similar dose had no effect; on the fourth night 1 drachm was satisfactory, but on the sixth night it produced no effect. When the paraldehyde failed it seemed to produce slight excitement. Morphine succeeded well afterwards.

Chloralamide.—In one case 20 grains, and in six cases 30 grains, were given in single doses. After the 20 grains sleep came on in twenty minutes and lasted three hours, with half an hour's interval of waking; after 30 grains, sleep came on in fifteen minutes to half an hour (four cases), one to two hours (two cases). Sleep lasted all night in three cases, in two cases four to five hours, and in one case there was two hours' dozing, then an interval of wakefulness, and then two hours' sleep.

Disagreeable After-Effects.—None observed.

Tolerance of the Drug.—Thirteen consecutive observations were made in a case of pernicious anæmia, with several weeks' insomnia. Thirty grains of chloralamide failed once on the ninth night; on the other nights the drug produced, in one to two hours, restless sleep, lasting all night, with two or three short intervals of wakefulness.

The Pharmaceutical Journal.

SATURDAY, AUGUST 9, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

The close proximity of the holiday season and the practical cessation of business until October may be to some extent an explanation of the circumstance that the Council meeting last Wednesday was attended by only sixteen members. After the minutes of the previous meeting had been confirmed thirteen pharmaceutical chemists and two chemists and druggists were elected members of the Society; seventy-two persons were elected associates, and twenty-one were elected apprentices or students. Reference was made to the lamented death of Mr. William Hodgkinson, who for many years held office as an Auditor of the Society, and had always been one of its strongest supporters. The services that have been rendered by him were gracefully acknowledged by the President, who also proposed that on behalf of the Council a letter of condolence should be addressed by him to Mrs. Hodgkinson and her daughter.

The report of the Finance Committee recommending a further payment on account of the new buildings and the sale of stock for that purpose was agreed to, and on its presentation the President mentioned that the time is approaching when the Society will be able to make a further investment of five thousand pounds in ground rents, and thus obtain better interest for application to charitable purposes. On the recommendation of the Benevolent Fund Committee a grant of ten pounds was made to a widow. Reference was made by the Vice-President to a very sad case of reverse arising from illness, and to another in which the applicants for relief, though much in need, did not come within the scope of the regulations, so that the Committee could only render some temporary assistance.

The report of the Library, Museum, etc., Committee dealt with the arrangements that have been made for the ensuing session of the School, and submitted a new syllabus that had been considered and approved, recommending that a copy of it should be sent to each subscriber to the Society. It was also recommended that Mr. H. G. Greenish should be appointed teacher of materia medica for the ensuing session, and that in accordance with a suggestion from the educational staff, one of their number should be elected Dean of the School. The circumstances which have led to the suggestion of these and other alterations were fully explained by the President as Chairman of the Committee, and after some discussion the motion for the adoption of the report was carried unanimously, Mr. Greenish's appointment being made by a special resolution.

The report of the Building Committee recommended some modifications of the builder's contract, which had become desirable in consequence of the new house not being fit for painting at present, and an alteration of the dispensing examiners' room for the purpose of obtaining better light and more room, and these recommendations were agreed to.

According to the report of the Law and Parliamentary Committee, which consists of fourteen members of the Council, the consideration of the draft of a Pharmacy Bill had been continued to a late hour on the previous evening, without an agreement being arrived at as to a final draft to be submitted to the Council, and therefore any further report on this subject was deferred.

The report of the General Purposes Committee stated the results of the examinations for the School prizes, the Council prizes, and for the Jacob Bell and Redwood Scholarships, the names of the successful candidates for which will be found at page 111. The account given of the progress made with cases placed in the hands of the Society's solicitor for prosecution showed that, as is usual, persons proceeded against had paid into Court the penalty and costs, while in other cases the requisite evidence had not been completed, or trial had not been reached. Several cases of alleged infringement of the Pharmacy Acts have been under consideration by the Committee, and in most of them proceedings were recommended. Other matters that are being considered by this Committee are a memorial from Glamorganshire chemists in reference to the sale of proprietary medicines containing poison and a communication from the Chairman of the Parliamentary Bills Committee of the British Medical Association relating to the desirability of placing restrictions on the amount of certain powerful medicines which might be supplied by dealers to their customers. Votes of thanks were passed to Professor Green for his report on the Herbarium competition, to Messrs. Blunt and Ransom and to Messrs. Davies and Saul for conducting the Council prize examination, and the Jacob Bell and Redwood examinations.

An important part of the business transacted by the Council was the adoption, on the recommendation of this Committee, of the draft Schedule that has been prepared by the Boards of Examiners. In moving its adoption, the President referred to the attempts that have been made to establish a curriculum and to the suggestions that more information should be given to candidates as to the scope of the examinations, adding that as the result of long conferences between the Committee, the Examiners and the Professors a schedule has now been finally approved, which he thought suitable to the present conditions, and one that would tend to increase the desire of candidates to get the best form of instruction and to eschew the short cuts to the examinations which are so much advertised and often adopted by young people who have no one to advise them. The motion was seconded by Mr. **Hampson** on the ground that he believed the new schedule would be a great boon to those who had to undergo examination as well as to teachers. Mr. **Martin** moved an amendment that the adoption of the schedule should be deferred until an improved method of conducting the examinations can be considered, and it was seconded by Mr. **Storrar**, but after some discussion negatived, and the President's original motion carried.

We are glad to be able to announce that Sir Edward H. Sieveking, M.D., F.R.C.P., Physician in Ordinary to Her Majesty the Queen, has consented to deliver the Sessional Address to the Students of the Pharmaceutical Society's School at the opening of the Session, on the 1st October next.

* * *

It appears that the educational wants of pharmaceutical students are beginning to be duly appreciated by the authorities who have the direction of educational institutions. The Owens College at Manchester, for instance, has issued a prospectus of its pharmaceutical department for the ensuing session, according to which arrangements have been made for courses of instruction in chemistry, botany, materia medica, pharmacy and pharmaceutical chemistry. The winter session will commence on the 1st October and terminate at the end of March. The summer session commences on the 1st May and terminates at the end of July. The Chemistry classes will be conducted by Professors Dixon and Schorlemmer, Drs. Bailey, Cohen, Fowler and Harden; the classes of Botany, Materia Medica and Pharmacy by Professor Leech and Mr. Kirkby. Candidates for admission to the Pharmaceutical department of the College will be required to produce certificates of having passed the Preliminary examination, satisfactory testimonials of good character, and to sign a declaration that they will observe the College bye-laws and regulations. An entrance exhibition of ten pounds will be offered for competition next October to students for the full Pharmaceutical course (Minor and Major examinations). The subjects of the examination will be elementary Botany and Chemistry. Candidates must give notice to the Registrar of the College of their intention to compete on or before the 20th September next. A Scholarship of ten pounds and a prize of five pounds will be offered at the end of the winter session (1890-1891) for competition among students proceeding to the course for the Major examination. The awards will be made on the results of the examinations in the course for the Minor examination. The prospectus may be obtained by application to Mr. H. W. Holder, the Registrar of the Owens College.

* * *

In Nottingham, also, the Council of the Nottingham and Notts Chemists' Association has made special arrangements with the authorities of University College for a complete three years' scheme of instruction, suitable for students intending to present themselves for the Minor examination. This pharmaceutical curriculum includes lectures and practical teaching in chemistry by Professor Clowes; Lectures and Class Work in Botany, by Mr. J. W. Carr; lectures in Materia Medica, by Mr. C. Haydon White; and Demonstrations and Practical Work in Dispensing, by Mr. F. R. Sergeant. The subjects specially taken up in the session commencing in October next will be Practical Chemistry, Practical Dispensing and Pharmaceutical Botany. Full details will be found in the College prospectus, obtainable at the College, price one penny, and tickets may be obtained from the Honorary Secretary of the Association, Mr. W. Gill, 183, Radford Road, Nottingham.

* * *

The argument of the President of the British Medical Association, to which reference was made in these columns last week, to the effect that some of the time now occupied by the ordinary medical student in acquiring a superficial acquaintance with the Latin language might be more profitably spent in a more thorough study of the subjects of physics, chemistry and biology, has been endorsed by Professor Huxley in a powerful letter addressed to the *Times*. Professor Huxley considers it to be a self-evident proposition that the educational training for persons who propose to enter the medical profession should be largely scientific, not merely because an acquaintance with the elements of physical and biological science is absolutely essential to the comprehension of human physiology and pathology, but more because of the discipline afforded by practical work in these departments. In his opinion it is a delusion to suppose that listening to lectures for two or three hours a week can confer a scientific training; such a process may instruct, it cannot educate. Professor Huxley does not question the value of a thorough and comprehensive classical education, but he fails to see that there is anything in common between such high intellectual discipline and the process by which boys are ground up to the pitch of being able to construe some easy Latin or Greek, or between a literary knowledge of Latin and so much acquaintance with that tongue as may suffice to turn Celsus into English or to concoct a prescription in a jargon that would have made a Pompeian apothecary explode. Students of medicine, like other people, should have a sound literary training. This they might obtain, as well as a sound elementary training in science, before they are seventeen, if only those who determine the conditions of medical education would cease to make the Latin fetish an object of superstitious reverence.

* * *

The Irish Pharmacy Bill has been read a third time in the House of Lords and passed, but the amendments made in that House will require the assent of the House of Commons.

* * *

We learn from Mr. Frederick Andrews that the prevailing movement towards association of chemists and druggists has excited among members of the craft in the South Paddington district a feeling of surprise that nothing of the kind has yet been established among them. A meeting has therefore been arranged to take place at the house of Messrs. Mathews, No. 1, Queen's Gardens, Hyde Park, on Friday, the 8th inst., to consider and discuss the matter.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 6, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Cross, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Schacht, Southall, Storrar and Watt.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Brackenbury, Richard Hayes.
Clark, Alfred Turner Sims.
Cranstone, Ernest Haughton.
Foster, Edgar Denney.
Franklin, John Henry.
Hobson, Edmund.
Lord, William Butler.
Lothian, John.
Martin, William Morley.
Millar, James Herd.
Negus, John Henry.
Perks, Alfred.
Prince, Roland.
Sherlock, Edward Birchall.
Tocher, James Fowler.
Whitbread, Howard.
Woodward, Moses Mellor.

ADDITIONS TO THE REGISTER.

The Registrar reported that

Alfred Parry, 75b, James Street, Deptford, S.E., and
Edward Parker Wolff, 44, Uverdale Road, Chelsea, S.W.,

having severally made declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported, their names had been placed on the Register.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

John Peters, 48, The Downs, Altrincham.
Thomas Palmer Tayler, 174, High Street, Lincoln.
Arthur Tharp, 45, Chesterfield Grove, East Dulwich, London, S.E.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Clark, Alfred Turner Sims	London.
Cranstone, Ernest Haughton	Hemel Hempstead.
Doble, Henry Tregellas	King William's Town.
Hobson, Edmund	Cheadle.
Jeffcoat, Joseph George	London.
Johnstone, Edward Straus	Whaley Bridge.
Lord, William Butler	Bolton-le-Sands.
Negus, John Henry	Northampton.
Perks, Alfred	Birmingham.
Prince, Roland	Uttoxeter.
Sherlock, Edward Birchall	St. Helen's.
Tocher, James Fowler	Peterhead.
Whitbread, Howard	Cheltenham.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Mason, Arthur Newton	Birmingham.
Wolff, Edward Parker	London.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Baker, Sydney George	Greenwich.
Breadner, Charles Gibson	Manchester.
Bush, James Edward	Melksham.
Edwards, David Powell	Bishops Castle.
Keith, Alfred George	Kintore.
Lacey, James	Melbourne (Victoria).
Marshall, John David	London.
Miller, William Henry	Dawley.
Watson, Arthur John	London.
Wells, Arthur John	Ramsgate.

ASSOCIATES.

The following, having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Addison, Charles Samuel	Hitchin.
Allenby, John Edward	Helmsley.
Bard, Cecil Harry	Exeter.
Bately, Stephen Briggs	Great Yarmouth.
Bishop, Ernest	London.
Coles, Charles Nathaniel	Horsham.
Collingwood, Robert	Rochdale.
Dawson, Athol Stancliffe	Sleaford.
Evans, Daniel Ashton	Llanbrynmair,
Falkingbridge, Frederick	Kennington.
Fielding, Clement	Elland.
Gartside, Charles	Oldham.
Gaziello, Charles Joseph	London.
Gribble, Edmund Arthur	Stockwell.
Hanham, Arthur Sydney	Portsmouth.
Harris, George Robert	Bradford.
Heaton, John	Rastrick.
Herbert, Sydney Reeves	Cockermouth.
Higgs, Andrew Badgery	Bodmin.
Hoit, Alfred Henry	Southsea.
Hutton, Thomas Walter	Dudley.
Jones, Hugh Kyffin	Mochdre.
Jones, John Ellis	Clynnog.
Kempston, Theodore	Dublin.
Kitching, Arthur Scott	Beckenham.
Lloyd, James Herbert	Leicester.
Lloyd, Walter George	Cardiff.
Lucraft, William Henry	Broad Clyst.
McCurrie, John	Port Bannantyre.
McFall, John Edward Whitley	Liverpool.
Miller, Frederick	Strood.
Morris, Edward Herbert	Bedford.
Nicol, Burton Alexander	London.
Nosworthy, Allan Percy	Yeovil.
Oxley, George	London.
Parker, Christian	Bath.
Partridge, Charles Henry	Clifton.
Pembleton, Frederick Paul	Nottingham.
Pickard, Samuel Norman	Ossett.
Poole, Thomas Brice	Sawbridgeworth.
Price, Herbert Henry Gay	Taunton.
Rayner, John	Uxbridge.

Riddle, Thomas Edward	Hexham.
Rose, Joseph Gandy	Buxton.
Sleggs, George Milner	Liverpool.
Smith, Walter Woodhouse	Doncaster.
Spencer, John Christopher	Manningham.
Stead, William Wilkinson	Bradford.
Sturch, Harry Howes	Kidderminster.
Sturton, Charles Hubert	London.
Sumner, George Thomas	Hawkhurst.
Sykes, Harry	Uppingham.
Tillman, Ernest Augustus	Truro.
Travis, Henry Arnold	Manchester.
Turner, Samuel	Buxton.
Twelves, Charles Henry	Whittington Moor.
Walton, Henry Egbert	Idle.
Wells, Arthur John	Lincoln.
Whitehead, Fredk. Nathaniel	Morecambe.
Williams, Arthur Llewellyn	Pembroke Dock.
Wilson, William	Nuneaton.

Modified.

Cugnoni, Alfred Horton Dyne	London.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Anderson, David	London.
Bridgman, William Herbert	Holsworthy.
Brown, Arthur Miller	West Malvern.
Crockart, William	Montrose.
Gregory, William Joseph	Boston.
Hopkinson, Joe	Rishworth.
Hubble, William Barton	Workington.
Jones, Lewis	Aberdovey.
Lancaster, Bernard	Chesterfield.
Mason, Arthur C. H. Newton	Birmingham.
Morley, Charles	Lelant.
O'Dell, John Denis	Hull.
Pendlebury, James	Manchester.
Richardson, W. N. Saunders	Warminster.
Robinson, Charles Holmes	Loftus-in-Cleveland.
Russell, Joseph Frederick	Leeds.
Scott, George Baty	Belford Station.
Sharland, William Cragg	Auckland (N.Z.).
Tapper, Charles Albert Henry	Bristol.
Thomas, John Wilbert	Hebden Bridge.
Williamson, Thomas	Liverpool.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

The Late Mr. Hodgkinson.

The **President** said he had to report the sad intelligence of the death of Mr. William Hodgkinson, who for many years filled the office of auditor to the Society, of which he had been a member from the commencement. Mr. Hodgkinson had always taken a great deal of interest in the proceedings of the Society, although, being engaged in the wholesale trade, he had never been a member of the Council, it being a generally understood thing that gentlemen in such positions should not be nominated. Mr. Hodgkinson was originally engaged in retail pharmacy in the midland counties, and was one of those quiet, educated men who reflected great honour on the Society. He also took sufficient interest in the affairs of the Society to be able to represent it in the city of London in all matters connected with benevolence or the reception of visitors, as in the case of the meeting of the International Congress and of the Pharmaceutical Conference in London. He had himself the most grateful personal recollections of Mr. Hodgkinson's kindness, and under these circumstances he thought it would be only fitting that he should write on behalf of the Council a letter of condolence to Mrs. Hodgkinson and her daughter.

The **Vice-President** cordially endorsed what had been said by the President. Although he had not had the privilege of personal intimacy with Mr. Hodgkinson, he had met him on many occasions, and always found him desirous to promote the best interests of the Society.

Meetings at Exeter and Plymouth.

The **President** said a communication had been received a few days after the last meeting of the Council, containing an invitation from the chemists and druggists of Plymouth and Exeter respectively to the President and Council to attend at meetings to be held in those places in order to confer on matters affecting the general interests of the Society and the trade. As the Council was not in session, he consulted with the members of the Library and Museum Committee, and having explained to the friends in the west that the Council collectively could not in the circumstances deal with the invitation, it was subsequently arranged that he, as President, the Vice-President, who kindly came from Scotland for the purpose, and Mr. Allen, should attend the meetings. They did so, accompanied by the Editor of the Journal, and he had to report that they received a most cordial reception, and that as the result of the conferences there seemed to be a very general feeling of appreciation of the efforts of the Society, both on the part of the members and of the trade at large. He was instructed to convey to the Council the best wishes of the friends in the west, and their gratification that he and his colleagues and the Editor had been able to attend.

Report of the Finance Committee.

The report of this Committee was of the usual character, and recommended various accounts for payment, including a sum not exceeding £1500 on account of the new building, on the certificate of the architect. For this purpose it was also recommended that a power of attorney for the sale of stock to an amount not exceeding £2000 be executed.

The **President** (as Chairman of the Committee), in moving the adoption of the report and recommendations, said there was nothing needing any special comment. With regard to the Benevolent Fund, the receipts were always low at this time of year, but two donations amounting to ten guineas had been received, and the dividends on the ground rents and invested capital had been received and carried to the current account. The time was approaching when the Society would be able to invest about £3000 further in ground rents, and so obtain better interest for charitable purposes. With regard to the sale of stock, it was proposed to take power to sell £2000, but so much only would be sold as was required.

The motion for the adoption of the report was unanimously agreed to.

Report of the Benevolent Fund Committee.

The report of this Committee included a recommendation of the following grant:—

£10 to the widow (aged 54) of an annuitant who died in 1881. She has had eight previous grants, amounting to £70. Her health is quite broken down. (Norfolk).

Another case had been deferred for further information, and one the Committee had declined to entertain.

The **Vice-President**, in moving the adoption of the report, said the cases which came before the Committee on the previous day were a little out of the ordinary run. One case was that of a man who had been in extremely good circumstances, and was known to many members. He had been stricken down, and at present was totally unable to care for himself, but had to be lifted from his bed to his chair and back again.

In this case no immediate grant was asked, as he had a little money in hand to meet present wants, but it was evident that if he survived he would have want staring him in the face at no distant period. His case would therefore be considered in October, when the list of approved candidates for annuities was being prepared. The other case was one of those which showed how difficult it was to provide for all cases by legislation. It was that of a woman who had five children, and who was suffering a great deal of privation, her husband being in a lunatic asylum. She was not a widow, and her children were not orphans, and so did not come within the scope of the regulations. The Committee, however, found a way to render some temporary assistance.

The report and recommendations were unanimously adopted.

REPORT OF THE LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
June	Day . .	671	33	16	27
	Evening .	202	15	4	10

Circulation of books.	Total.	Town.	Country.	Carriage paid.
June	241	132	109	£1 6 2

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Edinburgh University Calendar, 1890. From the UNIVERSITY.

Royal Society of Edinburgh, Proceedings, vols. 15, 16. From the SOCIETY.

General Medical Council, Minutes, vol. 27.

— Report on Preliminary Education, etc., 1890. From the COUNCIL.

Dragendorff, Über die Untersuchungen von Nahrungs- und Genussmitteln, Hausgebrauchs-Gegenständen, etc.

Adermann, Beiträge zur Kenntniss der in der Corydalis cava enthaltenen Alkaloide, 1890.

Jacoby, Beiträge zur Chemie der Salix-Rinden, 1890.

Kara-Stojanow, Ueber die Alkaloide des Delphinium-Staphisagria, 1889.

Lezius, Untersuchung einer angeblich von Aconitum sinense abstammendem aus Japan importirten Sturmhutknolle, 1890.

Lubbe, Chemisch-pharmakologische Untersuchung des krystallisirten Alkaloïdes aus den japanischen Kusa-usu-Knollen, 1890.

Pehkschen, Untersuchung der Alcaloïde des Veratrum album unter besonderer Berücksichtigung des Veratroïdins, 1890.

Spehr, Pharmacognostisch-chemische Untersuchung der Ephedra monostachia, 1890. From Professor DRAGENDORFF.

For the Library in Edinburgh—

Ephemeris, vol. 3, part 5. From Dr. SQUIBB.

Victoria, Pharmacy Board, Report, 1889. From the BOARD.

The Committee recommended that the undermentioned works be purchased:—

For the Library in London—

Goodale, Physiological Botany, 1890.

Hjelt, General Organic Chemistry, 1890.

Elborne, Laboratory Course of Pharmacy and Materia Medica, 1890.

Proctor, Manual of Pharmaceutical Testing, 1890.

Ye Apothecarie, his Booke of Recepts, 1890.

For the Library in Edinburgh—

Remsen, Inorganic Chemistry.

Proctor, Manual of Pharmaceutical Testing.

The Committee had ordered that the Libraries and Museums in London and Edinburgh be closed in the evening during August and September; that the Library and Museum in London be closed entirely from August 30 to September 13, both dates inclusive; and that the Library and Museum in Edinburgh be closed from August 18 to September 2, both dates inclusive.

The Committee recommended that the Librarian should attend the annual meeting of the Library Association at Reading in September.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
June	Morning	633	42	5	25
	Evening	110	12	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of falsely packed Lima Sarsaparilla. From Messrs. WRIGHT, LAYMAN and UMNEY.

Specimen of an astringent bark from Queensland. From Messrs. EVANS, LESCHER and WEBB.

The staff of the School had attended the Committee and discussed the arrangements for the ensuing session, and a draft syllabus had been submitted and generally approved. The Committee recommended in accordance with a suggestion from the staff, that they be empowered to elect one of their number Dean of the School.

Revised regulations with regard to the Herbarium Prize had been submitted and approved, one important feature in which was that no collection commenced after the end of this year may contain more than 150 specimens, which must be mounted so as to show the characteristic features and the more prominent and *typical* genera of the chief British natural orders.

The Committee recommended the acceptance of a tender for new sunburners in the Lecture Theatre; also that various cleaning operations, etc., be carried out during the vacation. A sub-Committee had been appointed to superintend the removal of the offices to No. 16. The question of holding a meeting in London of Local Secretaries had been considered and adjourned. At an adjourned meeting the arrangements of the new offices had been considered in detail and settled.

It was recommended that Mr. H. G. Greenish be appointed teacher of materia medica for the ensuing session.

The President had reported that Sir EDWARD H. SIEVEKING, M.D., F.R.C.P., Physician in Ordinary to Her Majesty the Queen, had consented to deliver the Sessional Address.

The Committee had finally approved the School prospectus, and recommended that a copy be sent to each subscriber to the Society.

The PRESIDENT (as Chairman of the Committee) moved the adoption of the report and recommendations. He said it had been found desirable that one of the staff of the School should be appointed to receive fees, answer communications from parents and guardians, and do certain detailed work which had hitherto been done informally, and sometimes by more than one. It was thought best that the professors should amongst themselves select one of their number to be Dean of the School. With regard to the Herbarium Prize, it would be noticed that the proposed alteration was one reducing the number of specimens practically to one-half. It had been found that the tendency was for competitors to get as many specimens as they could, and it was a question how far it was right to encourage the collection of rare plants—and sometimes the very rarest plants were included in these collections. Secondly, it was generally found that the care with which the specimens were mounted and described was in inverse ratio to the number collected. Moreover, the competition was very much limited by the large number of specimens allowed, as the number of apprentices who were able to make a collection of anything like 300 specimens was very small. It was felt that the stimulus which this prize was intended to supply would be more effective under regulations amended as proposed. This year the number sent in was five, and it was felt that anything which would tend to widen the operation of the prize would be an advantage. He might add that the Committee had the concurrence of the professors, and especially of Professor Green, in making this recommendation. Some years ago the number of specimens was reduced on the same grounds. Mr. Borland, who was then on the Council, and who took a great interest in botany, said then that the conditions of success were almost impossible of attainment, except under very exceptional circumstances, and it was certainly desirable that a prize of this sort should be made possible of attainment by as large a number as possible. The question of holding a meeting in London of the Local Secretaries had been adjourned. At an adjourned meeting of the Committee it had been decided to recommend certain structural alterations, including fitting up a room on the ground floor as a second room for the Secretary, and also converting the present council chamber into a reading room in connection with the Library. The idea had been suggested that it should be made a special room for members, apart from students, and possibly that might be carried out at a future time, but there was no necessity for deciding it immediately. Then it was recommended that Mr. H. G. Greenish should be appointed teacher of materia medica. When Mr. Holmes resigned that position the Committee had naturally considered what was the kind of materia medica which should be taught in future and in what way it could best be dealt with, and it was felt that there was a considerable difference between the materia medica of the present time and that of thirty years ago. A good deal of chemistry and pharmacy which was formerly included was now taught separately, and it was considered that the special subject remaining was more what the Germans called pharmacognosy, a study of the internal and external structure of drugs. It was therefore deemed advisable to find someone who had had such a training as would enable him to teach this kind of materia medica efficiently, especially the histological side of it, in which they had been somewhat behindhand in England for some time. Mr. Greenish had been educated in a very distinguished university abroad where this subject was specially studied; he was the translator of a very well-known work on plant analysis, and he had been a distinguished pupil, medallist and demonstrator in the Society's School some ten years ago. It was thought desirable that this duty should be undertaken by a pharmacist rather than a medical man, and he did not know anyone in this country who had an equal knowledge and training in this subject. He had been very pleased to find, therefore, that Mr. Greenish was willing to undertake the duty, and the Committee recommended his appointment.

Mr. Leigh asked what salary would be given.

The President said the fees only.

Mr. Abraham suggested the desirability of obtaining tenders for all the work recommended wherever it was possible. Experience showed that this practice was the most economical.

The President said tenders were obtained for any work which could be definitely specified; but the greater part of what was now recommended could not be carried out on that footing; it was simply the removal of cases, etc., from one place to another, and the arrangements might have to be varied as the work progressed.

Mr. Martindale having seconded the motion,

Mr. Martin said this report was one of the most important of the whole year, and covered a good deal of ground. It occurred to him that the appointment of Dean of the School should be made from above by the Council, and it would be a greater compliment to the gentleman appointed.

The President said the appointment would be confirmed by the Council.

Mr. Martin said he was very glad to see the limit which was placed on the number of plants which might be collected, especially as there had been complaints from time to time of the destruction of rare plants in their native habitats, and at a meeting of the British Association the matter had been specially referred to. He feared some of their students had been transgressors in this matter. He would point out, however, that in some localities it would be very easy to collect 150 specimens with very little labour, whilst in others it would be very difficult; but that applied equally whatever limit was fixed. With regard to the teaching of materia medica he could understand that the hands of the Council were some what tied by the fact of the professor of botany having been already elected, but he noticed that the Committee only recommended the election of Mr. Greenish for the session of 1890–91, no doubt with the view of leaving the matter open next year. He thought it would have been a greater honour to Mr. Greenish to have been elected if the vacancy had been announced and applications invited from other candidates. He thought probably next year the whole subject would be considered, and perhaps materia medica would be treated as a separate subject and a regular professor appointed. If Mr. Greenish were then elected it would be a greater honour than being merely selected by the Committee.

Mr. Hampson said he did not quite accept on the part of the Committee the explanation which Mr. Martin had offered of its action. The Committee had simply filled up a vacancy which had occurred, and it did not at all follow that the whole question would be reconsidered next year. Before that was done it would have to be shown that there was a reason or necessity for doing so.

The motion was then carried unanimously.

A separate resolution was also passed, appointing Mr. H. G. Greenish teacher of materia medica for ensuing session.

A resolution was passed authorizing the affixing of the seal of the Society to the leases of Nos. 15 and 16, Bloomsbury Square.

Report of the Building Committee.

This Committee recommended that certain decorative work should be done by Messrs. Campbell and Smith, that a sum not exceeding £1,500 be paid on the architect's certificate, on account of the new building, and that £100 be paid the architect on account of fees. Also that an extension of the examiners' dispensing room be carried out.

The President, in moving the adoption of this report, said the contractors wanted their account settled up, and as the new house was not quite fit to be painted it was proposed to take certain work out of their contract and have it done by someone else, the amount of which would have to be settled between them and the architect. The recommendations, when adopted, would authorize the payment under the certificate of the architect of the tradesmen who supplied the fittings, etc., which would be required. When the dispensing examiners' room was constructed, the then Committee intended to propose, when the time came, the throwing out of a window at the back to enlarge the room and give a better light. While No. 15 was in the occupation of the then tenant this could not be done, but now that the Society was in possession of that house it was thought desirable to do it at once. It would not be a costly affair, and would enable a skylight to be put in which would add greatly to the light. Even an extension of 4 feet 9 inches would be a great advantage, but if it could be made 6 feet it would enable a larger number of candidates to be examined.

Mr. **Martindale** in seconding the motion said the room in question was not only badly lighted but very small, and when there were several candidates in it it was very hot and stuffy.

Mr. **Hampson** also spoke in favour of enlarging the room.

Mr. **Southall** asked if there was any prospect of a tenant for No. 15.

The **President** said there had been several applications, but the house was not quite ready for occupation.

Mr. **Southall** asked if a tenant would not prefer to finish the house according to his own fancy.

The **President** said that was not found to be case in London. The way to let a place was to have it ready for immediate occupation. The weather had been so bad during the last two months that the lower part of the building had not dried sufficiently to be painted.

The motion was then put and carried.

REPORT OF THE LAW AND PARLIAMENTARY COMMITTEE.

The **President** said this Committee had sat till a late hour on the previous night, but was not able to complete the final draft of a Pharmacy Bill to be submitted to the Council, and he must therefore defer any further report until October.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the reports of the Professors and Staff on their classes and the Prize Competitions, as follows:—

Practical Chemistry.

Professor Attfield had reported that in his class there had been 75 students during the session, being above the average for the last ten sessions. Nearly half entered for the whole session, and the average period of study was nearly four hours daily for nearly seven months.

Chemistry and Chemical Physics.

Professor Dunstan had reported that there had been eight competitors for this prize, and that the attendance, diligence and interest manifested by the students in his class had been very satisfactory.

Botany.

Professor Green had reported very favourably on the work done by the competitors in this class, though they were limited to six in number. The percentage of marks awarded had been hardly so high as in former years, but that might be attributed to the greater difficulty of the paper.

Materia Medica.

Mr. Holmes had reported that six candidates had competed for this prize, and those standing highest on the list he commended very highly. The conduct of the class throughout the session had been very satisfactory.

Herbarium Prize.

Professor Green had reported that five collections had been sent in, two of which were of very great excellence.

Acting on the above reports, and that of Messrs. Blunt and Ransom, who had been appointed by the Council to conduct the Council Prize examination, the Committee recommend that the following awards be made:—

Practical Chemistry.

Silver Medal	John Charles Umney.
Certificates of Honour	Harry William Kilby Pears. William Butler Lord. Wm Fredk. Jno. Shepheard.

Chemistry and Chemical Physics.

Silver Medal	Charles Ernest Boucher.
Certificates of Honour	Edward Birchall Sherlock. Harry William Kilby Pears. William Butler Lord.

Botany.

Silver Medal	Harry Howes Sturch.
Certificates of Honour	Harry William Kilby Pears. Edward Birchall Sherlock.

Materia Medica.

Silver Medal	Edward Birchall Sherlock.

Pharmacy and Practical Pharmacy.

Silver Medal	Harry William Kilby Pears.

Herbarium Prize.

Silver Medal	Edward John Lumb.
Bronze Medal	Harold Horatio Prosser.
Certificates of Honour	John Austen. William Moore.

Council Examination Prizes.

Pereira Medal (Silver); and Books value £5, presented by Mr. T. H. Hills.

Edward Birchall Sherlock.

Pharmaceutical Society's Medal (Silver); and Books value £3, presented by Mr. T. H. Hills.

John Garwood Everett.

Pharmaceutical Society's Medal (Bronze); and Books value £2, presented by Mr. T. H. Hills.

John Lothian.

Jacob Bell Memorial Scholarships and Redwood Scholarship.

The gentlemen appointed to conduct the examination for the Jacob Bell Memorial and Redwood Scholarships for the ensuing session, had reported that twenty-five candidates had presented themselves at the following centres:—Bristol 1, Canterbury 2, Carlisle 1, Carmarthen 1, Cheltenham 1, Darlington 1, Exeter 2, Lincoln 1, Liverpool 2, London 11, Manchester 1, Nottingham 1. The envelopes bearing the mottoes of the successful candidates had been opened by the Committee and found to contain the following names:—

1.	Edward Frank Harrison	London.
2.	Henry Garnett	Plymouth.
3.	William Bonny Hoile	Chatham.

The Committee had therefore awarded the *Jacob Bell Memorial Scholarships* to:—

Edward Frank Harrison
and
Henry Garnett,
and the *Redwood Scholarship* to
William Bonny Hoile.

The report also included the usual letter from the Solicitor stating the progress made with cases placed in his hands. One defendant had paid the penalty and costs into Court; other cases were awaiting trial or the completion of the evidence.

Several other cases of alleged infringement of the

Acts had been considered by the Committee, and in most cases proceedings were recommended.

A memorial from chemists of Glamorgan had been received with reference to the sale of poisonous patent medicines, to which it was recommended that a reply be sent saying that the subject was under consideration.

A communication from the chairman of the Parliamentary Bills Committee of the British Medical Association had been received respecting the desirability of placing restrictions on the amount of certain powerful medicines which might be supplied by dealers to their customers. The consideration of this communication had been deferred.

The draft Schedule of Subjects of Examination prepared by the Boards of Examiners had been considered and was recommended for adoption.

The **PRESIDENT** moved that the awards be made in accordance with the recommendation of the Committee, which was seconded by Mr. **HAMPSON**, and carried unanimously.

Votes of thanks were passed to Professor Green for his report on the Herbarium Competition, to Messrs. Blunt and Ransom for conducting the Council Prize Examination, and to Messrs. Davies and Saul for the Jacob Bell and Redwood Scholarship Examination.

The consideration of the legal portion of the report of the Committee was deferred until later, and the President moved that the following Schedule of Subjects of Examination be confirmed and published in the Society's Journal and Transactions:—

REGULATIONS OF THE BOARDS OF EXAMINERS.

SCHEDULE OF SUBJECTS OF EXAMINATION RECOMMENDED BY THE BOARDS OF EXAMINERS AND ADOPTED BY THE COUNCIL.

Major Examination.

These Regulations will come into force one year after their publication.

The examination in the respective subjects may be oral, practical, or in writing.

Botany.

In addition to what is required for the Minor, the candidate is expected to possess an intimate acquaintance with the parts of the flower, fruit, and seed; to describe the structure and development of the pollen and of the ovule, and to trace the steps by which the latter is transformed into the seed. To have an intimate knowledge of the structure of cells, whether isolated or in combination to form tissues; of the contents of cells in their various stages of development; and a general knowledge of the origin of gums, acids, mineral and other secretions of plants. To be familiar with the composition of the cell wall, its chemical nature, properties and reactions; with the changes it undergoes in the formation of wood, cork, and mucilage, and in the processes of thickening and cuticularization. To possess a knowledge of the general principles of classification, the system of Linnæus, and of the natural system founded upon that of De Candolle. To be able to distinguish practically the natural orders included in the schedule appended below, and such of the leading genera of each of these orders as are therein specified; also to refer to their respective orders or genera such specimens included in the schedule as may be shown to him. To possess a general knowledge of the method of reproduction in cryptogams, and to describe that of mosses; to be familiar with the development of the spores in these plants, and to be able to compare the different organs with the corresponding organs in phanerogams; to possess a knowledge of the alternation of generations in the cryptogams, and the modifications under which this is represented in the phanerogams. To have a practical acquaintance with the use of the microscope, and by means of it to recognize the various tissues found in the plant, the reproductive organs of cryptogams and phanerogams, and the more important cell contents.

Schedule for the Major Examination.

- RANUNCULACEÆ.
  - Aconitum.
  - Anemone.
  - Helleborus.
- PAPAVERACEÆ.
  - Papaver.
  - Chelidonium.
- CRUCIFERÆ.
  - Brassica.
  - Cochlearia.
- VIOLACEÆ.
  - Viola.
- MALVACEÆ.
  - Malva.
- RUTACEÆ.
  - Ruta.
- LEGUMINOSÆ.
  - Lathyrus.
  - Mimosa.
  - Cercis.
- ROSACEÆ.
  - Rosa.
  - Potentilla.
  - Pyrus.
  - Spiræa.
  - Prunus.
- CUCURBITACEÆ.
  - Ecballium.
  - Bryonia.
- UMBELLIFERÆ.
  - Carum.
  - Cicuta.
  - Conium.
  - Œnanthe.
  - Coriandrum.
  - Fœniculum.
  - Eryngium.
  - Daucus.
- COMPOSITÆ.
  - Anthemis.
  - Cichorium.
  - Tussilago.
  - Inula.
  - Matricaria.
  - Lactuca.
- DIPSACEÆ.
- GENTIANACEÆ.
  - Erythræa.
  - Menyanthes.
- CONVOLVULACEÆ.
- SOLANACEÆ.
  - Solanum.
  - Atropa.
  - Hyoscyamus.
  - Physalis.
  - Datura.
- SCROPHULARIACEÆ.
  - Digitalis.
  - Verbascum.
  - Scrophularia.
- LABIATÆ.
  - Marrubium.
  - Origanum.
  - Lamium.
  - Thymus.
  - Mentha.
- POLYGONACEÆ.
  - Polygonum.
  - Rumex.
- EUPHORBIACEÆ.
  - Buxus.
  - Euphorbia.
- CUPULIFERÆ.
  - Quercus.
  - Fagus.
  - Corylus.
  - Alnus.
- SALICACEÆ.
  - Salix.
- CONIFERÆ.
  - Juniperus.
  - Pinus.
- ORCHIDACEÆ.
- AMARYLLIDACEÆ.
- IRIDACEÆ.
  - Iris.
  - Crocus.
- LILIACEÆ.
  - Ruscus.
  - Allium.
  - Convallaria.
- GRAMINEÆ.

Materia Medica.

This comprises a practical knowledge of the methods of estimating the value of important drugs, of distinguishing commercial varieties of the same, and of separating such of their active principles as are official in the British Pharmacopœia.

The candidate is also expected to have a general acquaintance with the active constituents of all important drugs, and to possess a general knowledge of the chemical properties of the official alkaloids, glucosides, resins, and essential and fixed oils.

The microscope will be introduced for the examination of certain drugs.

Physics and Chemistry.

In addition to the subjects indicated by the Schedule for the Minor examination the candidate will be expected to possess a knowledge of the most important facts connected with—

1. The physical constitution of the three states of matter; liquefaction of gases, critical point; the diffusion of gases and liquids, dialysis; methods for determining vapour densities; solution.

2. The dynamical theory of heat; heat and temperature; sources, development and propagation of heat; radiation, diathermancy and anthermancy, separation of heat from light; latent heat; boiling point, distillation; freezing mixtures; specific heat; calorimeters; relation of specific heat to atomic weight; thermometers, the air thermometer; methods of determining exceedingly high and low temperatures.

3. The undulatory theory of light; reflection; refraction; propagation of light, the photometer; mirrors and lenses, the microscope; decomposition of white light by a prism; the spectroscope, spectrum analysis; double refraction; polarization, the polariscope; influence of light in promoting chemical change, the principles of the ordinary photographic processes.

4. The methods of producing magnetism; magnetic induction. Sources of electricity, frictional electricity; the electroscope; electric induction; electric machines; the Leyden jar; voltaic electricity; the principal forms of voltaic batteries; the galvanometer; chemical effects of current; electrolysis; measurement of current, Ohm's law; voltameter; secondary currents, secondary batteries; thermo-electricity, the thermopile; production of heat and light from electricity; electromotors; dynamo-machines.

5. The history of the atomic theory; the hypothesis of Avogadro; the methods by which the standard atomic weights have been determined; dissociation; specific volume; the periodic law.

6. Classification of carbon compounds; rational formulæ; isomerism. The characteristics and constitution of the chief typical organic compounds. The constitution, sources, methods of preparation, properties, reactions and mutual relations of the following organic compounds: *Cyanogen derivatives.*—Urea, cyanuric acid, uric acid. *Hydrocarbons.*—The principal members of the paraffin, olefine, acetylene and benzene series; their chief haloid and nitro-derivatives. Theory of isomerism in paraffin and benzene series. *Paraffin derivatives.*—Distinction of primary, secondary and tertiary alcohols; the chief primary monohydric alcohols; glycol; glycerine (glycerol); mannite; acetaldehyde, chloral; chloral hydrate; acetone; ether; the principal acids of the acetic series; oleic acid; glycollic and lactic acids; oxalic, succinic, malic, tartaric, racemic and citric acids; ethylamine; acetamide; glycocine; cane sugar, grape sugar; milk sugar; maltose; starch and cellulose. *Benzene derivatives.*—Phenyl sulphonic acid; phenol; resorcin (resorcinol); aniline; benzaldehyde; salicylaldehyde; benzoic acid; salicylic acid. The principal properties of the terpenes and camphors, essential oils, resins. The characteristics of naphthalene and its derivatives. The processes of alcoholic, acetic, lactic and ammonic fermentation. The properties and decomposition products of the principal glucosides and alkaloids.

Practical Examination—Chemistry.

The candidate will be expected to be able—

To analyse mixtures containing three metallic salts; to estimate the nitrogen in organic compounds by the soda-lime process; to determine melting and boiling points. To perform the operations (or certain stages of them) necessary for the preparation of cyanogen, artificial urea, ethyl chloride, iodoform, ethylene, ethylene dibromide, acetaldehyde, formic acid, oxalic acid, nitrobenzene, aniline, benzoic acid, the nitrophenols. To recognise by their chemical reactions, and to determine, where necessary, by the Pharmacopœial gravimetric or volumetric methods, the strength and purity of the most important of the inorganic and organic compounds (including crude drugs and galenical preparations) described in the British Pharmacopœia. To detect and separate the most important alkaloids, alkaloidal salts and glucosides, and to separate in the pure state morphine from opium and strychnine from nux vomica.

Minor Examination.

Prescriptions.

The candidate is required to read without abbreviation autograph prescriptions; translate them into English; understand the grammatical construction of the Latin; and render a literal as well as an appropriate translation of the directions for use. To detect errors, discover unusual doses, and have a general knowledge of Posology. To calculate percentages and other quantities occurring in prescriptions; also to render in good Latin ordinary prescriptions written in English.

Practical Dispensing.

To weigh, measure, and compound medicines; write the directions in concise language in a *neat and distinct* hand; to finish and properly direct each package. [*In awarding marks in this subject the time taken by the candidate in doing the work is taken into account.*]

Pharmacy.

The candidate will be required to possess a general knowledge of the following branches:—

(*a*) Operations requiring the use of heat. Evaporation, with particular reference to the preparation of extracts and inspissated juices; special characters and modes of preparing the various classes of extracts; influence of surface, temperature and pressure upon the rate of evaporation; water, steam and sand baths; distillation, ordinary, fractional and destructive, distinctive characters and objects of each; official preparations illustrating the various kinds of distillation, apparatus employed: the retort and receiver, still and worm, Liebig's condenser; principles on which they are constructed and used. Sublimation; its objects and applications in pharmacy; official products of sublimation, calcination and fusion. Desiccation; temperature best suited for drying particular drugs, loss in drying vegetable drugs, forms of drying ovens, principles on which they are constructed and used.

(β) Disintegration of solid substances; cutting, bruising and pulverization: apparatus employed, principles indicating which is to be adopted in particular instances: methods for controlling the degree of comminution, sieves and sifting, trituration, levigation, elutriation, granulation, including methods for producing certain chemicals as fine powders, small crystals, scales, etc. Solution: its nature, solvent power of various menstrua, influences of (*a*) temperature; (*b*) state of division of the substance to be dissolved; (*c*) time; (*d*) position of the substance in the menstruum; lixiviation, infusion, digestion and decoction; maceration, percolation and displacement, principles on which the successful performance of these processes depends; form and materials for percolators and other vessels employed. Filtration, objects and methods, filtering media, means of expediting filtration; dialysis: its application in pharmacy, construction and use of the dialyser. Expression; methods of obtaining the juices from plants; recovery of the residual liquids from tincture marcs, etc., screw, hydraulic and other presses. The principles involved in the dispensing of medicines, particularly with reference to the best excipients and methods for forming pill masses, the preparation and nature of emulsions, the most suitable emulsifying agents, and the best means of suspending insoluble substances in liquids.

(γ) The candidate will also be required to show a practical knowledge of the processes, and understand the principles of the processes by which the official preparations belonging to the following classes are made, viz., collodions, confections, decoctions, dilute acids, extracts (solid and liquid), glycerines, infusions, juices, liniments, lotions, mixtures, ointments, pill masses, plasters, powders (simple and compound), solutions, spirits, suppositories, syrups, tinctures, vinegars, waters and wines. He must be able to conduct such of the operations, or parts of them, as may be required by the examiner. A knowledge of the proportion of active ingredient or crude material in official preparations containing aconite, antimony, arsenic, belladonna, Calabar bean, cantharides, hydrate of chloral, chloroform, caustic potash and soda, colchicum, digitalis, elaterium, ergot, iodine, iodoform, ipecacuanha, lead, mercury, nux vomica, opium, phosphorus, scammony, stramonium, squill, alkaloids and alkaloidal salts.

Materia Medica.

The candidate is required to recognize specimens of any crude drug mentioned in the British Pharmacopœia or in the annexed list, and to describe their characteristics so far as may be necessary to detect adulteration or substitution. He must be familiar with their geographical source, the botanical and zoological names of the plants and animals yielding them, the natural orders to which they belong, and the localities from which they are obtained. The candidate will be required to name their chief active constituents and also the official preparations into which they enter.

Roots.
Althæa officinalis
Inula Helenium
Alkanna tinctoria

Rhizomes, etc.
Helleborus niger
Hydrastis canadensis
Sanguinaria canadensis
Iris florentina
Allium sativum
Veratrum album
Acorus Calamus

Barks.
Berberis vulgaris
Cinnamodendron corticosum
Simaruba amara
Quillaia Saponaria
Prunus serotina
Ulmus campestris
Ulmus fulva
Cinnamomum Cassia

Herbs.
Tussilago Farfara
Spigelia marilandica
Marrubium vulgare
Solanum Dulcamara

Leaves.
Datura Stramonium

Flowers.
Calendula officinalis
Pyrethrum cinerariæfolium, etc.
Arnica montana

Fruits.
Anamirta paniculata
Punica Granatum
Cuminum Cyminum
Capsicum annuum
Laurus nobilis
Piper longum
Vanilla planifolia

Seeds.
Paullinia sorbilis (Guarana)
Trigonella Fœnum-Græcum
Dipteryx odorata
Pyrus Cydonia
Strophanthus species
Strychnos amara
Hyoscyamus niger
Amomum Melegueta
Areca Catechu

Hairs.
Mucuna pruriens

Juices, etc.
Acacia Catechu
Lactuca virosa (Lactucarium)
Aloe spicata, etc.

Gum-Resins.
Boswellia Carterii, etc.
Euphorbia resinifera

Oleoresins.
Pistacia Terebinthus

Resins.
Callitris quadrivalvis
Pinites succinifer
Calamus Draco

Cryptogamic Substances.
Lycopodium clavatum, etc.
Fucus vesiculosus
Chondrus crispus

Animal substances.
Spongia officinalis
Coccus Lacca
Mylabris Cichorii
Sepia officinalis
Castor Fiber

Botany.

The candidate will be required to recognize any of the plants specified in the list appended to this schedule; to refer any flowers that may be shown to him to their class and sub-class; to possess a general knowledge of the internal structure of stems, leaves and roots, and their parts, and of the elementary tissues of which they are composed; to describe a cell, its structure and usual contents; to explain the thickening of cell-walls, and to describe the manner in which cells are combined to form tissues. To distinguish between roots and stems, and to name such important modifications of either as present distinguishing characteristics. To name correctly such leaf shapes as are shown, and to recognize appendages or any important modifications of the leaf. To have a practical knowledge of the various arrangements of leaves or flowers in the bud, and of the different kinds of phyllotaxis and of inflorescence; to understand the principles of branching, and the different kinds of branch systems. To possess a general knowledge of the processes of reproduction of plants, and to describe those of phanerogams and ferns. To name and describe the arrangements of the parts of the flower, the number, position and shape of the floral envelopes and of the organs of reproduction, to name and describe the different kinds of fruits, and the various modes of dehiscence and kinds of placentation. To have a general knowledge of the physiology of plants, and to describe the functions of the roots, stems and leaves. To be acquainted with the materials which form the food of plants, and to understand the part played by starch, sugar and aleurone grains in the life of the plant. To recognize, by means of the microscope, sections of stems of dicotyledonous, monocotyledonous and cryptogamic plants; spiral, reticulated and scalariform vessels; as well as the simpler structures, such as stomata, pollen grains and hairs.

List of Plants for Recognition.

Aconitum Napellus.
Papaver Rhœas.
„ somniferum.
Ruta graveolens.
Althæa officinalis.
Cytisus scoparius.
Rosa canina.
Bryonia dioica.
Æthusa Cynapium.
Conium maculatum.
Œnanthe crocata.
Anthemis nobilis.
Matricaria Chamomilla.
Taraxacum officinale.
Achillea Millefolium.
Menyanthes trifoliata.
Borago officinalis.
Cochlearia Armoracia.
Fœniculum Dulce.
Valeriana officinalis.
Atropa Belladonna.
Datura Stramonium.
Hyoscyamus niger.
Solanum Dulcamara.
Digitalis purpurea.
Mentha piperita.
„ viridis.
„ Pulegium.
Daphne Laureola.
„ Mezereum.
Juniperus Sabina.
Taxus baccata.
Arum maculatum.
Colchicum autumnale.
Avena sativa.
Hordeum vulgare.
Triticum sativum.
Aspidium Filix-mas.
Rosmarinus officinalis.
Lavandula Vera.
Sinapis alba.

Chemistry and Physics.

The candidate will be expected to possess an *elementary* knowledge of the following subjects:—

(α) The law of the conservation of energy; the law of gravitation; the British and metric system of weights and measures; the balance; specific gravity; atmospheric pressure; the barometer, air-pump, and syphon; the law of Boyle; temperature; thermometer; the law of Charles; the law of gaseous diffusion; V. Meyer's method for determining vapour densities.

(β) The chief characteristics of chemical action, the distinction of elements and compounds; the laws of chemical combination by weight and volume; the hypothesis of Avogadro; atomic weight and molecular weight; chemical formulæ and nomenclature; valency; the distinction between metals and non-metals.

(γ) The general characters of the non-metals; the chief methods of preparation and the typical reactions of the following non-metallic elements and compounds:—hydrogen, oxygen, ozone, water, peroxide of hydrogen; chlorine, bromine and iodine, and their compounds with hydrogen and oxygen; fluorine, hydrofluoric acid; nitrogen, ammonia, the oxides of nitrogen, nitrous acid, nitric acid; sulphur, sulphuretted hydrogen, sulphurous and sulphuric anhydrides and acids, thiosulphuric acid; phosphorus, phosphine, the oxides and oxy-acids of phosphorus, the chlorides of phosphorus; silicon, silica, fluoride of silicon, silicofluoric acid; boron, boric acid. The usual impurities in those of the above-named substances that are included in the British Pharmacopœia.

(δ) The general characters and classification of the metals, and the general methods of forming oxides and salts; the sources, the usual methods of extracting, and the chief properties of, the undermentioned metals, and the principal modes of preparation, properties, adulterations and contaminations of such of their compounds as are described in the British Pharmacopœia:—

potassium, sodium, ammonium, lithium, barium, calcium, magnesium, zinc, aluminium, iron, chromium, manganese, arsenic, antimony, tin, copper, bismuth, lead, silver, mercury, gold and platinum.

(e) Carbon, its oxides, cyanogen, hydrocyanic acid, cyanide of potassium, ferrocyanide and ferricyanide of potassium, oxalic acid. The chief methods of preparing marsh gas, ethylene, alcohol, aldehyde, acetic acid, acetate of ethyl, spirit of nitrous ether, nitrite of amyl, hydrate of chloral, chloroform, iodoform, ether; the principal properties, reactions, and mutual relations of these compounds. The candidate will also be expected to possess a general knowledge of the methods of estimating carbon, hydrogen, oxygen and nitrogen, in organic compounds and of obtaining molecular formulæ.

Note.—Candidates will be expected to solve simple problems relating to the weight and volume, under different conditions of temperature and pressure, of elements and compounds concerned in chemical reactions.

Practical Examination—Chemistry.

To determine the specific gravity of liquids and solids, to be familiar with the general construction and use of the thermometer and barometer.

To recognize by chemical tests the more important non-metallic elements and compounds, as well as the metals and salts indicated in the foregoing list; to detect the chief impurities in those that are included in the British Pharmacopœia; to recognize by their physical properties those which possess well-defined characteristics.

To identify by chemical tests the organic compounds before enumerated, and in addition tartaric and citric acids, starch, cane sugar, grape sugar, salicin, quinine, morphine, and strychnine; and to detect the impurities in such as are included in the British Pharmacopœia.

To perform those volumetric determinations which are described in the British Pharmacopœia.

To quantitatively determine the total alkaloids in cinchona bark, and in the tincture and extract of nux-vomica, and the morphine in opium.

The candidate will further be expected to have a practical acquaintance with the methods of preparing the more important inorganic substances, including the non-metals and their compounds, and such metallic compounds as are included in the British Pharmacopœia, and also the following organic compounds:—Ether, chloroform, spirit of nitrous ether, nitrite of amyl, acetate of ethyl, and hydrocyanic acid, so that he may be able to explain to the examiner the operations involved in their preparation, and, if called upon, to perform the operations or certain stages of them himself.

The **President** said all the members of Council knew the different attempts which had been made to get powers for enforcing a curriculum. In the course of the discussions which had taken place on the subject both in that house and elsewhere suggestions had been made from time to time that it was not wise and hardly fair to candidates to give them only the very condensed information to be found in what was called the schedule, as it was thought that while the short general particulars there found might have been sufficient twenty years ago, they were hardly adapted to examinations at present. Accordingly the Boards of Examiners, some four years ago, considered the subject and drafted a schedule after conferences with the Committee and the professors, and this schedule had now been finally approved by the Boards of Examiners both in London and Edinburgh, each branch of the subjects having received the individual as well as corporate sanction of the examiners. That being so, he brought forward this motion with some confidence and in the hope that although the enlarged schedule might be thought by some to be conducive to cramming, still, since the teaching would be founded, as it ought to be, on the schedule, it would at least give every person who thought of presenting himself for examination the means of knowing what he had to pass in, and that at the beginning of his career. At present young men did not know, and often had to wait until after their apprenticeship before they knew how much chemistry, botany, and other things they had to acquire. Moreover, in examinations covering six subjects there was a tendency on the part of examiners, which it was very difficult to prevent, to get a little wide of the subject. Obviously the scope in chemistry and physics was enormous, and it was much the same in botany and other subjects, and there was practically no limit to any one of them, except the plain common sense of the examiner, and that was sometimes a little affected by the circumstances in which he was placed. The mixture of knowledge and ignorance—perfection of attainment on the part of one candidate, almost absolute ignorance in another, and mediocre knowledge in a third—had rather a bewildering effect. He thought it was desirable and just that while on the one hand the student was given a complete schedule to which he could work, and which would also guide his teachers and the authorities of such colleges as those at Nottingham; on the other hand the examiners should also be tied to the schedule, and not allowed to wander outside it. When this schedule was in force the examiners would be bound by it equally with the candidates. Taking it all round the schedule would speak for itself, and he would not therefore take up time by enlarging upon it. Although it looked a vast thing by the side of the present one, and to some might look much more formidable, those who had any experience of examinations would agree that on the whole it would be better for the candidate. He also thought it would tend to increase amongst candidates a desire to get the best form of knowledge, and to eschew as much as possible those short cuts to the examinations which were so much advertised, and which, as an old examiner, he knew were often practised by young people who had no one to advise them.

Mr. **Hampson** seconded the motion. This schedule mainly commended itself to him because it had received the support, after careful consideration, of the teachers as well as the examiners. It had been considered very frequently, and finally had received the almost unanimous support of the committee, and would, he believed, be a great boon not only to those who had to be examined, but to teachers.

Mr. **Martin** moved as an amendment—

> "That the consideration of the means of indicating to students the range of the subjects of the examinations be deferred until they can be considered in connection with an improved method of conducting the examinations themselves."

It was a matter of some surprise to him that a question of such grave importance, which admittedly would have such a widespread influence on education for good or for evil, had been presented to the Council in this undignified and informal manner. He did not think the Board of Examiners had been intentionally discourteous to the Council, but a question of this importance might have been presented by a deputation, of whom questions might have been asked, or at least by means of a formal report, setting forth the reasons which had actuated the examiners, after consultation with the professors, in adopting this method of getting out of the difficulty which confessedly existed. When he came to consider the subject itself, he was surprised that the Board had not made the slightest allusion to the Preliminary examination, for if anything wanted an amended schedule surely it was the Preliminary, which was almost identical now with what it was twenty-five years ago, although the general education of the country had improved during that period probably 50 per cent. Yet, in respect to the Preliminary, they practically stood still. There was confessedly a want of harmony between education and examination, and they were told that this was in consequence of the bald and meagre schedule put forward by the Board as to the subjects in which it examined. He entirely demurred to that view, and thought the Council must look far deeper. The inequalities between the two arose in his mind chiefly from two things, the constitution of the Board of Examiners and the method of conducting the examinations. With regard to the constitution of the Board that was somewhat delicate ground, and he hoped no one would interpret anything he might say as showing any disrespect to any individual examiner or to the Board collectively. They were all men of ability and of conspicuous fairness, but he should like to say in connection with this, what the President had already said, that a machinery which might have been perfectly effective twenty-five years ago was not necessarily suited to modern requirements. At that Board there was a most important element in examining men for a technical pursuit, the practical element, but there were other elements which must be combined with that at this stage of the Society's history, which would be a relief to the examiners and be of considerable assistance in ascertaining the fitness of candidates to receive the diploma or hall mark of the Society. Passing on to the method of conducting the examinations, there were subjects included which did not in the slightest degree lend themselves to the *vivâ voce* method, but in which that method only was employed. He could not imagine how any man could be fairly examined *vivâ voce* in physics or chemistry. How could you expect a nervous man to say what was meant by the undulatory theory of light? But when this schedule was published and a man was asked to define Ohm's law, there would be an answer as complete and polished and to which there could be no more cavil than there could to that given in the Church catechism to the first question, viz., N. or M.; and to that answer the maximum number of marks would have to be awarded. But when one considered what effect on the brains of the student the learning of that answer would have he thought it would be about the same that turning a barrel organ in front of a phonograph would have on the musical education of that instrument. Some, he feared, had passed through the examination room so long ago that they did not quite realize the condition of things that prevailed there. A single examiner stood up in front of a single candidate and examined him *vivâ voce* and appraised his answers. It was customary in nearly all examining bodies, even after the candidates had had the advantage of a written examination, for the *vivâ voce* to take place in the presence of two men, one of whom asked the question, and the other assessed the answers and totalled the marks. The disadvantages of the system adopted by this Board was, that when a man entirely competent had gone through the hands of a certain number of examiners he came face to face with the last one, who might be examining in chemistry, and he might be asked, Give me a liquid test for carbon? The man might be a trained chemist, capable of making an estimation of steel, and giving the amount of combined and uncombined carbon in it, but he ransacks his memory in vain for a liquid test for carbon, and feels inclined to ask, almost in the words of a celebrated modern writer, Are things what they seem, or is modern chemistry played out? The result would be that for the next ten minutes it is a veritable game of cross purposes, and the examiner, although very anxious to pass the candidate, is obliged to report that he cannot do so. It was the system which was at fault. A liquid test for carbon might be a very fair and proper question for all he knew, but under the present system inequalities must arise, unless the examiners were a little more than human. It might be said that the Government visitors approved this schedule, and that they found no fault with the examinations, but so far as he knew, it was no part of their duty to criticise the constitution of the Board, or to offer suggestions on this point. The Government visitor was a human being, and able as he might be, he was not perfect, and when he came into the presence of the examiner and examinee, the conditions were exactly what he said, though there would be no conscious unfairness. Publishing this or any such schedule was, in his view, putting the cart before the horse; instead of examining on the area of education it was inviting education to conform itself to the area of examination, and that according to all competent authorities was an utterly erroneous system. A good many statements had been made, and many gentlemen were ready to accept the "I tell you" of the President, which usually was most valuable; but in this case he should like to ask those who were going to vote for this schedule what pains they had taken to inform themselves of what was the custom of other examining bodies which had the responsibility of conferring degrees entitling the the holder to practise law or medicine. For some years he had taken considerable pains to collect information on this point from all the universities in the United Kingdom and in other parts of the world, and he could say that such a schedule was absolutely without a parallel. There were examining bodies which issued a more or less detailed syllabus; the London University did to a certain extent, much more detailed than the teaching universities; but after a considerable amount of inquiry, extending from Aberdeen to London, he found that a schedule detailed to this extent was without a parallel.

The **President** remarked that Mr. Martin's inquiries had had reference to bodies where there was a curriculum in force and an examination upon it.

Mr. **Martin** said that did not apply to London University. For the reasons he had given he thought it would be wise to defer the application of such an extended schedule until the Council could consider the examinations of the Society as a whole. When this was published it would only be necessary to go one step farther, and then it would be possible to do away with the Board of Examiners altogether, for the Secretary and the clerks in the office would be able to conduct the examinations as well as the ablest examiners. We would not take the responsibility of deciding in the year 1890 that materia medica did include *Inula Helenium* and not *Potentilla tormentilla*, or that *Althæa officinalis* was included, while *Erythræa Centaurium* was not. As they had just been informed, the examiners were to be bound by the schedule as much as the examinees, but the same limits could not be put upon text books. If this matter had been thoroughly discussed in Council, he thought many suggestions might have been made for accomplishing the end aimed at without introducing the grave elements of danger which seemed to him involved in the present scheme, and he therefore proposed the amendment he had read.

Mr. **Storrar** thought Mr. Martin had made out a sufficiently strong case to call for discussion, and he would therefore second the amendment. He believed the motive which actuated them all was to secure that the examinations should be the test of education and not of successful cramming, and it certainly appeared to him that the schedule went too much into detail, and might lead the student simply to study those details and not take an all-round view of the subject in the curriculum. He seconded the amendment mainly for the sake of having the matter further discussed.

Mr. **Martindale** thought Mr. Martin had brought forward an indictment against the Board of Examiners which was hardly worthy of him. He believed the examination of candidates by one examiner was the mode generally adopted throughout the country. He was acquainted with the practice of several boards, and with one or two exceptions they were all conducted in a similar way with regard to the *vivâ voce*; though in the College of Surgeons and the Conjoint Board of the Colleges of Surgeons and Physicians, something like what Mr. Martin had indicated was the practice. At any rate this schedule was a step in the right direction, and would have a good effect he believed on the examiners in keeping them within a certain line. It was hardly as full as he should like to see it in some respects. He remembered once Dr. De Vrij telling him that Holland was a freer country than England, for there candidates were examined in pharmacy without knowing where or how they obtained their knowledge, but then they sometimes examined the candidate for a week. He should like to see something of that kind, but it was quite impracticable at present, and the issue of this schedule would certainly be an advantage to the candidates respectively in the two subjects of chemistry and botany. If the examiner were allowed to go too widely over the ground, it was impossible for the candidate to know what he was to prepare for. Materia medica, he thought, was rather too limited, and the same with regard to dispensing, in which he thought a knowledge of the metric system ought to be required. This system was still hardly known in England at the close of the 19th century, though it was universally adopted on the continent, but it was used to some extent in London, and he thought all candidates ought to be familiar with it, so as to be able to dispense rhubarb or calomel by it. He also noticed that the recognition of pharmaceutical preparations was omitted from the pharmacy branch, which was not perhaps of much importance, but it would be possible perhaps for a youth of good memory to cram up the whole of the practical pharmacy, and have had hardly any practical experience in handling the things themselves. Still that was a species of knowledge which would soon be gained, and the omission was not perhaps of so much importance as might be imagined. On the whole, he was very desirous of taking this scheme as an instalment, and seeing how it worked for a few years.

Mr. **Hampson** scarcely thought Mr. Martin could be in earnest, especially as he made the very rash statement that with that schedule it would be possible for the clerks in the office to conduct the examinations.

Mr. **Martin** explained that he had said this would be possible when it was carried one step farther.

Mr. **Hampson** said Mr. Martin had further stated that the examiners would not be able to do anything in the way of ascertaining whether a man was crammed or not, or what was the amount of his knowledge, because the schedule was so particular in certain lines. That was a very grave accusation, and he ventured to contradict it absolutely. Whatever the amount of detail in the schedule, there would still remain sufficient good sense in the examiners to detect the character of the answers given by the candidates. He was entirely in accord with Mr. Martin as to the Preliminary examination, but that was not a matter involved in the schedule at all. This was only a step, and he believed it was a wise step, which would commend itself to the majority of intelligent men.

Mr. **Schacht** sympathized a good deal with Mr. Martin in his desire that the whole subject of the examinations should be considered, but he did not see why the Council should not deal with a portion because it could not at the moment deal with the whole. There was no subject on which there were more difficulties realized by thinking men than that of examinations, and the question of how far it was a fair test of knowledge under all circumstances lay at the root of the difficulty. The next question was how examinations could best be arranged so as to attain that great end. That also was a difficult question, but because the way to absolute perfection was not apparent, it was not a reasonable or business-like proceeding to hesitate about adopting what was an improvement in one part. At present the Council was not asked to decide on every possible theoretical improvement in the process of examination. No one said the arrangements were perfect, and when the time came for discussing the whole subject, he should hope to take an intelligent part in it; but that time had not yet arrived. He asked himself was there any value in any schedule, and he came to the conclusion that there was very great value, and it then became a question of degree how far it should extend. In going up and down amongst men of science he had found there was a common notion that the Society's examinations were really a very small affair, and covered a very small ground, and that those who took their certificates were not very cultured gentlemen, and he felt sure that the publication of this schedule would do a great deal to remove that impression. It would also be of great use in keeping unsuitable youths from being apprenticed, for it ought to be shown to everyone who contemplated entering the business, and to parents and guardians, and in some cases might probably have the effect of leading them to prefer some other calling. And when a lad was apprenticed it would be of great use to him, in showing what he had to work up to, and in the same way it would be useful to teachers. Perhaps the point he had first alluded to was the most important, that of showing the world of culture what their candidates had to go through, and that was a point which had perhaps not been sufficiently attended to.

Mr. **Hills** did not think Mr. Martin's speech was quite worthy of his ability. He knew the speaker took a great interest in everything concerning education, but the arguments had not carried conviction to his mind. In the first place, as to the way in which the schedule came before the Council, he thought it came in the usual way; it had been under consideration for a considerable time, and it would be a great responsibility to reject a scheme which came so strongly recommended by those best fitted to judge. He regarded it as a move in the right direction. Though the members of Council might all agree with Mr. Martin in many of his wishes, these were at present impossible of attainment. The greatest difficulty was the financial one. It was not possible at present to divide the examinations, or to have a second examiner or assessor, with the fees the Society was authorized to take. If there were power to charge a fee of ten guineas for passing the Minor some of Mr. Martin's suggestions might be adopted. He did not profess to have studied all other examinations, but he might point out that the position of the Society was a peculiar one; by Act of Parliament it was obliged to examine all who presented themselves before they were allowed to earn their living, and it was only fair, from the examinees' point of view, that they should know what they were to be examined in. It was not a question of honours, but of a man getting his living.

Mr. **Southall** supported the motion, but at the same time thought it would be well if the Major examination were a written instead of an oral one.

The **President** said the whole of Mr. Martin's suggestions were outside the schedule altogether, and there was nothing to prevent him doing what he proposed, whether it passed or not. It was a mere matter of form. The first thing the Council had to do, following the lines of the Board of Examiners, was to say whether that was a proper scheme on which the examination should proceed. If Mr. Martin would move for a consideration of the Preliminary examination, or of how far the written examination should be extended, his colleagues would all be glad of his assistance, but it was necessary to proceed gradually and not needlessly alarm the candidates. For the last twenty years those who took an interest in the examinations had been desirous of making the Major examination a written one and a practical one; in the old voluntary days it was a written one chiefly. But although it was possible to get evidence of a certain amount of knowledge out of the men who came up for the Major by *vivâ voce* examination, the majority of them could not write papers; the current of education all round was not up to it. The fallacy which underlay Mr. Martin's criticisms and nearly all his suggestions was this. He measured examinees by himself, and assumed, as many others did, that when a candidate came up he was not only able to pass, but that he was an experienced chemist, which was a totally different thing. The medical man who had just obtained his diploma was not the one a man would select to practise on him; he was not an experienced medical man. In all these cases the examination simply fixed the maximum of knowledge requisite for the public safety, and that was the line to which the examiners must work. The man who had only just passed the Minor could not be expected to have the knowledge and experience of a man of thirty-five, and he held that a man who presented himself for the examination should not be expected to be equal to an accomplished dispenser in a West-end house. Any attempt to set up such a standard would be unjust. He agreed largely with Mr. Martin as to the advantage of a written examination, but the discussion was purely academic; fresh bye-laws and other things were necessary before any such thing could be introduced. There was nothing to prevent Mr. Martin doing all he wanted, whether the schedule passed or not. It was said the hands of the examiners would be tied, but they could be untied again by the same process if necessary, and if it was found by experience that any mistake had been made the schedule could be altered. If Mr. Martin thought he could get twenty men of different views on the Board of Examiners or the Council to agree on an improved method of examination he was very sanguine. He hoped he would withdraw the amendment and let the schedule pass unanimously, and that he would then occupy his leisure time in elaborating a scheme, which he might bring forward by way of motion or publish in the Journal. He agreed with him as to the Preliminary, and the adoption of this schedule would be a strong argument for revising that, but he thought this matter could be dealt with much better in parts than as a whole.

Mr. **Martin** said there were one or two points he wished briefly to explain. Mr. Hampson had misunderstood him about the clerks in the office conducting the examinations; what he intended to convey was that when the schedule was carried a step further and a catechism published upon it, as would probably be the case within a few months, then the clerks would be able to examine. He was astonished to hear Mr. Schacht say the length of this schedule would influence the world of culture. He could not conscientiously withdraw the amendment, even if no one voted for it but himself.

The amendment was then put and negatived, and the motion was carried.

The Pharmaceutical Conference.

The following were appointed delegates to the Pharmaceutical Conference at Leeds:—The President, Vice-President, Treasurer, and Messrs. Abraham, Allen, Cross, Leigh, Martin, Martindale, Newsholme and Schacht. The Secretary, Editor and Sub-Editor were also requested to attend.

Railway Rates.

The **President** stated that the Board of Trade had met to a very large extent the views of the retail traders, including chemists and druggists, on the subject of railway rates. It was mainly owing to the efforts of a number of prominent members of the Society, Mr. Umney, Mr. Southall, Mr. Barclay, Mr. Woolley, Mr. Francis, and others, that the concessions with regard to "smalls," which was really a very important one, had been made.

The **President** said a communication had been received from Mr. Sargent, of Kensington, who complained that the Council did not institute proceedings in certain cases, which could hardly be particularized without a breach of confidence, but he wished to state that the grievance was purely an imaginary one, and that the Council had not the statutory power to do what was desired. He made this statement because he understood that a number of Local and Divisional Secretaries and other prominent members of the Society were being favoured with similar communications from Mr. Sargent, and they were equally at a loss to know what it was the writer wished. As he understood, Mr. Sargent desired certain legal proceedings to be taken under conditions which rendered such a course impracticable. It was only right, therefore, that the members of the Society throughout the country should know that Mr. Sargent was under an entire misapprehension as to the law and the conditions under which the Society could act.

The Council then went into committee to consider the legal portion of the report of the General Purposes Committee. On resuming the report and recommendations were adopted unanimously.

Report of Examinations.—*July*, 1890.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (15th)	8	6	2
" (16th)	7	6	1
" (17th)	7	2	5
	—22	—14	— 8
Minor (15th)	23	7	16
" (16th)	24	4	20
" (17th)	25	9	16
" (18th)	29	14	15
" (22nd)	33	16	17
" (23rd)	31	20	11
" (24th)	32	16	16
" (25th)	30	14	16
	—227	—100	—127
Modified (18th) . . .	3	3	0
	—	—	—
	252	117	135

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (16th)	3	3	0
Minor (16th)	11	3	8
" (17th)	14	6	8
" (18th)	13	6	7
" (22nd)	14	6	8
" (23rd)	13	2	11
" (24th)	13	7	6
" (25th)	12	7	5
	—90	—37	—53
Modified (25th) . . .	1	1	0
	—	—	—
	94	41	53

Preliminary Examination.

8th.—Candidates examined, 359. Passed, 145. Failed, 214

24th.—Three certificates received in lieu of Society's examination.

THE NEXT MEETING OF COUNCIL.

The PRESIDENT announced that the next effective meeting of the Council would be held in October. In accordance with the Bye-laws, the summonses would be issued for a meeting in September, but a quorum would not be formed.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual picnic of the above Association took place on Thursday afternoon, when a good muster of ladies and gentlemen proceeded to Hazleford Ferry, where a substantial meat tea had been provided at the Star and Garter Hotel.

In the unavoidable absence of Councillor Fitzhugh, Mr. W. H. Parker presided, and very wisely decided that, owing to the beautiful weather, no speeches should be made.

The evening was spent in cricketing, boating, and rambling on the hills, those who chose to do the latter being amply rewarded for their trouble by the beautiful and extensive views obtained from the summit.

The picnic was a most enjoyable one, and the company returned to Nottingham about ten o'clock, well pleased with their outing.

Obituary.

WILLIAM HODGKINSON.

We very much regret to have to record the death, on the 1st instant, of Mr. William Hodgkinson, Pharmaceutical Chemist, of the firm of Hodgkinson, Treacher and Clarke, Upper Whitecross Street. Aged 70 years. Mr. Hodgkinson became a member of the Pharmaceutical Society in 1845, and always manifested a considerable interest in its proceedings. In 1869 he was elected an Auditor to the Society, and he continued to perform the duties of the office for a period of twenty years, when he retired in consequence of ill-health.

Notice has also been received of the death of the following:—

On the 25th of July, Mr. George Young Sharpe, Pharmaceutical Chemist, Lansdowne Road, Holland Park, London. Aged 75 years. Mr. Sharpe had been a member of the Pharmaceutical Society since 1843.

On the 1st of August, Mr. John Lindsay, Chemist and Druggist, Biggar, Lanarkshire. Aged 52 years.

BOOKS RECEIVED.

ARZNEIBUCH FÜR DAS DEUTSCHE REICH. Dritte Ausgabe. (Pharmacopœa Germanica, editio III.) Berlin. R. von Decker. 1890.

AN ELEMENTARY TEXT-BOOK OF HEAT AND LIGHT. By R. WALLACE STEWART, B.Sc. London: W. B. Clive and Co. 1890. From the Publishers.

FORMULAIRE DES MEDICAMENTS NOUVEAUX ET DES MEDICATIONS NOUVELLES. By H. B. LIMOUSIN. Paris: J. B. Baillière et fils. 1890.

Review.

PHARMACOGRAPHIA INDICA. A History of the Principal Drugs of Vegetable Origin met with in British India. By W. DYMOCK, C. J. H. WARDEN and D. HOOPER. Vol. I. 1890.*

This work is practically an enlargement of the 'Materia Medica of Western India' previously published by Dr. W. Dymock of Bombay. In the present work it has been sought to include the materia medica of the whole of India, many of the products employed in native medicine in the eastern half of India being quite different from those used on the Western Coast. Dr. Dymock has therefore availed himself of the assistance of Dr. C. J. H. Warden, Professor of Chemistry in the Calcutta Medical College, and of the chemical experience and energy of Mr. D. Hooper, the quinologist to the Government of Madras, to aid him in making it more complete. In addition, it is evident from the text, that some valuable and interesting information has also been contributed by Mr. J. G. Prebble, of the firm of Kemp and Co., of Bombay. The result of the labours of Dr. Dymock and his colleagues has been to produce a most valuable work of reference on all that relates to the vegetable drugs of India. The 'Pharmacographia' of Hanbury and Flückiger has been taken as the type of what such a work should be. There are probably few who combine, as Dr. Dymock does, great scholarly attainments in eastern languages and literature, with an extensive practical knowledge of the drugs themselves, and who could throw so much light on the drugs mentioned by ancient writers as he is able to do. The 'Pharmacographia Indica' is, however, not valuable merely to those residing in India and to merchants importing Indian drugs, but also to students of materia medica in this country, since the information on a large number of the drugs which are also used in this country is brought more closely up to date than in almost any other work on materia medica. Evidence of the careful perusal of the best European sources of information is present on almost every page, whilst the voluminous and scattered literature relating to drugs, to be found in the journals of various Asiatic scientific societies, has evidently been carefully collated. Thus we find *Delphinium Zalil*, recently described in the 'Transactions of the Linnean Society,' by Dr. J. E. T. Aitchison, referred to in the early pages of the work, where the information must have been incorporated almost immediately after its publication. The articles on Indian opium, Indian tea, myrrh, gum acacia, and many other drugs, form contributions to materia medica of the greatest value, which must of necessity be referred to by future writers on this subject. The amount of chemical investigation of Indian drugs that has been accomplished during the last few years, largely due to the instigation of Dr. W. Dymock, and the liberal supplies furnished by him for the purpose of analysis to European chemists, is simply marvellous. The chemical work that has been done in India, although in many cases not carried to a definite conclusion, but consisting rather of proximate analyses, is of great value for future reference, since the exact modes of treating the various drugs, and the solvents used are always stated. The physiological action is in many instances described, and the reputation of the drug among the natives confirmed, or contradicted, as the case may be. There is thus placed before Western nations a repertory of materia medica, replete with valuable, because practical information, from which the searcher for new remedies may cull many promising articles.

The references for quotations or extracts taken from other authors are given in the most conscientious manner

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* Kegan Paul, Trench, Trübner and Co., Ld.

This is all the more useful that it becomes thus possible to run down such a statement as that theobromine, cocaine and guaranine are physiologically identical (p. 182), a statement that needs some qualification. But although the references are always given to the original papers of other writers, when the subject matter represents work done by one of the authors themselves, it is not always possible to decide to whom it is to be attributed.. In cases where this work has already been published in the *Pharmaceutical Journal* the particular author is of course easily discovered, but in other cases it would add to the precision of future quotations if the initial of the author were given in parenthesis at the end of the paragraphs. One feature of great usefulness is that in every case a reference to a published figure or description of the plant is given. Considering the polyglot character of the synonyms given and of the works consulted typographical errors are remarkably few.

The immense increase in the information concerning Indian drugs in the present work will readily be understood from the fact that in vol. I. of 'Pharmacographia Indica' the *Rosaceæ* are concluded on p. 585, whilst in the 'Materia Medica of Western India' the same point is reached on p. 304, the size of the page in both cases being practically the same.

It is hardly possible to find any point omitted in the present work, notwithstanding the rapidity with which scientific information is poured out from the press in modern days, the only one observed being the fact that the oil attributed to *Euodia fraxinifolia* by Helbing was subsequently shown to be that of *Xanthoxylon Hamiltonianum.*

Dr. Dymock and his colleagues may be heartily congratulated on having brought to such a pitch of perfection this useful work, which it may confidently be predicted will take as high a place in the pharmaceutical literature of the east as its namesake has in that of the west.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

EARLY CLOSING IN LIVERPOOL.

Sir,—I could have wished that "One of the Dissentients" had been within earshot on Saturday morning, when the Journal was laid on the breakfast table, that he might have heard the peals of laughter with which his far-fetched guesses at the writer's temperament and pecuniary position were greeted, the climax being reached when the imaginary "turnip field" was arrived at. While thanking your correspondent for his somewhat flattering allusion to the style of my last letter, I have to regret my inability to return the compliment with reference to his effusion in last week's Journal, which is so unmistakably "frothy" in the concluding paragraphs intended for my behoof, as to render it difficult to furnish a serious reply. I fully expected that mention of the fact of my taking the Thursday half-holiday, and occasionally extending it, would operate, to use the language of Mr. Richard Swiveller, as "an unmitigated staggerer" on "Dissentient," and so it has proved. However, as "facts are chiels that winna ding," your correspondent has been compelled to resort to "chaff" in place of argument, not deigning to notice my remarks respecting those "young gentlemen" of seidlitz powder and cherry tooth paste proclivities, to whose requirements he seems so anxious to minister both in season and out of season. "Open confession is good for the soul" is the proposition with which he sets out. Now confession implies previous concealment, but as I had nothing to conceal so I could have no "confession" to make, as "Dissentient" erroneously insinuates, and while appraising at its true value his complimentary allusion to myself as "a candid man," I may, perhaps, crave the additional credit of possessing the courage of my convictions and the candour of appending to them my real signature. As to "what would be thought in Liverpool" of "a chemist's shop closed all day," I would merely ask what "passers by" would care if any of the three things named by "Dissentient," viz., death, removal, or an execution on the premises, had happened? Not a jot, so far as my observation goes. Our friend and those who think with him vastly overrate their own importance in the public eye if they imagine the public cares a straw about them or their business except as a mere matter of convenience. With regard to the guess hazarded as to the writer's being in possession of "a comfortable competence by the vending of drugs and chemicals" it is wide of the mark indeed, the said "competence" being at present "*in nubibus*," as in the case of the majority of our craft. In the meantime, however, I see no reason for playing the *rôle* of Gradgrind, or occupying myself in, and treating others to such pessimistic forebodings as your correspondent. As to his advice anent my "hobby," I may inform him that it has been a pursuit of mine for above thirty years, and I may therefore be presumed to be sufficiently well versed in the management of my steed to prevent my being "thrown" by it at this time of day. Methinks however that I discern in his advice the wish that is father to the thought. I have been as much amused by his allusion to "the chain that fastens us to the counter" as he can possibly have been by the imaginary placard he has conjured up, and would in return present him with the advice to "snap the chain" for himself and abandon the helpless cry of *non possumus*. We read of captives who by long endurance have become so enamoured of their bondage as to hug their chains, and your correspondent appears so desirous of emulating their example that I can almost imagine his exhibiting the early (!) closing appeal "never shop after 9 o'clock," with the first word cut off. Coming to the "turnip field," I fail to see why that should be so contemptuously singled out as a target for his witticisms. Sure I am that it will bear favourable comparison with a chemist's shop as a subject for the camera, and prove quite as agreeable for the eye to contemplate, especially when, as is the case this year, the crop is so luxuriant. This latter piece of information will doubtless prove news to "Dissentient," who, unable to "snap the chain that fastens us to the counter," has, I am afraid, no chance of looking either at turnip fields or newspapers. The "supposititious placard" which has so tickled your correspondent's fancy must be like Mahomet's coffin, hanging in mid air, there being no "shutters" on which it could be "stuck;" nor do I choose to take "passers by" into my confidence to the extent of making known to them, when from home, either my whereabouts or occupation. As for "the druggist round the corner," I am glad to say that he and I are not only on most cordial terms, but frequently compare notes as to prices, etc., not omitting to join in a hearty laugh over the dismal prognostications of "One of the Dissentients." I feel that some apology is due to you and your readers for the length of this my last letter on the subject. What I contend for is that the public is not so exacting as to demand the sacrifice of the chemist's leisure, health and comfort to the extent that such writers as our friend the enemy would have us believe, and which in my own case I think has been amply proved.

Mexborough. R. J. SHIELDS.

OREXIN.

Sir,—As orexin is not unfrequently prescribed in cachets it should be borne in mind that it has a very unpleasant burning taste to the palate, and if by chance the patient bites up the cachet instead of swallowing it whole (which has happened frequently), the consequence may be serious.

Several cases have come under my own notice, and in one the patient, an old man, became black in the face and almost went into a fit.

Should, therefore, cachets of orexin be prescribed, the patient should be warned against biting them.

W. MURTON HOLMES.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Penney, Matthews, Inquirer, Lex, Apprentice.

THE NEW GERMAN PHARMACOPŒIA.

ARZNEIBUCH FÜR DAS DEUTSCHE REICH. Dritte Ausgabe. (Pharmacopœa Germanica, editio III.)

(Continued from page 103.)

Among the new introductions into the German Pharmacopœia, *Acetanilidum* (antifebrin) is described as melting at 113° and boiling at 295°. It should dissolve in 194 parts of cold, 18 of boiling water and 3·5 parts of spirit, and be easily soluble in ether and chloroform, yielding neutral solutions. It is to be identified by its developing aniline with caustic potash, and isonitrile if chloroform be added; ferric chloride does not change the colour of the aqueous solution (distinction from antipyrin). 0·1 gram boiled for a minute with 1 c.c. of hydrochloric acid turns red on the addition of 2 c.c. of solution of carbolic acid and chlorinated lime, passing to indigo blue with excess of ammonia. This (the indophenol reaction) is also given by phenacetin, which however is distinguished by the chromic acid reaction. Sulphuric acid forms with antifebrin a colourless solution.

Trichloracetic acid must boil at 195°, volatilize without residue, and contain only traces of chloride; warmed with an alkali it yields chloroform.

Benzoated lard is not made with benzoin, but with benzoic acid (obtained from the gum-resin).

Ethyl bromide should have a specific gravity 1·445 to 1·450, and boil at 38° to 40°; it should be neutral in reaction, yield to water traces only of bromides or chlorides, and when shaken with an equal volume of concentrated sulphuric acid should not develop a yellow colour within an hour (indicating the employment of a pure spirit in manufacture).

Agaricine, which has not been used in this country to any extent, is described as a white powder melting at 140°, slightly soluble in cold water, swelling with hot water, and yielding on boiling a cloudy frothing slightly acid solution, which becomes very turbid on cooling. Soluble in 130 parts of cold, 10 of hot spirit, more easily in hot acetic acid; slightly soluble in ether, scarcely at all in chloroform, but dissolved by solution of potash.

Amylene hydrate (dimethyl-ethyl-carbinol) should be clear, colourless and neutral in reaction, soluble in 8 parts of water, miscible with spirit, ether, chloroform, petroleum spirit, glycerine and fixed oils. Boiling point 99°-103°; specific gravity ·815 to ·820. 20 c.c. of a 5 per cent. solution should not decolorize two drops of solution of permanganate of potassium within ten minutes; ammoniacal solution of nitrate of silver should not be reduced when warmed with the aqueous solution (absence of ethylic alcohol, aldehyde, etc.).

Antipyrin is described as consisting of tabular colourless crystals, with a scarcely perceptible odour and slightly bitter taste; it should melt at 113°, be soluble in less than its own weight of water, in 1 part of spirit, 1 of chloroform and 50 of ether. A 2 per cent. aqueous solution gives the following reactions: with tannic acid a white precipitate; 2 c.c. with 2 drops fuming nitric acid a green coloration, passing to red when the solution is boiled and another drop of acid added. 0·2 c.c. diluted to 2 c.c. gives a deep red colour with 1 drop of solution of perchloride of iron; with 10 drops of sulphuric acid the colour changes to bright yellow (distinction from antifebrin, phenol, kairine, resorcin, etc.). Antipyrin should further be free from inorganic matter. Its aqueous solution (1 in 2) should be neutral in reaction, free from acrid taste and remain unchanged by sulphuretted hydrogen.

Subnitrate of bismuth is obtained free from arsenic by dissolving bismuth (which, it may be observed, is not in the Pharmacopœia) in nitric acid 1·2 and allowing the solution to stand several days, pouring off and evaporating to crystallization. The crystals are rubbed down with water and thrown into boiling water. One gram of the subnitrate thus obtained, heated as long as vapours are evolved, cooled, powdered and dissolved in chloride of tin solution, should not produce any coloration within an hour.

For *quinine* the Kerner-Weller ammonia test has been adopted. Tannate of quinine should yield not less than 30 per cent. of alkaloid on treatment with an alkali and ether.

Chloral formamide (chloralamide) should present white shining crystals melting at 114°-115°, dissolving slowly in 20 parts of water and 1·5 of spirit. It should be free from acid and more than traces of chlorides and yield chloroform when warmed with solution of soda.

The purity of *cocaine hydrochlorate* is ascertained by the salt dissolving in concentrated sulphuric and nitric acids without coloration and by the permanganate of potassium test; 0·1 gram in 5 c.c. water, to which 3 drops of dilute sulphuric acid and 1 drop of a 1 per cent. solution of permanganate of potassium are added, should yield a violet solution, which protected from dust should scarcely show any diminution of colour in half an hour.

Cantharidized collodion (1 in 1) is still made by exhausting cantharides with ether, evaporating and mixing with collodion. The method is well known to be defective.

Extract and *tincture of nux vomica* are prepared from the coarsely powdered seed (about No. 20 powder) and dilute spirit (7 spirit to 3 water). Neither the fineness of the powder nor strength of spirit are well adapted to ensure exhaustion of the drug.

Honey is not official, although there are two preparations, viz., mel depuratum and mel rosatum, for the latter of which a new and improved formula has been adopted.

The tests for the identity and purity of *homatropine hydrobromate* are insufficient. They are confined to precipitation by alkaloid reagents, the identification of the acid radical by silver and the nitric acid test applied as follows:—1 centigram with 5 drops fuming nitric acid is evaporated to dryness in a porcelain capsule and the residue treated when cold with alcoholic solution of potash; a transient violet colour is developed. This statement is scarcely in accord with experience.

Hyoscine hydrobromide should occur in colourless rhombric crystals. Dried at 100° it loses about 12·3 per cent. in weight; with the nitric acid test it gives a violet coloration.

Keratin is prepared by digesting shavings of quills first with a mixture of equal parts of ether and spirit and then with an acidulated solution of pepsin at 40° C. The residue is dissolved in acetic acid by prolonged boiling (30 hours), the solution strained, evaporated to a syrup, and dried on plates. It forms then a brownish yellow tasteless and odourless powder or scales, insoluble in ordinary solvents and dilute acids but soluble in alkalies and in concentrated acetic acid. It should not yield anything to water, spirit, ether or dilute acids, or to the latter combined with pepsin. It should not yield more than 1 per cent. of ash, or 3 per cent. of matter insoluble in acetic acid or ammonia.

Naphthalin melts at 80°, boils at 218°, is easily soluble in ether, spirit, chloroform, bisulphide of carbon and liquid paraffin; insoluble in water and does not impart to it an acid reaction. Shaken or warmed with sulphuric acid it should not develop a colour deeper than pale red.

Naphthol (beta-naphthol) melts at 122°, boils at 286° and yields with 1000 parts of cold and 75 of boiling water solutions which do not affect litmus paper. It is easily soluble in spirit, ether, chloroform and solution of potash or soda. The aqueous solution shows a violet fluorescence with ammonia, and turns cloudy with chlorine water. Ferric chloride produces a greenish (not violet) coloration. Naphthol dissolves in 50 parts of ammonia without residue.

Paraldehyde should have a specific gravity 0·998. When sufficiently cooled it solidifies, melting again at 10·5. Boiling point 123°–125°. It is soluble in 8·5 parts of water and the solution clouds when boiled (paraldehyde being less soluble in hot than in cold water). Spirit and ether mix with it in all proportions. Solid paraldehyde should not possess a melting point below 10°. From a 10 per cent. aqueous solution no oily drops should separate on standing. It should be free from chlorides, sulphates and more than traces of acid and should volatilize completely on the waterbath without leaving unpleasantly smelling residue.

Phenacetin is stated to melt at 135° and dissolve in 1400 parts of cold, 70 of boiling water and 16 of spirit to form neutral solutions. It is identified by the chromic acid reaction, which distinguishes it from exalgine and antifebrin, and is applied by boiling 0·1 gram with 1 c.c. hydrochloric acid for a minute, diluting with 10 c.c. water, filtering and adding to the filtrate 3 drops of chromic acid solution (3 per cent.): a ruby-red colour is gradually developed. Bromine water should produce no turbidity when added to a saturated solution of phenacetin in water (acetanilid, carbolic acid); concentrated sulphuric acid should dissolve it without colour.

Pil. ferri carb. are made from precipitated ferrous carbonate with sugar and honey.

Resorcin dissolves in 1 part of water, ·5 part of spirit, freely in ether and glycerine, but with difficulty in chloroform or bisulphide of carbon; melting point 110°–111°. The aqueous solution throws down a white precipitate with solution of subacetate of lead, and a dark carmine-red colour is developed when resorcin (0·05 gram) is warmed with tartaric (0·1 gram) and sulphuric acids (10 drops). The aqueous solution should be colourless and not affect litmus paper nor give off an odour of phenol when warmed.

Salol melts at 42°, is almost insoluble in water, but soluble in 10 parts of spirit and 0·3 ether. The alcoholic solution strikes a violet colour with dilute solution of ferric chloride. Excess of hydrochloric acid added to a solution in warm caustic soda precipitates salicylic acid and separates phenol. Salol should have a neutral reaction, and the aqueous solution is not altered by ferric chloride (carbolic or salicylic acid) nitrate of barium or silver.

Sebum salicylatum is mutton suet with 2 per cent. of salicylic acid.

The official *strophanthus* is the grey-green seed "supposed to be obtained from *S. Kombé* and *S. hispidus*."

Poppy capsules are exhausted with cold water instead of hot for making *syrup. papaveris*.

Sulphonal should melt at 125° to 126°, and dissolve in 500 parts of cold, 15 of boiling water, 65 of cold and 2 of boiling spirit. The production of mercaptan when heated with charcoal serves to identify it. It should be free from chlorides and sulphates. The boiling aqueous solution should be free from smell (mercaptan), and it should not immediately reduce permanganate of potassium solution in the cold.

Terpin hydrate melts at 116° and simultaneously loses water, by which the melting point is reduced to 102°. It is soluble in 250 parts of cold, 32 of boiling water, 10 of cold, 2 of boiling spirit, 100 of ether, 200 of chloroform and 1 of boiling acetic acid. Sulphuric acid forms with it a yellow solution, and if a hot aqueous solution is mixed with sulphuric acid a turbidity is produced and aromatic odour evolved. Terpin hydrate should not smell of turpentine.

Thalline sulphate is soluble in 7 parts of cold and ·5 parts of boiling water. Ferric chloride produces in a dilute aqueous solution a deep green colour, changing after a few hours to deep red. The solution in sulphuric acid is colourless, but immediately turns deep red when nitric acid is added.

Tinct. digitalis is prepared by macerating 5 parts of fresh, crushed herb with 6 parts of spirit, a method which has its advantages.

In making *tincture of strophanthus* the seeds are to be freed from oil as far as is possible by pressure; the cake is powdered and macerated with dilute spirit. Any oil globules floating on the tincture thus prepared are to be removed by filtration.

The leading additions and alterations, as they present themselves during a perusal of the work, have now been noted. In the chemical section a precision has been obtained that might well be aimed at in the next edition of the British Pharmacopœia. Notwithstanding that it is chiefly in this part of the work that progress must be looked for, English pharmacists will be well repaid by a careful study of the third edition of the Pharmacopœia Germanica.

NOTE ON LIQUOR FERRI, QUININÆ, ET STRYCHNINÆ PHOSPHATUM, PRO SYR. EASTON.

BY R. A. CRIPPS.

Having experienced some difficulty in making a preparation of the customary strength (1 to 3 of syrup by measure), which would remain clear during cold weather, I have obtained samples of this preparation representing several makers, and have submitted them to an examination, with the object of satisfying myself as to the possibility of such a preparation remaining clear when of full strength.

The results are so striking that I think they will prove of interest to pharmacists, indicatin how little reliance should be placed on this preparation as supplied in the ordinary course of trade.

The samples varied considerably in appearance when received. No. 1 was quite solid, from separation of phosphate of quinine; the colour varied from quite pale brownish-green to a full yellow-brown. This colour in every case deepened by keeping, and after six weeks varied from pale orange-brown in Nos. 2 and 6, to full red-brown in No. 1. Some of the samples, notably Nos. 7 and 3, had meanwhile deposited a whitish sediment containing iron; Nos. 2 and 6 were free from this objection.

The following table shows the results obtained by analysis. It will be noticed that the quantity of ferrous phosphate varied from rather less than one-half to about 10 per cent. above the correct amount; while only two samples contained such an amount of alkaloid (calculated as quinine phosphate) as might be reasonably expected, one of these being considerably above the quantity required by the B.P.C. formulary. One sample contained barely one-third of the required proportion.

The sp. gr. and free phosphoric acid also varied enormously; sample No. 5 contained sugar. All were free from metaphosphoric acid. The quantities are expressed in grains per fluid drachm.

No. of Spl.	Stated strength.	Sp. gr.	Free H_3PO_4.	Fe_32PO_4.	Alkaloid calcul'ed as quin. phosph.	H_2SO_4	HCl.
I. 1. . .	1 to 3	1·159	4·8	3·08	3·86	absent	absent
II. 2. . .	1 to 3	1·389	20·0	4·18	2·69	absent	absent
3. . .	1 to 3	1·357	20·0	3·6	2·7	trace	absent
4. . .	1 to 4	1·17	9·2	2·3	3·0	full trace	trace
5. . .	1 to 3	1·299	6·7	3·27	1·1	absent	absent
III. 6. . .	1 to 3	1·218	14·7	1·77	2·18	absent	mere tr.
IV. 7. . .	1 to 3	1·358	20·6	3·37	2.51	mere tr.	absent
B.P C. syrup × 4	1 to 3		21·2	3·8 (about)	3·18	absent	absent

No. I. Labelled "This preparation should not be kept in a store room of low temperature."

No. II. Labelled "Is liable to crystallize at a low temperature, should be kept at about 60° F."

No. III. Stated to contain 4 grains phosphate of quinine in each fluid drachm.

No. IV. Stated to contain 3 grains phosphate of quinine in each fluid drachm.

CHINESE CINNAMON.

BY HENRY HUMPHREYS, PH.C., HONGKONG.

It is generally supposed that Chinese cinnamon is the same thing as cassia, but there is reason to believe that this is not the case. One day I noticed our Chinese manager take a piece of bark out of his pocket, cut a bit off, and put it in his tooth. He explained that it was cinnamon, and that it was used to stop his toothache. I looked at the bark and asked him if it was not cassia he meant. He smiled complacently and remarked, "One does not pay 5 dollars an ounce for cassia." I have since investigated the matter, and although unable to identify the "Chinese cinnamon" plant with Ceylon cinnamon, owing to the impossibility of obtaining the flowering branches, the results of my inquiries tend to show that Chinese cinnamon differs very materially from ordinary *Cassia lignea*, if only in the fact that it is certainly obtained from very old wild trees, whereas the cassia of commerce is obtained from cultivated trees only (Ford).

I found the six samples I worked on and which I have sent to Mr. Holmes for further investigation, to differ from cassia in appearance, taste and smell, and to contain little or no mucilage. On the other hand the iodine test gave a similar reaction to cassia. Owing to the costly nature of the bark, I was able to experiment only on very small quantities.

The Chinese call their cinnamon bark by different names and pay more in some cases for an ounce of "cinnamon" than a picul (133⅓ lbs.) of cassia.

A cold aqueous infusion of all six samples yielded with iodine a bluish-black coloration, but with $HgCl_2$ there was no evidence of the presence of mucilage. The aroma of all six came near that of Ceylon cinnamon, but in some cases there was a pungency more consistent with the idea of their being derived from cassia.

One important point, however, I have been able to ascertain is, that "Chinese cinnamon" grows wild in Annam much further south than the West River in the Kwangsi and Kwangtung provinces, where cassia is cultivated.

The Chinese adopt the common name of Kwei for both cinnamon and cassia, but distinguish the two by an additional name; for instance, ordinary cinnamon is Jan Kwei and ordinary cassia Kwei pi.

Chinese cinnamon is never exported, owing to the heavy prices the Chinese pay for it. There are a good many varieties, all of which grow wild in Annam, in the neighbourhood of a mountain there, called Ching Fa. The most expensive kinds come from the mountain itself, and are obtained from trees one or two hundred years old. It is said that trees of this age emit a fragrance. The size of one of these trees is from twenty to fifty feet high, and four to five feet in circumference. Annamites, who go in search of these trees, usually carry provisions to last for two months. Owing to the enormous price the Chinese pay the trees are denuded of their bark and consequently die.

Ching Fa Kwei, so called because it comes from the Ching Fa mountain, is the best kind, and its cost is about 25 dollars an ounce. Chinese doctors say this kind of cinnamon is good for curing and purging disease of the lungs and kidneys, inflammation of the eyes, convulsions in children, toothache, etc. When a piece has actually cured a dangerous disease, it is called Shan Kwei or God's cinnamon, and is held to be invaluable by the Chinese, and if procurable costs from fifty to one hundred times its weight in silver.

Foo Kwei (bitter cinnamon) and *Ye Kwei* (wild cinnamon) are also obtained from the same mountain. An infusion of the former is colourless and bitter, while that of the latter gives a sweet taste and imparts a dark red colour to the water.

All the above kinds are very scarce.

Ngoi Ho Kwei.—A very good kind obtained from hills close by the above named mountain. It is readily procurable at Chinese druggists' shops and costs from 5 to 7 dollars an oz. Chinese doctors generally prescribe this kind for sickness.

Ko Shan Kwei.—This is an inferior kind of cinnamon, and is an article of trade; cost 50 cents. to 3 dollars a catty.

All the samples sent to Mr. Holmes are strongest in flavour in the liber or endophlœum.

The liber of this drug in fact agrees with Ceylon cinnamon.

The remarks already made on the subject by various authors may be here summarized.

Wells Williams, in his Chinese Commercial Guide, under the head of "Chinese Imports," gives the following:—

Cinnamon (Jan K'wei). "A little is imported into the northern provinces where none of the cinnamon or cassia trees grow. Cochin china produces both these plants, and the true cinnamon has long been sent thence to China both by vessels and travelling traders across the frontier."

Stillé and Maisch (page 476), "A kind of Chinese or Saigon cinnamon of late occasionally met with is in more regular unscraped quills, yields a darker coloured powder (than cassia), but has a very sweet and warm cinnamon taste. Its histological structure is very similar to Ceylon cinnamon."

'Pharmacographia' (pages 528–30), "China cinnamon of 1870 comes still nearer to Ceylon cinnamon, except that it is coated. A transverse section of a quill not thicker than one millimetre exhibits the three layers described as characterizing that bark. The schlerenchymatous ring is covered by a parenchyma rich in oil ducts, so that it is obvious that the flavour of the drug could not be improved by scraping."

The expedition of Lieut. Garnier for the exploration of Cochin China found cassia (?) growing wild in about north lat. 19°. Dr. Thorel also states that it grows in a wild state in the forests of Cochin China. Ford in his West River expedition, 1882, says *C. Cassia* was not met with anywhere in a wild state, nor could any native be found who knew where it did grow wild.

Dumoutier's 'Essai sur la Pharmacie Annamite' mentions both the bark of cinnamon and cassia.

DETERMINATION OF LITHIA IN MINERAL WATERS.*

BY E. WALLER, PH.D.

Practically, three methods are now available. 1. The phosphate method (Mayer's modification) (*Ann. Chem. u. Pharm.* xcviii., 193). 2. The amylalcohol method (Gooch, *Am. Chem. Journ.*, ix., 33). 3. The fluoride method (Carnot, *Bull. Soc. Chim.*, [3], i., 280).

Rammelsberg's method (*Pogg. Ann.*, lxvi., 79), somewhat similar in principle to that of Gooch, in that it depends upon the comparatively greater solubility of lithium chloride in an organic solvent, has been comparatively little used, on account of the difficulty and expense involved in obtaining the pure anhydrous alcohol and ether necessary for the process. Moreover the experiments of J. L. Smith (*Am. Journ. Sci.*, [2], xvi., 56), rearranged in convenient form for reference by Gooch (*loc. cit.*) do not indicate that it is very satisfactory in its application, even with the best of care. Some indirect processes, such as the weighing of mixed chlorides of sodium, potassium and lithium, and then determining the chlorine and potassium (Bunsen, *Ann. Chem. u. Pharm.*, cxxii., 348), have been also proposed, but they are troublesome in execution, and likely to be unsatisfactory in result.

For all of these processes, it is necessary to obtain from some known quantity of the water, the alkalies as chlorides free from admixture with other bases, and in most cases, a considerable proportion of the sodium and potassium salts, which usually predominate largely over those of lithium, must be removed. To accomplish this, the usual method may be followed, acidification with hydrochloric acid, evaporation, treatment with barium hydrate solution, removal of the excess of baryta by ammonium carbonate, driving off the ammonium salts, and extraction with alcohol or alcohol and ether, to take out the lithium chloride which is inevitably accompanied by some sodium and potassium chlorides. Throughout this treatment, the spectroscope must constantly be used to determine when the extraction or washing is complete and these preliminary operations often prove very tedious. Some suggestions in this connection may be of value. The small platinum wires used to test the precipitates, solutions, etc., need critical examination. A wire which has been once used with lithium salts may perhaps be held in the flame until it will give no trace of colour to the flame, nor show the lithium line by the spectroscope, but on moistening with hydrochloric acid and inserting in the flame, the line will show almost as brightly and distinctly as if no lithium had been removed from it. Repeated scouring, immersion in acid and insertion in the flame, or long soaking in acid may be necessary to remove this trace of lithium from the wires. It has been found convenient to keep several wires dipping into a test tube partially filled with dilute hydrochloric acid, and to use them in succession, so that each wire shall have a tolerably long immersion in the acid, before being tested again, as a preliminary to using it for a test on a precipitate, etc.

Barium precipitates ($BaCO_3$ and $CaSO_4$), when formed in the presence of lithium compounds, carry down and retain perceptible quantities of lithia (by spectroscope test) with great persistency. The well known tendency of the barium sulphate to drag other salts with it *seems* to be greater in the case of lithia than in that of other alkaline salts, although this may perhaps be due to the exceeding delicacy of the spectroscopic reaction. Precipitation in a rather dilute solution, and rather liberal washing, is usually the most convenient course to pursue in the case of the precipitation of $BaSO_4$ in presence of lithium salts. With $BaCO_3$, re-solution in HCl, and reprecipitation with ammonia and ammonium carbonate is most effective. If the proportion of lithium is large, re-solution, and re-precipitation a third time may be advisable. The precipitate produced by barium hydrate, unless consisting largely of sulphate, does not give so much difficulty in the washing out of the lithia, except when it has been exposed for some time to the air of the laboratory containing CO_2.

A word further as to the decomposition of LiCl by heat. Direct quantitative estimations upon the subject were not made in this investigation, but the phenomena noted tend to confirm Mayer's remark that under the influence of heat in presence of water, lithium chloride has a tendency to exchange chlorine for oxygen.

A solution containing lithium chloride is evaporated to dryness with difficulty when placed on the water-bath, and if it finally is made to *appear* dry after prolonged treatment in this manner, more of the material is slow to re-dissolve in water (apparently because of the formation of lithium hydrate) than if the same solution is evaporated nearly to dryness and the moisture driven out by careful ignition over a naked flame.

Assuming in every case that one has obtained a concentrated aqueous solution from a known quantity of the water, containing all of the lithium and some of the potassium and sodium as chlorides, but no other bases, the phosphate method would be as follows:—

Add an excess of hydro-disodium phosphate, and then a moderate excess of pure sodium hydrate, evaporate to dryness, redissolve in water by the aid of a gentle heat, add an equal volume of strong ammonia, digest warm for some time, allow to stand for twelve hours, filter and wash with a mixture of equal volumes of ammonia and water, and finally ignite and weigh as Li_3PO_4. A second or third portion of precipitate may be recovered by evaporating the filtrate and washings, adding ammonia, and allowing to stand as before, filtering, etc. The chief difficulty with the accuracy of the process consists in the practical impossibility of obtaining all the lithium as phosphate, free from any other alkaline salts. Too much washing will cause appreciable amounts of lithium phosphate to go into solution. Indeed, in my experience the filtrate and washings have always showed a decided lithia line in the spectroscope, from the start. On the other hand, too little washing leaves some alkaline salt along with the lithium phosphate—shown by its tendency to cake on ignition—but whether it cakes or not, lithium phosphate separated by this method when tested by the flame, almost invariably gives so strong a sodium flame, as practically to obscure the red of the lithium to the naked eye. Consequently it becomes to a considerable extent a matter of judgment, to decide when the washing is completed, and *then* the amount of lithium phosphate obtained is a compromise between the precipitate dissolved off by washing, and alkaline salts left with it. However, by the aid of a little experience, the error can be usually brought within moderate limits, if the proportion of water which the chlorides represent is sufficiently large (ordinarily 10 to 20 litres). The use of such large quantities of water is naturally attended with more or less labour, in evaporation, removal of bases, etc., and is in itself objectionable aside from the sources of error inherent in the method of determination. This method has, however, until recently been practically the only one in general use.

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* From the *Journal of the American Chemical Society*, June.

The method of Gooch (*loc. cit.*), used by him in the examination of the waters of the Yellowstone Park (*Bull. U.S. Geol. Survey*, No. 47, also *Chem. News*, lix., 113, *et seq.*), may be described as follows:—The concentrated solution of the alkaline chlorides should contain only about 0·2 grm. of salts in all. To this solution, in a casserole or dish, is added 30 to 50 c.c. of pure *anhydrous* amyl alcohol. The vessel is then heated on a sand bath over a low flame, so as to boil off the water through the amyl alcohol, leaving the undissolved salts adhering to the sides of the dish. The heat is kept up until the volume of amyl alcohol has been reduced to about 15 or 18 c.c. after cooling. A few drops of hydrochloric acid are added to restore to the form of chloride any lithium oxide or hydrate which may have been formed, and the heating is repeated for a short time. The amyl alcohol is then filtered through paper, or through a Gooch crucible, into a measuring cylinder, and its volume noted (usually 10 to 15 c.c.). In case the proportion of lithium is large the undissolved salts should be taken up with a little water, and the treatment repeated in the same way as just described, the amount of amyl alcohol which has been heated with the chlorides being measured as before. The salts are then washed with cold amyl alcohol until no trace of lithium is perceptible in them by the spectroscope; the filtrate and washings are evaporated in a weighed platinum dish, and the chlorides converted into sulphates, ignited and weighed. From this weight, for every 10 c.c. of amyl alcohol which remained in contact with the chlorides after heating, the following deduction is made:—

	Grm.
When only sodium and lithium chlorides were present	0·00050
When only potassium lithium and chlorides were present	0·00059
When both sodium and potassium, as well as lithium chlorides were present	0·00109

The cold amyl alcohol used for washing dissolves so little that it is needless to take it into account.

The relative solubilities of NaCl, KCl and LiCl in amyl alcohol, as determined by Gooch, are essentially:—

NaCl. .	1 in	30,000 or 0·0041	grm. in 100 c.c.
KCl. .	1 in	24,000 or 0·0051	grm. in 100 c.c.
LiCl. .	1 in	15 or 6·60	grm. in 100 c.c.

Temperature seems to have but little influence upon the solubility of NaCl and KCl.

Pure amyl alcohol freed from water by boiling, if necessary, is indispensable.

Gooch's test experiments with mixtures of pure salts may be here quoted, arranged in a form slightly different from that given in his paper. The Li_2SO_4 obtained was calculated back to LiCl in every case. The error is noticeably greater in the presence of potassium chloride.

Expt. No.	Conditions.	LiCl taken.			Errors in corrected weight of LiCl found.	
(23)	NaCl only	Single	0·1298	grm.	0·0002—	grm.
(24)	„ „	Extr'n	0·1227	„	0·0002—	„
(32)	„ „	Double	0·1287	„	0 0007—	„
(33)	„ „	Extr'n	0·1347	„	0·0006+	„
(26)	KCl only	Single	0·1256	„	0·0008—	„
(27)	„ „	Extr'n	0·1287	„	0·0010—	„
(34)	„ „	Double	0·1125	„	0·0003+	„
(35)	„ „	Extr'n	0·1251	„	0·00011+	„

The average of these errors is 0·0001— with a range from 0·001— to 0·0011+, or, if we calculate to the equivalent in $LiHCO_3$, from 0·0016— to 0·00176+, a difference of 0·00376 grm.

The process has the advantage that the sodium and potassium chlorides are left in a condition for the determination of those bases, in which case, however, an allowance must be made for the small amounts dissolved by the amyl alcohol which was heated with the chlorides. One disadvantage of the process is to be found in the fumes of the amyl alcohol, which even in a well ventilated laboratory is a source of great discomfort to most analysts.

The small amount of water, 100 to 200 c.c., that can be used for this process is advantageous, though for those accustomed to the use of the phosphate process, the amount seems hardly large enough to give a fair average, and to average on a larger amount requires the concentration of the LiCl by extraction with alcohol or alcohol and ether. In some of the first trials made with the process, the amount of mixed chlorides experimented upon considerably exceeded 0·2 grm., probably nearly 1 grm., and in some cases more. This was because Prof. Gooch's paper seemed to imply that the operation might be reasonably expected to be successful, when applied to quantities ordinarily handled in analytical work. In the case of one water it did prove so, but with another water, containing more lithia as well as alkaline salts, it was not. The removal of all the water in the manner described, was a matter of extreme difficulty, and curiously enough, a limit seemed to be reached, beyond which the LiCl was extracted, but slowly and with great difficulty. The results may prove interesting.

The alkaline salts from two equal quantities of a water, each lot amounting to between one and two grams, were treated as described:

	Grm. Li_2SO_4.		Li_2SO_4.
Obtained from A. . .	0·2400	from B. . .	0·2354
Found in insoluble part.		from B. . .	0·0943
f. A.	0·0974		
Total .	0·3374		0·3297

The control process used in this case was Carnot's fluoride method, which cannot however be regarded as absolutely free from imperfections. It is as follows: the mixed alkaline chlorides after evaporation nearly to dryness, are extracted with a mixture of about equal volumes of alcohol (of 90 per cent. or over) and ether, so as to obtain the LiCl comparatively free from the others. It was found most convenient to add the alcohol ether mixture, and allow to stand for some time with frequent stirring, and then after standing over night to filter through a small filter, and wash with alcohol, one extraction will often suffice. A second extraction may however be necessary, the work being of course controlled by the indications of the spectroscope. After evaporating off the alcohol and ether, the salts are dissolved in the least possible quantity of water, and filtered into a platinum dish. The filtrate and washings should then be concentrated to small bulk (5 or 10 c.c.) and pure ammonium fluoride and ammonia added; after thorough mixing the dish is set aside over night for the LiF to precipitate. The solution is then decanted through a small filter, and the precipitate is washed by decantation three or four times (5 to 7 c.c. at a time), with a solution consisting of the reagent mixed with 5 to 10 times its bulk of ammonia; between decantations the solution must be allowed to stand some little time with stirring. The bulk of filtrate and washing (30 to 50 c.c.) is noted, the filter paper and contents placed in the dish, sulphuric acid added, and heat applied until the paper has been incinerated, and the lithium converted to sulphate, in which form it is weighed. To this weight is added 0·0040 grm. for every 7 c.c. of filtrate and washings, and the result estimated as Li_2SO_4 is calculated to Li, $LiHCO_3$, etc., according to the requirements of the case.

Care is necessary in preparing the reagent, and wash liquor.

Carnot seems to have found that the ammonium fluoride ordinarily supplied for laboratory use is the only member of the combination liable to contain impurities which would interfere (chiefly fluosilicic acid, which might precipitate alkaline fluosilicates), but experiments have shown that ammonia which has been standing for some time in contact with glass will give a cloud (presumably ammonium fluosilicate) with a mixture of solutions of ammonium fluoride and ammonia after boiling and filtering clear. This solution, so long as it contains a fair amount of free ammonia, appears to be without action upon glass. It has been found advisable therefore to make up (and cork up) the reagent and washing solution some time beforehand, and to filter off such portions as may be required at the time of using. Naturally, it is necessary to use for the final filtration a filter paper which has been extracted with hydrofluoric acid. Schleicher and Schull's papers were found satisfactory in this connection. Carnot also recommends that the resulting Li_2SO_4 should be dissolved in 40 to 50 c.c. of water, and a test made for the presence of magnesium, which may have remained with the alkaline chlorides. If any is found to be present, it must be determined as phosphate and a correction made accordingly.

In connection with this process it was observed that lithium sulphate ignited in contact with the carbon of the filter paper, is especially prone to reduce to sulphide and especial caution is necessary at this stage of the operation. The sulphide, when heated in contact with the platinum, attacks it in a very marked manner.

The process seems to be very good, although not rapid.

Its tendency is to yield results a little high, apparently because the allowance for solubility is usually larger than the actual amounts of precipitate dissolved. Test analysis tended to show also that unless the amounts of potassium and sodium chlorides present with the lithia are kept within narrow limits the results will be high.

Unfortunately, a number of the tests and comparison experiments with these methods have not yet been completed, and will have to be deferred to a second communication.

In order to test these methods upon water containing lithia, samples of several of the best known and widely advertised waters were purchased and submitted to examination.

The results were somewhat surprising, and showed unquestionably that either the original analyses, or the strength of which those waters are now sold, were erroneous, on account of imperfection in the methods used, or, what is more probable, that the proportions of lithium in those waters are liable to great fluctuations.

The results given were chiefly obtained by Carnot's fluoride method, but were in several cases confirmed by the use of other methods. The most scrupulous care was exercised to be sure of obtaining *all* of the lithium in the waters under examination, the spectroscopic indications having been used at every stage of the process.

In the Farmville lithia water, purchased at the office of the company, no lithium could be detected by the spectroscope on moderate amounts of the water. On evaporating eight litres of the water, and treating in the manner described for the concentration of the lithia into a solution of small bulk, a lithia line was obtained in the spectroscope, but the amount was found to be too small to permit of a quantitative estimation. The experiment was repeated with ten litres of the water, with essentially the same result.

With the Buffalo lithia water the reaction for lithium was more distinct, when considerable quantities of the water were concentrated. From 20 litres of the water was obtained lithium sulphate corresponding to 0·0185 part $LiHCO_3$ per 100,000.

In the Londonderry water the lithia reaction could be obtained without great difficulty. Analysis of the water purchased by myself showed a little over 4 parts per 100,000. The company puts up some of the water in half-gallon bottles not charged with CO_2, and also some in pint bottles (called in their circulars "sulphocarbonated,") which is charged with CO_2, and has also received the addition of some salts. The amounts of salts added appears to be somewhat irregular. For instance, the following results were obtained (results given in parts per 100,000):—

	Total solids.	Loss on ign.
Londonderry, half-gallon bottles (aver)	37·35	2·25
Londonderry, pint bottle, A . .	149·4	4·9
" " B . .	104·2	4·5
Average of eleven others . . .	224·7	6·4

The variations in the eleven bottles were 221·3 to 231·4, for total solids. The proportion of lithium was essentially the same as for the still water.

I was told that several lots of water, purporting to come from these springs, had at times appeared on the market in which no lithia could be detected. As I learned that Dr. Endemann had obtained some water of that kind, I requested him to send me a bottle. He complied, and although the bottle bore all the labels and marks similar to those purchased by myself, no lithia could be detected in it. The water contained 5·2 parts total solids per 100,000. I have heard of others who had similar experiences.

I naturally desired to obtain samples of these waters direct from the springs, taken by some one whom I knew to be disinterested. Attempts thus far have been unsuccessful. In the case of the Londonderry springs, all access is denied to visitors, and applications for water are referred to the bottling establishment in Nashua.

Of all the waters examined, purporting to be natural, the Saratoga Hathorn proved to be the strongest in lithia. The result of tests on this water are not at present in such form that they can be here recorded, but it suffices to say that the water contains fully as much as the analyses call for (12 to 14 parts $LiHCO_3$ per 100,000, corresponding to 7 or 8 grains per U.S. gallon).

Tests were also made on the waters manufactured and sold by Carl H. Schultz as containing lithia. They were found to contain a little more lithia than claimed. E.g., the formula on his "Vichy with Lithia," calls for an amount corresponding to about 57 parts $LiHCO_3$ per 100,000. The analyses showed 60 to 62 parts.

The results enumerated may be thus tabulated:—

Designation of Water, etc.	Total Sds. per 100,000.	Loss on Ign.	Non-Volatile.	$LiHCO_3$.			
				Used for Determination.	Per 100,000.	Grs. U.S. Gallons.	Grs. Imp. Gallon.
Farmville Lithia, half gal. bottles. . .	16·4	1·1	15·3	8·L		traces.	
„ „	...	...	...	10·L		traces.	
Buffalo Lithia, half gal. bottles. . . .	93·2	6·5	88·7	20·L	0·0185	0·011	0·013
„ „	...	...	...	20·L	0·0135	0·008	0·009
Londonderry Lithia, half gal. bottles .	37·35	2·25	35·1	10·L	4·171	2·432	2·920
„ „	...	...	...	10·L	4·075	2·376	2·852
„ „	...	...	...	2·L	4·130	2·408	2·891
„ „ pints (c'h'g'd CO_2). .	...	...	...	2·L	4·129	2·407	2·890
„ „ „	...	...	...	4·L	4·074	2·376	2·851
„ „ (half gal. Dr. E) . .	5·1	1·	4·1	1·L		none.	

EXPERIMENTS ON GUM ARABIC AND GUM SENEGAL.*

BY L. LIEBERMANN.

Gum arabic is often adulterated with gum senegal, the latter being sometimes sold in its stead. If the gum has not been powdered, the appearance is sufficient to show which variety is chiefly present. Gum arabic forms round or irregular masses, varying in colour from colourless to brown, which reflect light strongly, almost appearing to be crystalline. Gum senegal is usually colourless or pale yellow, with a surface resembling ground glass, the pieces cylindrical or worm-like. It occurs occasionally in round masses resembling a mulberry.

On dissolving either gum in water, only small particles of wood are left, which, according to Kramsky, are usually red in the case of gum arabic, but black with gum senegal. Other gums, cherry, for example, are only partially soluble in water, leaving a swollen residue, which only dissolves after long digestion.

With potassium hydrate, and a few drops of copper sulphate solution, both gums give a blue precipitate, which, in the case of gum arabic, is larger in quantity, coherent, and rises to the surface, while the other is more flocculent and remains diffused in the liquid. The precipitates are only slightly soluble on heating, and are not reduced even by boiling. Dextrin yields a similar precipitate, easily soluble on warming, and which is completely reduced on boiling for some time.

On prolonged heating with dilute potassium hydrate, solutions of gum arabic and of dextrin become amber coloured, those of senegal are only slightly coloured.

Mixtures of gum arabic and senegal behave to the copper test like senegal alone, but with potassium hydrate they assume the amber colour. Mixtures of gum arabic or senegal and dextrin with the copper test behave like gum arabic alone, and if the amount of dextrin is not too small, reduction takes place on boiling. When only small quantities of dextrin are present, the copper precipitate after thorough warming may be filtered off, and the filtrate boiled; reduction will then take place. When all three substances are present, the precipitate should be washed, dissolved in dilute hydrochloric acid and a large excess of alcohol added. The precipitated gum is allowed to settle for a day, washed with alcohol, dried, and examined as above.

Gum arabic may be systematically examined in the following manner:—The powdered substance is treated with luke-warm water; a gelatinous residue indicates other gums. The aqueous solution is mixed with an excess of potassium hydrate and a few drops of copper sulphate, warmed and filtered, and the filtrate examined for dextrin by boiling, the precipitate being tested as above.

It is usually stated that gum senegal is more hygroscopic than gum arabic, but when dried at 105° C., gum senegal lost 13·39 per cent. of water and gum arabic 14·56, and on exposure to moist air for twenty-four hours, the former gained 6·15 per cent., the latter 6·34.

SOME RELATIONS BETWEEN HOST AND PARASITE IN CERTAIN EPIDEMIC DISEASES OF PLANTS.*

BY H. MARSHALL WARD, F.R.S.

Professor of Botany, Royal Indian Engineering College, Cooper's Hill.

(*Continued from page* 68.)

In the first place, the mycelium and conidia are not only capable of growing and flourishing in artificial nutritive media, but they often refuse to do otherwise—at least while young. If the conidia are sown in such media as the juice of grapes or other fruits, or in solutions containing an organic acid, sugar, asparagin, and traces of mineral salts, enormous cultures may be made for weeks, and millions of new conidia, sclerotia, etc., obtained, provided certain conditions are fulfilled. Among these conditions are the following:—The temperature must not be high, and may be relatively low (best about 15° C.); the solution must not be alkaline or neutral, but should be somewhat acid;† sugar of some kind—and preferably a glucose—must be present; and the nitrogenous materials may be offered as asparagin or peptone with advantage.

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* *Chem. Zeit.*, xiv., 665—666. Reprinted from the *Journal of the Society of Chemical Industry*, July 31.

* Croonian Lecture. From the 'Proceedings' of the Royal Society.

† See Marshall Ward, "A Lily Disease" (*Annals of Botany*, vol. ii., 1888, p. 334); also *cf.* de Bary, *Bot. Zeitg.*, 1886, col. 400).

It will be noted that just those external climatic conditions which we have seen to be disturbing to the well-being of the green host-plant are either favourable to the fungi we are concerned with, or are at any rate not in the least inimical to their development.

Thus the oxygen respiration of the fungus goes on at all temperatures from 0° C. to 30° C. and higher, and although we still want information as to details, experiments have shown that the mycelia flourish at temperatures considerably below the *optimum* for higher plants.[*]

Moreover light, so indispensable for the carbon assimilation of the green host, is absolutely unnecessary for the development of the fungus.[†]

Then, again, the dull, damp weather and saturated atmosphere, so injurious to higher vegetation if prolonged, because they entail interference with the normal performance of various correlated functions, as we have seen, and render the plant tender in all respects, are distinctly favourable to the development of these fungi.

Consequently the very set of external circumstances which make the host-plant least able to withstand the entry and devastation of a parasitic fungus like *Botrytis*, at the same time favour the development of the fungus itself.

As already said, it had long been assumed that these forms of *Botrytis* are saprophytes, and the ease with which they may be cultivated in artificial solutions, as above, tended to support that view: moreover, many attempts to directly infect living plants with the conidia failed; the conidia, if merely placed in a drop of water on a healthy leaf, simply germinated and died, and very often nothing more came of it. Nevertheless, odd instances of infection were recorded here and there, and the whole matter became a great puzzle,[‡] until several points of startling importance came to light.

In the first place it turned out that, although the germinal tubes of certain of the *peziza* forms could not penetrate into the living leaf of the host directly—whereas they plunged forthwith into the tissues of a dead organ[§]—nevertheless the *mycelium* developed from such spores, provided it was vigorous and well nourished by previous culture as a saprophyte, could do so, but in many cases only provided the tissues of the host were in a favourable condition. This last proviso was found to be necessary, because in some cases the mycelium easily infected young growing internodes, etc., but could not penetrate into the more fully developed older parts of the same plant.[‖] This threw some light on the curiously capricious behaviour of the fungus in green-houses, where seedlings, cuttings, young internodes, etc., were often attacked and destroyed, while other parts escaped, though without any regularity of behaviour.

The key to the mystery appeared to be offered when it was discovered that the invigorated mycelium, well nourished by cultivation in a solution such as that mentioned above, excretes a ferment which possesses the power of swelling and dissolving cellulose, and that this ferment is formed at the tips of the hyphæ,[*] and thus enables them to enter the cell-walls, as they were actually seen to do. It becomes intelligible now why these hyphæ sometimes can and sometimes cannot quickly enter the cell-walls of a plant; when the cell-walls are thin and watery, and especially if small quantities of organic acids are present, the fungus hyphæ can easily attack and dissolve them, but in cases where they are thick and tough, owing to paucity in water and no traces of acids, the hypha has no chance. Just such differences as these would occur in the case of young and old organs respectively, or of partially etiolated or thoroughly matured tissues respectively.

But in addition to piercing the walls, and at first living in the cellulose substance,[†] the hyphæ also excrete a soluble substance which kills the protoplasm (with which they are not in contact) of the cells in the immediate neighbourhood. Whether this substance is a separate zymase, or whether it is the same soluble ferment as that which swells the cellulose, is not clear, or whether the protoplasm simply dies after excessive plasmolysis due to water passing into the swollen walls, but it is clear that some such poisonous action is exerted at a little distance from the tip of the hypha, and therefore by means of a soluble poison or zymase of some kind. It is difficult to decide what this poison is, and the following questions arise:—first, Is the poison the same zymase as that which causes the swelling and solution of the cellulose? This must be denied provisionally, at any rate, because if sections of the tissues are put into solutions containing extracts of the mycelium which have been previously boiled for a minute or two, the protoplasm contracts and dies much as before, though the cellulose walls no longer swell as before, because the zymase has been killed by the boiling. This experiment is not quite conclusive, because the contraction of the protoplasm may be due to the action of bodies in the boiled extract, which did not exist in the freshly expressed liquid.[‡]

The next question which arises is—Is there any definite body in the extract that could kill the protoplasm, and which would not be destroyed by the short boiling? The answer to this question is simple: the hyphæ of the fungus develop large quantities of oxalic acid[§] in the substratum, and this is a substance which is peculiarly poisonous to the living protoplasm of higher plants[‖] if present in any large quantity. In the normal cells of plants rich in salts of oxalic acid (*Oxalis*, *Begonia*, etc.), I need only remind you that the acid is not in the protoplast, but is kept strictly isolated from it by the vacuole wall, as is clear from the researches of Pfeffer and De Vries.

It is at least conceivable, therefore, that the hyphæ kill the cells by flooding the protoplasm with oxalic acid; but it is not certain that they do not excrete a more subtle poison of the nature of a ferment.

In any case, it is a significant fact that the hyphæ kill the cells by emitting some soluble poison which causes the protoplasm to collapse, and then to turn brown, clearly because it destroys its power of retaining and restraining the sap in the sap-cavity; the latter therefore escapes through the now permeable dead or dying protoplasm, and owing to its acid contents, chromogenes, etc., stains it and the cell-walls brown as the oxygen of the air enters into combination.

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[*] See also Hoffmann (*Jahrb. f. wiss. Bot.*, vol. ii., 1860, p. 267) and Zopf. 'Encyklopædie der Naturwiss' (Schenk's 'Handbuch,' vol. iv., 1889, pp. 471—472).

[†] According to Klein (*Bot. Zeitung*, 1885, col. 6), the conidia of *Botrytis cinerea* are only developed in the darkness of night, but this is certainly not the case with other species.

[‡] We shall see that the occasional infection depends on (1) condition of host, (2) whether any soluble food-materials pass from the leaf into the drops of water, and (3) the state of the conidia.

[§] See de Bary, 'Ueber einige Sclerotinien and Sclerotinien-Krankheiten' (*Bot. Zeitung*, 1886, col. 410).

[‖] See de Bary, *Bot. Zeitg.*, 1886, col. 440—441.

[*] See Marshall Ward, "A Lily Disease" (*Annals of Botany*, vol. ii., pp. 339-343).

[†] See *Annals of Botany*, vol. ii., p. 356, and figs. 55 and 56.

[‡] De Bary inclined to the belief in a special ferment in the case of his *Peziza* (*loc. cit.*, pp. 418—426), but admitted that he had not proved the point either way.

[§] De Bary observed the same in the case of *Peziza sclerotiorum* (*op. cit.*, pp. 399—403), and it is a common phenomenon in fungi. See *e.g.*, Zopf (Schenk's 'Handbuch,' vol. iv., 1889, p. 454).

[‖] See de Vries, 'Plasmolytische Studien über die Wand der Vacuolen' (*Pringsheim Jahrb.*, vol. xvi., 1885, pp. 565—6).

There is thus, from the very first, a struggle between the hypha of the fungus and the cells of the host; the hypha is in the position of an attacking party, which has to overcome, first the outworks, in the shape of cuticle and cell-wall, and secondly, the real fighting force—the protoplasm.

I take it that the attacking hypha (invigorated by previous culture, as said) excretes various zymase-like substances formed in its metabolism; one of these succeeds in overcoming the resistance afforded by the cuticle[*] and then the cell-wall is penetrated; the partially victorious hypha then advances in the cell-wall, and is nourished by the cellulose which it goes on dissolving, and under its changed conditions of life excretes in increasing quantities yet another zymase or some kind of poison which diffuses to the protoplasm. Now comes the real tug of war—so long as the outer layer of the protoplasm (the ectoplasm) is in a position to refuse access to, or in any way to destroy, the poison, the rest of the protoplast remains impermeable, and the hyphæ keep to the cell-walls; but as soon as the protoplasm of a cell succumbs, it signifies its defeat by collapsing, and then its own more or less acid cell sap filters through to the walls and hyphæ. If this view is correct, and the evidence supports it entirely, it is clear that any variations in the host-plant which lead to weakening the outposts—cuticle and cell-wall—or diminishing the fighting power of the protoplast, increase the advantages of the hypha to a corresponding extent; and we have seen that such variations exist when circumstances cause the cells to become more watery and turgid, the cell-walls thinner and softer, and so forth. But, no doubt, the most important event is the lowering of the resisting power of the protoplasm, as must happen whenever external changes—such as low temperature, murky weather and a saturated atmosphere, etc.—combine in lessening the activity of respiration and assimilation, and consequently bring about the accumulation and possible filtration of organic acids, glucose, asparagin, etc.; for in the first place, the lowered metabolism means less resisting power, no matter what hypothesis we adopt; and, secondly, the organic acids themselves prove an internal source of weakness if they become too abundant, and filter through the partially disorganized protoplasm. The protoplasm, then, has its powers diminished or destroyed by the accumulation and inhibitory action of products of its own activity.

Fortunately, however, we have something more than the above evidence, strong as it is, to support this view. Müller-Thurgau found, in the case of grapes devastated by *Botrytis cinerea*,[†] that the *Botrytis* mycelium lives on the sugar, acids, and soluble nitrogenous substances of the living cells; but he also discovered, by means of numerous comparative analyses, that the mycelium consumes especially the organic acids, the sugars to a less extent, and the soluble nitrogenous matters were all converted into insoluble nitrogenous substances.[‡] No doubt some of the destruction of the acids is to be put down to direct oxidation, but much is due to assimilation by the fungus. Similar events were found to occur when the *Botrytis* was cultivated as a saprophyte on the juice of grapes.

It is, however, not difficult to give experimental proof of the accuracy of the statements that the entrance of the hypha into the cell is dependent on the condition of the protoplasm.

If the mycelium of one of these fungi is placed on an uninjured living carrot, or turnip[*] and the whole placed in a moist atmosphere, etc., the hyphæ do not at first enter the tissues as above described, but form a dense mycelium on the surface, and branches from this slowly penetrate into the interior, producing the symptoms referred to. If the carrot or turnip is first submerged for half a minute into boiling water, however, the hyphæ plunge into the outer cells (the protoplasm of which has been killed by the hot water) at once. These facts are easily explained when we recognize that the hot water causes plasmolysis of the cells, and escape of the sap into the intercellular spaces, cell-walls, etc.; in short, destroys the fighting power of the protoplasm against the hyphæ. Moreover, the latter are invigorated by their saprophytic nutrition, and are able to excrete such quantities of ferment that the still living cells deeper in the tissues are unable to withstand the attack.

Equally conclusive is the following experiment:—

A mature firm shoot of a petunia was infected with the mycelium, and the hyphæ penetrated into the cortex about 1 cm., and then grew no further; evidently because the cell-walls were thick, and their protoplasm disposed of the poisonous zymase as fast as it reached them. When the infection was made on slightly etiolated rapidly growing shoots, however, the fungus entered at once, and destroyed the entire shoot off-hand.[†] This is explained by the thinner, watery cell-walls, and the less vigorous protoplasm, more acid cell-sap, and so forth, of the latter offering less resistance to the zymases or poison excreted by the hyphæ.

Another excellent case is the following. During the very wet, cold, and dull weather of the summer of 1888, plants suffered a good deal from such diseases as we are discussing, and the white lilybuds were utterly destroyed in my neighbourhood by an epidemic of *Botrytis*,[‡] aggravated by the low rate of transpiration, and consequently retarded respiration and metabolism, and the diminished assimilation leading to paucity of carbohydrates. The cell-walls were thin and watery, the sap unduly charged with acids, etc., and the protoplasm of the cells less capable of dealing with the poison emitted in larger and larger quantities by the hyphæ of the invading fungus.[§] It was a very easy matter to directly infect the tissues of these lilies at the time mentioned, but considerably more difficult to do so when the weather improved: and I have noticed the same fact in other cases as well.

INVIGORATION OF MYCELIUM AND CONIDIA BY SAPROPHYTIC MODE OF LIFE, AND DIFFERENCES IN BEHAVIOUR OF SUCCESSIVE GENERATIONS.

We have seen from the foregoing that the relations of the host to the parasite may depend very much on the condition of the former, as induced by the complex action of the environment. I have now to show you that the variations from a normal which culminate in an epidemic are not confined to the host; but that the parasite also exhibits phenomena leading to the same result.

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[*] Not impossibly, different zymases are concerned. See Wortmann ('Zeitsch. für Physiol. Chemie.,' vol. 6, 1882, pp. 287–329, especially pp. 321–329).

[†] Thiel's 'Landwirthsch. Jahrb.,' 1888, pp. 83–160.

[‡] *Penicillium* behaved very differently; it took the sugars in greater proportion than the acids, and left the juices more acid than before. *Botrytis*, on the other hand, left the juices less acid than before, and more concentrated, owing to the evaporation of water from the injured grapes, and it is interesting to note that these diseased (so-called *edelfäule*) grapes yield the best and sweetest wines of the Rhine district.

[*] As a rule, roots are less acid than other organs, and inflorescences more so than leaves, which again are more acid than the stem (G. Krauss, 'Ueber die Wasservertheilung in der Pflanze,' IV., Die Acidität d. Zellsaftes,' 1885; also Warburg, *loc. cit.*, p. 116).

[†] De Bary, *Bot. Zeitung*, 1886, col. 440-441.

[‡] See *Annals of Botany*, vol. ii., 1888, pp. 319-376.

[§] Warburg showed that the leaves of *Lilium candidum* contain more acid when the temperature is lowered (*op. cit.*, p. 140).

That the mode of nutrition influences the vigour and size, etc., of a fungus is a fact well known; but it is a comparatively recent discovery that certain fungi, usually saprophytic in their habits, may be educated as it were to parasitism.[*] Thus, *Penicillium glaucum*, usually regarded as the type of a saprophyte, causes rotting in fruits, bulbs, etc., when its spores penetrate into a wound in the living organ;[†] and many other fungi usually met with as saprophytes are capable of assuming a parasitic mode of life if opportunity arises,[‡] *e.g.*, species of *Mucor*, *Pythium*, *Nectria*, *Agaricus*, etc.

The most instructive of all is the genus *Botrytis*, however, for it is apparently possible to carry the process of "educating" this saprophyte to habits of parasitism much further than in any other cases known.

It was pointed out as early as 1874, by Zimmermann,[§] that *Botrytis cinerea*, long known as a common saprophyte on fallen dead vine leaves, passes from the rotting *débris* on the ground to the healthy living leaves of several plants and develops spots on them; and the same fungus has been found as a parasite on the male inflorescences of junipers, thujas and other Conifers,[||] as well as elsewhere. But a still better case than any of these is the occurrence of a severe epidemic on the gentians in the Jura during the wet summer of 1888.[¶] The infection of the plants occurred in the young parts of the flowers, especially the stigmas and anthers, by means of spores. After growing outside the organs for some time, the hyphæ—now invigorated by their saprophytic nutrition—were able to enter other tissues, *e.g.*, those of the leaves, pedicels, etc. Experiments were then tried with *Echeveria metallica*,[**] with complete success, and it may be remarked that this disease is very common in a sporadic form on Crassulaceæ in green-houses. Infections of *Lilium* were also successful, and *Hemerocallis flava* was destroyed with extraordinary rapidity. Many other plants were also infected successfully.

In all these cases the spores only infected (directly) the most delicate or least protected parts of the flower, but the resulting mycelium when invigorated by its growth in the dead tissues was capable of directly infecting the ordinary tissues of plants.

It will be remembered that De Bary came to a similar result with his experiments,[††] and I have observed the same phenomenon over and over again with several of these forms. There is one, for instance, which sometimes causes great havoc among snowdrops in the early spring, and I found that the infection occurred especially by means of small invigorated mycelia developed from spores which germinated on the dead tissue of the sheaths at the base of the leaves; these hyphæ easily penetrated into the etiolated bases of the leaves and young flower-buds, especially when the plants were partially buried in snow.[*] Similarly with onions, hyacinths, and other plants; and similarly in every greenhouse on plants too far from the light, and often in store cellars on etiolated geraniums, calceolarias, and other plants put by for the winter.

But a still more remarkable proof of the influence of nutrition on the fungus is shown in the recent discovery that the conidia of successive generations of the *Botrytis* have different powers of infection.

It has already been pointed out that the conidia may or may not directly infect the tissues, and that one set of events affecting this is the condition of the tissues themselves; another, however, is the kind of food-materials on which the mycelium is growing which yields the conidia. I have found that if the attempt is made to infect a carrot with conidia taken directly from the *Botrytis* growing on artificial solutions it often fails, whereas the conidia produced on the carrot as a substratum succeed more easily; moreover, there was so much variability in the infections, and especially in the rate of progress of the infecting mycelium, that I was continually puzzled to account for the phenomena, and suspected that the conidia varied in infecting power, according to their size as well as the manner of culture. This would be a natural conclusion from what was already proved with regard to the invigoration of the mycelium, for, after all, conidia are only slightly specialized bits of mycelium cut off for purposes of rapid propagation,[†] and we may expect them to be directly affected by everything which promotes or retards the vigour of the mycelium. I regard the conidium as distinct from any vegetative piece of mycelium chiefly in its capacity to form the necessary (cellulose-dissolving, etc), ferment or zymase[‡] in greater quantity or in a shorter time (with respect to the size of the organ), and look upon its size, shape and colour, etc., as so many adaptations to the mode of life of the fungus.

(*To be concluded.*)

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[*] The converse is also true to a certain extent. See B. Meyer 'Ueber die Entwicklung einiger parasitischen Pilze bei saprophytischer Ernährung' ('Landw. Jahrb.,' 1888, vol. 17); and Brefeld, 'Botan. Unters. ü. Hefenpilze,' Part V., 1883.

[†] See Sorauer, 'Pflankzenkrankheiten,' vol. ii., p. 92; Müller-Thurgau (*op. cit.*), says *Penicillium* causes a speckling of living grapes.

[‡] See de Bary, 'Comp. Morph. and Biol. of the Fungi,' pp. 379–380.

[§] 'Ueber verschiedene Pflanzenkrankheiten' ('Hamburger Garten und-Blumenzeitung,' 1874).

[||] Klein 'Verhandl. d. Zool.-Bot. Gesellsch. zu Wien' (vol. xx., p. 547), and Sorokin, 'Mykologische Skizzen' (Charkow, 1871).

[¶] Kissling, 'Zur Biologie der *Botrytis cinerea*' (Dresden, 1889, p. 6). It is worth notice that this epidemic occurred in the same dull, damp summer (1888) as the one on lilies in this country.

[**] N.B.—This is one of the plants which is particularly rich in organic acids, and shows well the influence of warmth and daylight in diminishing them (see Warburg, *loc. cit.*, especially pp. 125, 132, 133, 134).

[††] *Bot. Zeitg.*, 1886, col. 396 (see also the remark under *Sclerotinia Fuckeliana* in 'Comp. Morph. and Biol. of Fungi,' p. 380).

[*] A circumstance distinctly calculated to retard the decomposition of the acids, and to bring about a tender etiolated condition.

[†] See Sachs, 'Lectures on Phys. of Plants,' p. 722; also de Bary's critical remarks in 'Comp. Morph. and Biol. of Fungi,' p. 129.

[‡] See *Annals of Botany*, vol. ii., 1888, p. 356.

ORNITHOPHILOUS FLOWERS.

In some papers recently contributed to the *Annals of Botany*, Mr. G. F. Scott-Elliot gives some interesting particulars respecting the pollination of flowers by the agency of birds, chiefly in South Africa. The birds which are most effective for this purpose are the *Cinnyridæ* or sun-birds, the species which were observed most frequently to visit flowers being *Nectarinia chalybea* and *bicollaris*, and *Promerops caper*. These birds have the same habit as the honey-bees and *Bombydæ* in our own country, of not "mixing their honey"; that is on the same flight they confine their visits entirely, or nearly so, to the same species of flowers, a habit obviously of the greatest importance in securing the pollination of the stigma by pollen from another flower of the same kind. The majority of the ornithophilous flowers in South Africa are coloured exactly the same colour, an unusual shade of red, as the breasts of species of *Cinnyris*, a fact previously noticed by both Darwin and Wallace.

The Pharmaceutical Journal.

SATURDAY, AUGUST 16, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH MEDICAL ASSOCIATION.

Reference has already been made in these columns to the presidential address delivered at the opening of the recent congress of the British Medical Association at Birmingham, but amongst the numerous other addresses that were delivered before the different sections at that meeting by eminent medical men there were naturally several that dealt with subjects more or less cognate to the interests of pharmacists. Especially was this the case in the addresses that related more particularly to the treatment of diseases by the administration of drugs and chemical compounds. Dr. Broadbent's Address in Therapeutics, for instance, in which he took as a theme the subject of therapeutics as an applied science, dealt with many points of great interest to all those who have to do with the handling of medicines. In claiming for therapeutics a place among the applied sciences, standing in relation to physiology similarly as engineering does towards mathematics, the speaker anticipated the time when therapeutic facts and phenomena will have become explicable upon chemical and physical grounds. In vital phenomena, he argued, different as they are from the phenomena of non-living things, there is no suspension or reversal of physical and chemical laws, but only change of the conditions under which they operate; no modification of atomic or molecular affinities, but a wider and more varied field of action for those affinities. Therapeutics, as a science, it was pointed out, must be essentially inductive, proceeding by observation and experiments, the difficulty which arises in the apparent impossibility of securing constancy in the results being really due to the present incapability of controlling all the conditions of the experiments. Health itself is not an identical state of things in different constitutions and under different conditions; still less does the same significance always attach to disease, which may be defined as a rupture of the normal relations between the organism and its environment. The restoration of these normal relations was described by Dr. Broadbent as the aim of therapeutics, many of the finest intellects of the time being credited with being engaged in the resolution of the physiological problems which bear indirectly on the action of drugs, whilst the characteristic mark of the true physician was spoken of as being the employment of drugs for the cure of disease, the minimizing of the value of remedial agents of this class being stigmatized as foolish. This led up to an interesting *résumé* of some of the results that have already been obtained in this direction, some passages from which are reproduced in another part of this Journal. In the opening address to the Section of Pathology, Dr. D. J. Hamilton also took for a topic one closely associated with the science of chemistry in its physiological aspect, namely, the pathology of gastric dyspepsia. Here again the treatment of the subject does not lend itself to condensation and better service will be rendered by reproducing some of the principal paragraphs *in extenso*.

Another subject that was referred to by Dr. Broadbent, was "the rage for new drugs which seems to have taken possession of the profession," which was deprecated as absolutely fatal to accuracy of observation and precision of treatment. Dr. Broadbent thinks it humiliating that statements made by "an advertising chemist" should find such universal acceptance by the medical profession; but he might have gone still further, for some of the most grotesque illustrations of this *gobemouche* propensity are to be met with in regard to statements made by persons possessing only the "advertising" qualification. Still he is not averse to the utilization of a new remedy when its history has been satisfactorily worked out by a competent authority, as in the case of strophanthus. This subject was also alluded to by Mr. Lawson Tait, who introduced into his Address in Surgery a brief, but humorous sketch of the history of a typical new remedy, for which he selected the suggestive name "rubbishin." When the new drug is placed upon the market everybody rushes to try it, and "rubbishin" is good for everything. Then come some hints as to the toxic effects of "rubbishin," and after a time it is dropped and heard of no more. For this Mr. Tait is disposed to lay the blame largely, if not wholly, upon the public, on the ground that the upper classes especially like the idea of a new discovery and that the burden of the lives of men practising near the dwellings of the princes of the land and in fashionable watering places is to "keep up with the new drugs and the new dodges." The argument does not appear to be a very forcible one, and it does not require a particularly strong effort of the imagination to picture the exhibition Mr. Tait himself could make of it if he found it in the mouth of an opponent.

Mr. Tait was more successful in his defence of specialism, the early development of which in surgery he connected with the introduction of anæsthetics, by which the area of the surgeon's work was enormously enlarged. With this increase it became perfectly evident that no one man could grasp the area of surgical work and subdivision became inevitable. By the consequent development of specialism and the establishment of a set of men who are not engaged in general practice Mr. TAIT thinks a clear gain has resulted to the public. Specialism and specialists were also the chief subjects of the Address in Otology by Dr. CHARLES WARDEN, who also defended specialism and illustrated the analogy of this practice in medicine with what obtains in other arts and sciences. But he started with the proviso that every good specialist should have first acquired a thoroughly broad and catholic knowledge of the entire subjects of general practice and that before taking up specialism he should be first a surgeon and a physician.

THE HERBARIUM PRIZE.

AMONG the business brought under the consideration of the Council at its meeting last week were the revised regulations with regard to the Herbarium Prize, which were adopted on the recommendation of the Library, Museum, Laboratory and House Committee. As these regulations involve an important modification in the conditions under which this prize is at present awarded, it may be useful to call attention more prominently than has yet been done to the alteration. The rule at present in force, and which will bind the adjudicator next year, requires that each collection sent in for the competition shall contain not less than three hundred specimens. But the effect of the new regulation will be that no collection commenced after December 31st, 1890, may contain more than one hundred and fifty specimens, which must be carefully selected and mounted so as to display the characteristic features of the more prominent and typical genera of the chief British natural orders. Otherwise the conditions will remain the same. A competitor must be a subscribing apprentice of the Society, under twenty-one years of age, and the herbarium submitted by him must have been collected and arranged by himself between the 1st of January in one year and the 1st of July in the next. The alteration is in accord with a suggestion made by Professor GREEN last October, and is intended to promote an intelligent selection and treatment of specimens rather than indiscriminate plant hunting.

The resolution of the Council to send a copy of the prospectus of the School of Pharmacy to each subscriber of the Society will have the effect of bringing under the notice of a large number of persons the opportunities that will be afforded during the next session by the educational arrangements maintained by the Pharmaceutical Society. It will be seen that these include two courses of lectures on Chemistry, including Physics in their relation to it, by Professor Wyndham R. Dunstan; the teaching of Practical Chemistry in the laboratories, by Professor Attfield and his assistants; two courses of lectures on Botany, by Professor J. R. Green; courses of lectures and laboratory work in Pharmacy and Practical Pharmacy, by Mr. Joseph Ince; and two courses of lectures followed by demonstrations in Materia Medica, by Mr. Henry George Greenish. The session will commence on the 1st of October and close at the end of July next. Full information respecting the classes and of the prizes that are offered to successful students will be found in the Prospectus, additional copies of which may be had by applying to the Dean of the School, Professor Attfield, 17, Bloomsbury Square.

* * *

On Tuesday night—or, to speak more correctly, on Wednesday morning—the amendments introduced into the Irish Pharmacy Bill by the House of Lords came under the consideration of the House of Commons. Several of the amendments were agreed to, but one was further amended, so that the Bill will have again to go to the Upper House before it is ready for the royal assent. As soon as the Bill is finally out of the hands of both Houses the complete text will be published in this Journal.

* * *

It would appear from reports forwarded to us by correspondents of the proceedings at an inquest held last week in Boston, that a local medical man took upon himself to denounce in unusually strong terms a chemist and druggist who is a fellow-townsman, whose principal offence appears to have been that he supplied a mixture of linseed oil and lime water for application to the scalded arm of a three year old child that died on the fifth day following in convulsions. Among other assertions, this self-constituted censor alleged that through the cupidity of the chemist and druggist and the stupidity of the mother the child had not had a chance to live. It is not probable, however, that the denunciations will harm anyone else so much as the speaker, since most reasonable persons will agree with the rebuke implied in the remarks of the Coroner, himself a medical man, and in the opinion expressed by the jury that no blame was to be attached to either the mother or the chemist.

* * *

In the *American Journal of Pharmacy* Mr. Charles Bullock records a curious experience with some tablets composed of potassium chlorate and ammonium chloride, a well-known remedy for mouth and throat affections. A lot of the tablets, more than a year old, were removed from the small bottles in which they are usually put up and four ounces were placed in one bottle and finished for delivery. While they were standing undisturbed a loud explosion occurred; the bottle containing the tablets was almost pulverized and the concussion broke several other bottles in proximity. Mr. Bullock thinks the cause of the explosion may be looked for in the formation of chloride of nitrogen as one of the resultants of decomposition between the salts.

BRITISH PHARMACEUTICAL CONFERENCE.

By the courtesy of the Honorary General Secretaries of the Conference we are enabled to publish the following preliminary list of titles of papers that are to be read at the meeting in Leeds next month:—

1. A Report on three years' experience of Chloroform Water as a Preservative. By J. F. Burnett, F.C.S.

2. The Solvent Action of Alcohol of different strengths upon some of the Drugs used in making Pharmacopœial Tinctures. By R. Wright.

3. On Glycerine. By J. Lewkowitsch, Ph.D., F.I.C., F.C.S.

4. Chemical Examination of the Bark of Oroxylin Indicum. By W. A. H. Naylor, F.I.C., F.C.S., and E. M. Chaplin, F.C.S.

5. A Comparative Examination of the Tests for Methylated Spirit. By E. J. Millard and A. C. Stark.

6. The Estimation of Nitrites in Drinking Water. By J. C. Thresh, D.Sc., M.B.

7. Alkaline Sulphites. By C. H. Bothamley, F.I.C., F.C.S.

8. Antidotes to Strychnine. By Louis Siebold, F.I.C., F.C.S.

9. The Medicinal Properties of some of the Indigenous Flowers of Southern India. By Dr. P. S. Mootooswamy, F.L.S.

10. Note on Strophanthus Hispidus. By E. M. Holmes, F.L.S.

11. The Constitution of Synthetic Remedies explained from a Chemical Point of View, showing the Relationship one to another. By J. Hodgkin, F.I.C., F.C.S.

12. Hydrargyri Iodidum Viride. By W. Martindale, F.C.S., and W. A. Salter.

13. Note on a Double Chloride of Caffeine and Mercury. By R. H. Davies, F.I.C., F.C.S.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The usual monthly meeting of the Council of this Society was convened for Wednesday, the 6th instant, at the Society's rooms, No. 11, Harcourt Street, Dublin. A sufficient number of members did not attend to form a quorum. The following members attended: The President, Mr. Charles Evans; the Vice-President, Mr. Wells; Dr. Burnes and Professor Tichborne.

British Medical Association.

THERAPEUTICS AS AN APPLIED SCIENCE.

BY W. H. BROADBENT, M.D., F.R.C.P.

The following passages are taken from Dr. Broadbent's Address in Therapeutics:—

Therapeutics, as a branch of natural science, is concerned with the action of drugs, and, while not denying the importance of the advice we are able to give our patients on climate, food, and drink, clothing, mode of life, we must admit that the characteristic mark of the physician is the employment of drugs for the cure of disease, and it seems to me foolish to minimise the value of remedial agents of this class. We have no doubt whatever as to the lethal power of the poisons. There is no question as to the purgative action of certain substances, and if we cannot turn such properties to profitable account it can only be from want of skill. To deprecate the use of drugs simply because our knowledge of their action is vague and imperfect, and because, therefore, we are liable to make mistakes, is to shirk our duty. What we ought to do is to render our knowledge definite. No work is more valuable than experimental investigation of the action of drugs. To mention only one illustration, with how much greater confidence do we employ digitalis and remedies of this class since such investigation has taught us that they are not cardiac sedatives, but that by their action on the cardio-vascular muscular fibres they increase at the same time the vigour of the cardiac systole and the tone of the arteriole walls.

But even experimental medicine does not fully meet the difficulty. It is true that the knowledge obtained is more definite, there is a more complete command over the conditions under which a given substance exerts its action on the organism. The method of difference can be applied, and, besides the power of securing approximately the same conditions in successive experiments and of varying the conditions in different directions, there is the power of making definite changes in the substances administered and observing the differences in the effects. What can be more important, for example, or more definite than the knowledge that some substances, such as curare, muscarin, and belladonna, produce their characteristic effects by action on the nerve endings; while morphine acts on the cerebral cortex and strychnine on the motor cells of the anterior cornua of the cord? Or what more clear and interesting than the modification of the action of the alcohol series by the changes in the radical molecule? But with regard to the action of curare, belladonna, morphine, strychnine, and digitalis, while our knowledge is in many respects definite it is still only mediate. We may know precisely the part of the nervous system on which they act and their effects but we do not know how the effects are produced. It is to this we must ultimately get down, and it is this which will be found to be a fact of chemistry.

The explanation then will come through deductions from the great general principles of chemical and physical science taken as guides for investigation.

Let us follow for a moment one or two of such deductions. We have accepted as a starting point the postulate that all physiological action and all therapeutical action comes under chemical laws. This being so:—

1. The physiological and therapeutical effects of drugs must be identical in their nature, and any apparent differences must be due to changes of conditions existing in disease. The effects of small and large doses of the same medicament, again, often apparently diverse or even opposite, must be alike capable of explanation by the chemical relation between the substance and the organism. This last conclusion will present no difficulty when we reflect upon the illustrations of the varying results of the reaction between two substances according to concentration and other conditions which are presented by the simplest chemical experiment. Strong sulphuric acid, for example, will char and destroy starch, while, diluted, it changes it into glucose.

2. Substances having similar chemical constitution must have similar physiological and therapeutical action, or, if not, the diversity must be capable of explanation on chemical grounds.

3. There must be a quantitative relation between the drug and its effects and a dynamic explanation of such effects.

Nothing more need be said with regard to the first of these deductions. Of the truth of the second, "that substances having similar chemical constitution must have similar physiological and therapeutical action," every chemical series is an illustration. Just as the ethers and alcohols are gaseous, liquid or solid, according to the size of the radical molecule, there are corresponding differences in their physiological effects. Their action is speedy and fugitive or slow and durable according as they enter the blood readily and escape quickly, or are slowly absorbed and gradually excreted. Their influence is obviously related to the oxygen-carrying function of the hæmoglobin, with which they interfere in varying degree according as they are, from the physical and chemical properties, capable of replacing oxygen in the corpuscles. When they cease to be volatile they are inert.

Another interesting illustration of the definite modification of physiological action by change of a given kind in the molecule of the substance administered has recently been brought to my notice by Dr. W. Hunter, who has himself already made his mark in medical science. There are three substances, xanthine, theobromine, and caffeine, which differ from each other in the substitution of methyl (CH_3) for hydrogen in the xanthine molecule; in theobromine two atoms of hydrogen have been replaced by methyl; in caffeine, three; one is dimethylxanthine, the other trimethylxanthine. Professor Wilhelm Filehne, of Erlangen, recognizing in this series an opportunity for testing the relation between chemical constitution and physiological action, obtained the following results:—

In frogs xanthine has two distinct effects: it renders the muscles rigid by direct action on their substance, and it exerts a paralysing influence on the spinal cord. Dimethylxanthine (theobromine) and trimethylxanthine (caffeine) have exactly similar effects, but in a minor degree, and caffeine is less powerful than theobromine. A larger dose of theobromine than of xanthine is required to produce the same effects on the cord, and a still larger dose of caffeine. The rigidity, again, is less marked and the heart muscle is not affected by the two others as it is by xanthine. No doubt, if a monomethylxanthine exists, its effects will be intermediate between those of xanthine and theobromine. The addition of methyl groups (CH_3) to the nitrogen atoms of the xanthine molecule has the effect of diminishing both the tetanizing action on the muscles and the paralysing action on the cord.

Results of this kind are important for more than one reason. By proving the truth of the corollary they increase our confidence in the postulate, and they also throw light on the processes which are concerned in the evolution of muscular and nervous energy. The tetanizing effect of the xanthine is not simply a coagulation of the muscle protoplasm; it is an imitation of the chemical change attending muscular contraction, and it would seem that the xanthine molecule, rendered heavier and less mobile by the substitution of CH_3 for hydrogen, is less apt for this. Another noteworthy point in the results of this investigation is that the same agent which tetanizes muscle paralyses the cord; this is suggestive of a similarity in the chemical changes which attend the evolution of motor and nervous energy, and all the more when the introduction of successive methyl groups into the xanthine molecule diminishes, *pari passu*, the effects both on the muscles and on the cord.

To Drs. Crum Brown and Fraser belong, so far as I know, the honour of leading the way in researches of this kind, and their investigations on the effects of substitutive changes in the morphine molecule were of extreme importance and interest. I see with pleasure that they have been resumed and extended by Dr. Ralph Stockman and Mr. Dott, who have made known their results in a valuable report to the Scientific Grants Committee of the Association quite recently published. The chemical constitution of morphine, they state, is not exactly known; but it is known that two of the oxygen atoms are present in hydroxyl (HO) groups, while a third probably acts as a connecting link between two carbon atoms. Now, the hydrogen of these hydroxyl groups is more easily replaced by radicals than the other hydrogen atoms of morphine, and one more easily than the other, and, while the change in the morphine molecule is limited to substitution of methyl, ethyl, or amyl radicals, or even radicals of another class, acetyl or benzoyl, for this particular hydrogen atom, the change in the action on the nerve centres is one of degree only, not of kind. The same centres are affected and in the same way, but in different degrees. A more decided modification of the action is produced by adding on chloride of methyl and other groups to the morphine molecule, but still it is one of degree rather than of kind. When, however, the body of the morphine molecule is attacked, as in methocodeine or apomorphine, the physiological action is radically changed.

The most remarkable inorganic chemical group, considered with reference to the physiological relations of its members, is the phosphorus, arsenic, antimony, and bismuth series. Therapeutically and physiologically there is a striking similarity in their action, which becomes rapidly less powerful as we ascend the scale of atomic weight, due allowance being made for a possible multiplication of the effects of arsenic, as pointed out by Dr. Odling. In the forms of anæmia, neurasthenia, and neuralgia in which arsenic is useful, phosphorus is also beneficial, as may be antimony in a less degree. In some cases of neuralgia, especially spinal and enteralgic, phosphorus is of the greatest service. In the treatment of skin disease of the dry and scaly character, again, phosphorus may replace arsenic; antimony is apparently more useful in eczema. The general similarity in the action of antimony is obscured by its emetic property, which is probably a collateral action. This is a mere speculation of mine, but I am interested to see that Dr. Stockman and Mr. Dott have come to a similar conclusion with regard to apomorphine. Bismuth is inert in consequence of the insolubility of its compounds and the feebleness of its affinities. A striking point is the minuteness of the fatal dose, which is comparable to that of the powerful alkaloids, especially taken in connection with the fact that the effects are not produced by action on a nerve centre, but by the general irritation of the gastro-intestinal mucous membrane which is set up, and, what is still more remarkable, by rapidly inducing a granular degeneration of the liver cells and of other structures. A preposterous and almost childish prejudice against phosphorus has been entertained on the ground of this degeneration produced by poisonous doses. A poisonous dose of the mineral acids produces the same effects, but we are not, therefore, afraid of employing them as tonics.

The powerful action of phosphorus and arsenic is still more interesting from the fact that it illustrates the dynamic action of drugs. The effect of phosphorus is clearly produced in the course of its passage from the uncombined state to the state of complete oxidation; it is not simply the presence of phosphorus which causes the disintegration of the cell protoplasm, but the commotion attending its oxidation. In the allotropic form, in which its affinity for oxygen is strangely suspended, it is inert. The phosphates have nothing whatever of the characteristic action of phosphorous, and an ounce of phosphate of soda may be taken without any effect on the liver cells. The hypophosphites, on the other hand, in which the oxidation of the phosphorus is incomplete, appear to retain some of its action, but I should have no doubt that if the hypophosphite is sufficiently stable in the presence of the hydrochloric acid in the stomach to resist decomposition, so that the hypophosphorus acid is never set free, that body will be inert.

The arseniates might be expected to be inert on similar grounds, but arsenic has almost as much affinity for hydrogen as for oxygen, and as Professor Odling pointed out, the arseniate may be reduced in one part of the system to be oxidized again in another. When arsenic is imprisoned in a perfectly stable molecule, as in the kakodyle compounds, it is harmless (unless it is responsible for the foul odour), and can be taken in large amount.

Mercury, again, is a remarkable metal, physiologically and therapeutically considered, both on account of the smallness of the poisonous dose of its soluble salts, and on account of the value and variety and constancy of its effects employed as a therapeutic agent. It is not easy to trace a dynamic explanation of these effects; they are no doubt intimately related with its powerful antiseptic action. In all its forms it is a deadly foe to minute organisms of every kind, vegetable as well as animal, contrasting in this respect with arsenic and antimony. Everyone who has dispensed medicines is familiar with the fungus which grows in a solution of tartar emetic—that is, if tartar emetic has not been banished from the materia medica—and arsenic does not prevent decomposition in vegetable infusions as mercury does. The antiseptic and therapeutic and poisonous actions of mercury are no doubt alike due to some relation of this metal with albuminoid substances.

But important as positive illustrations of the deduction that chemical groups ought to form therapeutical groups may be, it is not unlikely that explanation on chemical principles of apparent exceptions to the law may throw greater light on the mode of action of remedies.

When speculation as to the mode of action of remedies and poisons began to exercise my mind, this deduction, which is logically inevitable if the laws of chemistry and physics apply to the animal organism, was a great stumbling block in my path. No set of bodies can be more clearly related chemically than the chlorine, bromine, and iodine group, and yet there is nothing in the action of the chlorides and bromides comparable to the action of iodide of potassium on gummata and other tertiary syphilitic lesions. The explanation of this diversity by Professor Odling in his Gulstonian Lectures was like the lifting of a cloud from before my mental vision. It is no doubt familiar to all my hearers. The iodine acts like chlorine in bleaching; by its affinity for hydrogen it liberates oxygen, which in the nascent state oxidizes the organic matter, and the reason why iodide of potassium is available as a vehicle for iodine is that the hold of iodine on potassium is so slight that the combination is easily broken in the presence of living protoplasm, and the iodine is set free to do its oxidizing work. Chlorides and bromides are too stable to allow of this decomposition. An explanation of the special action of bromides in preventing epileptic attacks is greatly to be desired. I do not believe that it resides in any specific property of bromine, and I should not be surprised to learn that chloride of potassium had some analogous effect, unless, indeed, it is the displacement of chlorides of sodium and potassium by heavier bromides in the nerve elements which hampers their action and dulls their sensibility.

Among inorganic substances, the different classes—alkalies, alkaline earths, earths proper—the iron group and so on have each certain physiological and therapeutical actions in common, but, as I have pointed out more than once before, there is, underlying the conspicuous similarity, say between the different members of the alkaline class, a profound diversity, as is shown by the fact that soda salts are found in the serum, potash salts in the corpuscles, and that potash in all combinations is a muscle poison arresting the heart's action when injected into the veins even in small quantity, while soda has no such action; that is, the relation of these two bases with the organic constituents of the body is quite different. I have long held the opinion that in addition to the horizontal classification of metallic substances, there will be found a vertical arrangement, a member of each class corresponding with a particular member of the several classes above it from the alkalies through the earths and baser metals, up to the noble metals. I should conjecture, for example, that lead at one end may correspond with sodium at the other, and gold (or perhaps mercury) with potassium. Such speculations as these, however, are premature, and at present perhaps unprofitable; but the projection of the scientific imagination into the unknown is a legitimate preliminary to investigation. Facts may cluster round an idea, and crystallize into a general law.

The third of the deductions made is that there must be quantitative relation between the substance administered and the effects observed and a dynamic explanation of such effects.

The establishment of any quantitative relation between a substance introduced into the human system and the observed effects, seems to be a hopeless task, in view of the minuteness of the dose of the powerful poisons, and yet it must be done if therapeutics, or even physiology, is to be correlated with physical and chemical science. When we reflect that a single grain of anhydrous hydrocyanic acid, or of aconitine or strychnine, will destroy life; and try to calculate the proportion of the deadly agent present in the blood as it arrives at the nervous centre upon which it works destruction, the disproportion between cause and effect is bewildering to the imagination, even if we adopt the supposition of accumulation of the poison in a given part of the nervous system. One is tempted to think that the mode in which they act may best be illustrated by such a case as the presence of grease on the rails in front of a locomotive, when the engine, were the steam turned on, would for want of hold tear itself to pieces, or by grit among the wheels of a piece of machinery, which will bring it to a standstill. Here are effects altogether disproportionate to the cause, and to which the doctrine of the correlation of forces does not at first sight seem to apply. In a sense the illustration is just. CO, for example, combining with the hæmoglobin of the corpuscles, and preventing the interchange of oxygen and CO_2 may not inaptly be compared to grit in the wheels, and the suspension of function of a part of the nervous system which is essential to life, or the allowing of a vital centre to expend its energy and run down, may perhaps present some sort of parallel to the damage of a valve in a steam engine, or the self-destruction of a locomotive when the wheels do not bite. Or there might be a liberation of stored-up energies, as the touching of a button launches a vessel, or the pulling of a trigger determines the explosion of gunpowder.

But these illustrations cannot be accepted as indicating an explanation of the apparently disproportionate effects of poisonous doses of the alkaloids. The consistency and constancy of the effects of smaller doses, and even more, the modification of these effects, already dwelt upon by changes in the chemical molecule, points to some definite relation between the drug and the special chemical processes concerned in the evolution of nervous energy in the particular centre upon which it acts.

Let us think for a moment what this implies. A grain or two, say, of anhydrous prussic acid is swallowed; a fraction of it is absorbed; the blood by which it is carried receives a first dilution by admixture with the general portal stream from the viscera; again, in the right side of the heart it is lost in the floods of blood arriving by the two venæ cavæ. The proportion of hydrocyanic acid in the blood carried to the brain must thus be incalculably minute, but it is sufficient to suspend the action of the respiratory centres, and thus to destroy life within a few minutes, with the accompaniment of frightful convulsions. Or we might take as an instance a fraction of a grain of aconitine injected hypodermically, which will more slowly, but almost more surely, prove fatal by paralysing the heart. Now we cannot admit that these effects are due to the mere contact of the poison with the nerve centres; this would be an absolute negation of the doctrine of the correlation of forces. There must be some dynamic action on the part of the drug—some evolution of energy which interferes with the evolution of nervous energy, or antagonises it; that is, there must be chemical change and dislocation of the constituent parts of the molecule, and this chemical change must be equivalent in amount, and probably opposite in character, to the chemical change which evolves nerve energy. This, if true, is a far reaching conclusion. It shows that the quantivalence of nerve force is exceedingly small, and, again, that there is some definite relation between the chemical constitution of the poisonous alkaloids and that of the substances contained in the nerve cells, by change in which nerve force is liberated.

There are many other considerations which go to show that nerve force is characterized by intensity rather than quantity, and that its electrical analogue is frictional rather than galvanic, so that I have been led to the conclusion that the nervous impulse which determines muscular contraction is not the transmission of energy but the disturbances of equilibrium.

The sudden evolution of nerve force shows it to be of the nature of an explosion, and this implies chemical tension in the molecule which yields it. The atoms, were they free to follow their affinities, would arrange themselves differently, just as in nitro-glycerine the carbon and hydrogen are held apart from the oxygen by nitrogen and rush together with explosive violence when concussion shakes loose the unstable NO compounds. The absolute necessity of duly oxygenated blood for the functional activity of nerve centres shows that oxygen from outside the unstable nervous molecule takes part directly and immediately in the decomposition and recomposition which liberates nerve force. The active nerve poisons should hypothetically, also, be so constituted as to be in a state of chemical tension, and as far as my knowledge, now very imperfect, extends, they are all of the nitrite type of molecule, which is an extreme departure from the ammonium type in which the affinities of nitrogen and hydrogen are balanced. Successive atoms of hydrogen are abstracted till in amides we have NH_2 instead of NH_4, and in imides NH, and in nitrites N only. This leaves unsatisfied affinity and unbalanced forces which imply chemical tension. The analogy or the contrast of the chemical constitution of the molecule from which nerve force is evolved, and of the molecule of the poison by which nerve force is antagonized, ought to be full of instruction.

It has always seemed to me, if a dynamic explanation of the action of poisons is possible—and such an explanation is a scientific necessity—it should be yielded by prussic acid. Its composition and its constitution are simple. Dynamic change can only have one result—the separation of its atoms, and one tendency—deoxidation, in consequence of the seizure of oxygen by the carbon and hydrogen. The hypothesis which commends itself to my mind, and which I have many times propounded is, that in the presence of the affinities which evolve nerve force, the dislocating influence of nitrogen comes into play; the molecule explodes, and its carbon and hydrogen seize upon the oxygen which is necessary to nerve action, and a vital nerve centre is thrown out of gear long enough to destroy life.

This is a thrice-told tale, and I crave your indulgence in once more repeating it. May I also trespass on your patience in again alluding to the fact which presented itself when I was experimenting with this substance, namely, that prussic acid is not a poison to frogs in the same way that it is to warm-blooded animals? When I dropped dilute hydrocyanic acid upon a frog's back, except that it seemed to sting him he took no notice of it unless he were put under a glass shade, when he would gradually become narcotized, but would recover in the open air. When I injected it under his skin he hopped about as if nothing had happened, until again I placed him in a confined atmosphere, when both he and his companions were gradually narcotized, showing that he was impregnated with the poison.

My interpretation of this immunity is that the languid affinities concerned in the evolution of nerve force in batrachians fail to bring about the explosion of the hydrogenic molecule.

GASTRIC DYSPEPSIA.

BY D. J. HAMILTON, M.B., F.R.C.S.E., F.R.S.E.

The following passages are taken from Dr. Hamilton's address to the Section of Pathology:—

Acidity in Dyspepsia.—By the term "acid dyspepsia" I understand a condition in which the individual experiences, some time after the ingestion of food, a feeling of burning pain in the epigastrium; suffers from eructations which impart to the mouth the feeling of acidity: in which digestion of the meal is delayed; and in which the feeling of burning pain is relieved—it may be only temporarily—by the administration of sodic bicarbonate or other such salt with eructation of liberated carbonic acid.

Not only is there a feeling of acidity, but recent researches show, in spite of what has been asserted to the contrary, that an increased quantity of acid is present; and, moreover, that the particular acid to be found in the stomach at a given period after the taking of a meal is often the wrong acid. It is these contingencies which confer the peculiar acid features upon the affection. For our present purpose it is therefore necessary to be conversant with what acids ought to be in the stomach under a given regimen at particular periods, and to know in what quantity they should be found. Let us endeavour to settle these points.

Acids of Natural Digestion.—It is universally admitted that hydrochloric is the acid which confers acidity on the gastric juice. Hirsch found the quantity of hydrochloric acid in human gastric juice to be at least 2·5 per mille—a pretty reliable result, seeing that the estimation was made by the approved method of Cahn and v. Mering. After a rich mixed meal, however, the quantity of this acid found in the stomach contents may become greater than it is in the gastric juice itself (3·57 per mille), and new acids make their appearance. The quantity of hydrochloric acid seems to vary with the nature of the diet and the period of digestion at which the observation is made. In the course of natural digestion, however, a large quantity of lactic acid is also forthcoming, and under pathological conditions butyric and other acids may develop, or the acidity may in part be occasioned by acid phosphates.

Under Cahn's direction, Rothschild has made a number of observations relative to the amount of acidity in the different stages of digestion of meat. The subjects of these observations were himself and a healthy patient. After the administration of 50 grams of pure lean meat, and 325 grams of water, he found, by the use of the stomach pump, that the total acidity at different intervals was as follows:—

	I.	II.
After ½ hour	0·74 per mille	0·74 per mille.
„ 1 „	0·82 „	1·64 „
„ 1½ „	0·99 „	1·86 „
„ 2 hours	1·40 „	2·88 „
„ 2½ „	2·46 „	2·22 „
„ 3 „	stomach empty	stomach empty

Ewald and Boas's researches on the human stomach seem to show that in the digestion of lean meat there are three distinct stages.

During the first, which may continue for fifty minutes after ingestion, lactic acid alone is present. They are of opinion that the lactic acid is simply set free from the meat, and not secreted by the stomach, because when other proteids, such as pure egg-albumen, were substituted for the meat, they could not detect lactic acid by any method of testing, although hydrochloric acid was evident enough. Digestion has not proceeded far as yet; the pieces of meat are in a red swollen condition; and the transverse striæ are particularly evident.

During the second or intermediate stage, which continues up till sixty to ninety minutes after ingestion, the lactic acid becomes contaminated with hydrochloric. The striation of the muscle fibre is less evident, and in some fibres it has already vanished. Digestion is proceeding and the remains of the meat have a paler tint than in the foregoing.

The third stage reaches its point of greatest activity in about two hours. Digestion is now at its height, and hydrochloric acid alone is met with, the lactic acid having either been absorbed or destroyed in some way.

The digestion of fish seems to be characterized by the same stages as that of meat.

Roll bread and potatoes also call forth both acids. In ten minutes after swallowing a quantity of white bread lactic acid prevails in abundance in the stomach. It goes on increasing up to thirty or forty minutes, after which time hydrochloric acid begins to manifest itself; while still later, the lactic acid entirely vanishes and hydrochloric alone can be detected. Pure starch or pure albumen, however, when introduced into the fasting or washed out stomach, was found, by Ewald and Boas, to induce the secretion of hydrochloric acid alone, and it appears rapidly.

The important practical point, however, for us to remember is that in the digestion of a mixed meal two acids make their appearance, and always in a particular order. Lactic acid is the cause of the acidity in the first instance, hydrochloric in the second.

The lactic acid seems to be derived from two sources, namely, from the fermentation of carbohydrates and from the meat consumed. In the latter case, it seems to be simply dissolved out. Richet gave to this the name of "meat lactic acid," and Ewald and Boas call it "paralactic acid." Fermentation lactic acid can be readily produced artificially by placing white or black bread with water in a warm chamber.

It appears to be clearly made out, however, that the better the stomach is working the sooner the lactic acid called forth by a mixed diet disappears and is replaced by hydrochloric; and it is when the hydrochloric is alone present that digestion is most active. It is not quite clear what becomes of the lactic acid; it may be simply absorbed. Maly supposed that it might be converted, along with the chlorides, into hydrochloric.

Causes of Acid Dyspepsia.—1. In the commonest form of acid dyspepsia, the acid which seems to be present in greatest quantity is lactic. Along with this there may be volatile acids, such as butyric and acetic, but the quantity of hydrochloric seems to be relatively small. The lactic acid stage is prolonged, and digestion cannot proceed further without the advent of fresh hydrochloric acid. Under these circumstances, and at this period, the administration of hydrochloric acid, one would say, might be beneficial.

An alkali such as sodic bicarbonate, although it might neutralize the lactic acid, would not, it might be thought, remedy the evil; the food would still remain undigested. The administration of sodic bicarbonate, however, has been found to call forth a hypersecretion of gastric juice in the healthy stomach. It is possible the same thing may happen in acid dyspepsia, if sufficient alkali be taken, and that digestion may thus be directly favoured.

2. Besides instances of acid dyspepsia caused by the mere prolongation of the lactic acid stage of digestion, there appear to be others in which lactic acid is furnished in too great quantity. The source of it under these circumstances seems to be the sugar taken as food.

When pure boiled starch is swallowed, it has been repeatedly shown, by withdrawing it from time to time, that it does not give rise to grape sugar, but to maltose and dextrin. The transformation of maltose into grape sugar occurs chiefly in the small intestine under the influence of the pancreatic and intestinal juices. The quantity formed in the stomach is quite inconsiderable. The source of the grape sugar necessary for the production of the lactic acid must, therefore, be sought for elsewhere, and it seems that to account for it we must fall back upon the cane and other sugars taken into the stomach as food. Cane sugar is naturally converted into dextrose, partly in the stomach, partly in the small intestine, and it is apparently from this that the excessive lactic acid is forthcoming. The intolerance to cane sugar of many individuals subject to acid dyspepsia supports this notion.

When the abnormal conversion into lactic acid of the grape sugar derived from this source occurs the interchange appears to be caused by fermentation organisms, which are always more or less abundantly present, and adhering to the mucosa. The organisms which have this power seem to be numerous. The decomposition is as follows:—

$$\underset{\text{grape sugar}}{2(C_6H_{12}O_6)} = \underset{\text{lactic acid.}}{4(C_3H_6O_3)}$$

In course of time a further transformation may supervene, in that the lactic acid splits up into butyric acid, carbonic acid, water and hydrogen—

$$\underset{\text{lactic acid}}{2(C_3H_6O_3)} + \underset{\text{water}}{2(H_2O)} = \underset{\text{butyric acid}}{C_4H_8O_2} + \underset{\text{carbonic acid.}}{2CO_2} + 2H_2O + H_4$$

This further interchange is also brought about by micro-organisms, but as these are not so constant in the stomach as the foregoing, the morbid decomposition does not always go on so far.

The stomach, under these circumstances, contains torulæ, sarcinæ and many other vegetable parasites in abundance. The gas-forming organism, however, does not appear to be either a torula or a sarcina, but a bacillus. McNaught has succeeded in isolating the organism and growing it artificially in Pasteur's fluid. Gas was freely liberated, which burnt with a blue flame, and probably consisted of H and CO_2. The organism grows in a highly acid medium, even when the acid is hydrochloric. The cause of its not fructifying in the normal gastric contents is probably either that they are removed before it has had time to develop to any extent, or that it does not happen to be present. Where there is delay in the removal of the semi-digested contents, as in cases of stricture of the pylorus, full time is afforded for its growth.

3. In addition to these forms of acidity due to the presence of lactic acid and its derivatives there appear to be cases which are to be accounted for by the hydrochloric acid being in too great quantity.

Thus the hydrochloric acid may be secreted in such volume and so rapidly that it almost neutralizes the alkaline saliva, and consequently leaves masses of starchy food untransformed in the stomach. The transformation of starchy food into maltose and dextrin commences momentarily on its introduction into the mouth. The salivary ferment will act only in an alkaline solution, and its action consequently ceases in health, when its alkalinity is neutralized by the lactic acid of commencing gastric digestion. Opinion differs as to how long is required in health to bring this about, some authors going so far as to deny that the saliva remains active at all on passing the gullet. Such an extreme view, however, is now mostly abandoned; v. den Velden fixed the time at from half-an-hour to an hour. Ewald says this is too long, and that the sugar-forming properties of saliva in the stomach cease in about ten minutes.

However this may be, there seems to be conditions of the stomach in which the neutralization occurs far too rapidly, and so the starchy food remains undigested, and confers a sense of uneasiness upon the individual. The work of transformation would, under these circumstances, have to be borne chiefly by the pancreas.

In the variety of hyperacidity from hydrochloric acid just referred to, the acid is secreted only on the introduction of food. There appears, however, to be a condition, not very uncommon, in which gastric juice, highly acid from the presence of hydrochloric acid, is secreted during fasting. In the year 1882 Reichmann drew attention to this aberration in the functions of the stomach and v. den Velden recorded a number of cases occurring in men, accompanied by vomiting, etc. He found that during the intervals of meals a large quantity of highly acid gastric juice can be drawn off by the pump. Riegel says that it may last far several years without any notable symptoms. In time, however, the individual develops pain in the epigastrium, water-brash, acid eructations, etc., accompanied by vomiting. He states that it is always followed by dilatation of the stomach, and that it predisposes to *ulcus ventriculi.*

The condition was named *Gastroxynsis* (ὀξὺς acid) by Rossbach, but Rosenthal since then has termed it *Gastroxia.* The latter supposes that it results from an alteration of the nervi vagi or their nuclei, and that many instances of hysterical vomiting are of this nature. He fixes the quantity of acid in the secretion at from 0·3 to 0·32 per cent.

It appears to be a frequent accompaniment of nervous diseases, such as hysteria, tabes, or neurasthenia (Reichmann) and when so, comes on periodically, each attack lasting from twenty-four hours to several weeks. The diagnosis is easily made by washing out the stomach at night and pumping out the liquid accumulated within it in the morning.

(*To be concluded.*)

Proceedings of Societies in London.

MEETING OF CHEMISTS OF SOUTH PADDINGTON.

A meeting of the chemists of South Paddington, and friends from North Paddington, North Kensington, and other parts of West London was held at No. 1, Queen's Gardens, Hyde Park, on the evening of August 8, to consider the desirability of forming an association for the western portion of London.

Mr. F. Andrews (Divisional Secretary for South Paddington) in the chair, reported that he had received a large number of letters from gentlemen, regretting that either from their own or their assistants' absence from town they were unable to be present. The writers in every instance expressed their entire sympathy with the object of the meeting, and most of them desired to become members when the Association was formed.

After considerable discussion, some of the speakers thinking that possibly it would be preferable to have an association wherever there was a divisional secretary, it was at length on the motion of Mr. Mathews, seconded by Mr. Long, unanimously resolved, "That it was most desirable to form an association of the chemists and druggists living in the western portion of London," and the Committee of the North Kensington Association, with power to add to its number, was appointed a Committee for the purpose of carrying out the resolution.

Messrs. Martindale and Mathews were appointed delegates to represent the Association at the meeting of the Pharmaceutical Conference at Leeds.

Votes of thanks were passed to Messrs. Mathews for their kindness in lending their rooms for the purpose of the meeting, and to Mr. Andrews for his conduct in the chair, and the meeting then terminated, but several gentlemen remained for a considerable time, in friendly conversation, upon various trade and other kindred subjects.

Parliamentary and Law Proceedings.

INFRINGEMENT OF A TRADE MARK.

In the Chancery Division of the High Court of Justice, on the 6th instant, the case of The Apollinaris Company (Limited) *v.* Snook was heard by Mr. Justice Kekewich. It was an action brought against Mr. Joseph John Snook (trading as Gabriel Jozeau, 49, Haymarket; Wilcox and Co., 239, Oxford Street; and Jabez Munro, 273, Regent Street) to restrain him from infringing the plaintiffs' registered trade mark 48,933 (known as "The F. and Arrow Mark") used in connection with Friedrichshall water. This mark is not used by the plaintiffs in connection with the sale of their Friedrichshall water in England, but is used by Messrs. Oppel and Co., the owners of the spring, in connection with the sale of the water abroad in bottles, on which is a label stating as follows:—"This bottle must not be exported to any part of the world outside of the Continent of Europe. If so exported, it will infringe rights of others, and will be the subject of legal proceedings." The defence was that the registration of the mark was not *bonâ fide* for the purpose of identifying or warranting the waters, but for the purpose of securing in restraint of trade an illegal monopoly. The similarity of the defendant's mark to that of the plaintiffs was admitted. The defendant had, in fact, purchased abroad the bottles with the labels affixed, and brought them to England for sale, the original vendors (though not to the defendant) being Messrs. Oppel and Co.

Mr. Justice Kekewich said he had no doubt about the case. The defendant admitted he was using the very thing which the plaintiff company had registered, and that what he was doing was against their wish and without their consent. What he had done was an infringement, and could not be justified by the defences put forward on his behalf. The plaintiffs were entitled to the relief sought and the costs of the action, including the costs of a motion for an interim injunction. His Lordship also granted the plantiffs a certificate under the Trade Marks Act, 1888, that the right to the exclusive use of the trade mark came in question.

Poisoning by Lead in Drinking Water.

Mr. P. P. Maitland, district coroner, held an inquiry into a case of lead poisoning at Pudsey, near Leeds, on August 9.

From the evidence it appeared that Joseph Fawbert, [illegible] years of age, of Rider's Row, Chapeltown, Pudsey, a partially deaf and dumb man, felt the first symptoms of lead poisoning eight months ago, when he consulted Dr. Kershaw, who pronounced it a case of lead poisoning. He gave him a note for the Leeds Infirmary, of which the deceased man, Fawbert, became an in-patient, and remained so three months, the doctors were also reporting the case as one of lead poisoning. The deceased man then became an out-patient, and gradually grew worse. He was latterly attended by Dr. Smyth. When he became an out-patient of the Infirmary he had practically lost the use of one arm, and was losing the use of the other.

Dr. James Smyth, who had attended deceased before he went to the Infirmary and again a few days before his death, concluded that the deceased was suffering from lead poisoning. He had examined some drinking water in the same block of houses about twelve months ago, and found lead in it in quantities injurious to health. There were many other cases in Pudsey, and the sister of the deceased in the same house was at present suffering from lead poisoning. Experience showed that the greater the length of lead pipe the greater the danger from using the water.

After further evidence had been given, the jury returned a verdict of "Died from lead poisoning."

Supposed Poisoning of Two Children by a "Sleeping Mixture."

On August 10 the Shipley police received information of the death of two children, at Shipley, and inquiries made subsequently point to the conclusion that death has been due to the administration of a sleeping mixture. On Saturday night the mother took the children with her to bed at the usual hour, previously, however, giving each a dose of a children's sleeping mixture known as "Betsey," a bottle of which the father had recently purchased at a shop in Shipley. On awaking next morning the mother found both children dead beside her. Dr. Rutherford was called, and as he was unable to certify the cause of death, the bottle of mixture in the house and the similar mixture at the shop where the other was purchased were taken possession of and sealed up by the police.

Reviews.

A Dictionary of Applied Chemistry. By T. E. Thorpe, B.Sc. (Vict.), Ph.D., F.R.S., Professor of Chemistry in the Normal School of Science, and Royal School of Mines, South Kensington, assisted by Eminent Contributors. Vol. I.*

Since the publication of a 'Dictionary of Chemistry' by Dr. Ure in the early part of the century as a single volume of 500 pages, the development of chemical science has been so extensive and the applications of chemistry in various arts and manufactures have been so numerous that it has become impracticable to continue to treat this subject in all its aspects in a single work. Hence the subject matter of the new edition of the 'Dictionary of Chemistry' by Morley and Muir, now in course of publication, has been restricted to the exposition of the present state of chemistry as a science, without giving any special information relating to its practical applications. This latter portion of the subject was left to be treated of in a companion three-volume work, and the first volume of it has recently been published under the editorship of Dr. Thorpe. The general plan of this work is similar to that of the 'Dictionary of Chemistry,' to which it is intended to be complementary, and in all cases where purely scientific principles have not a direct and immediate bearing upon technical operations reference must be made to the 'Dictionary of Chemistry' by those who desire information beyond the present range of industrial practice. In carrying out this general plan, however, it has been found impossible to avoid a certain amount of overlapping, especially in such articles as those treating of the atmosphere, water, fermentation, etc.

The first volume of the 'Dictionary of Applied Chemistry' comprises 715 pages, and it extends to about the end of the letter D, the principal articles on chemical industries being those on Bleaching, Bread, Brewing, Candles, Cements, Disinfectants, Distillation and Dyeing. Under such special heads as acetic acid, albuminoids, alcohol, alizarin, aluminium, ammonia, aniline, etc., the chemistry of the several substances referred to is treated of from the standpoint of practical application, and descriptions are given of the various branches of manufacturing industry in which those substances or their derivatives are concerned. Considerable space has been devoted to articles upon acidimetry, alkalimetry, alcoholometry, analysis and assaying, as well as aspirators and the balance, amounting in all to about ninety pages, or nearly one-eighth part of the volume. These articles are written with suitable regard for the requirements of industrial operations, and the fact that methods of analysis which will give an approximately correct result in a short space of time are of much greater value to the manufacturer than more accurate methods which require much time. But the amount of space they occupy is so considerable as to suggest the question whether it would not be preferable to extend the application of the principle of separation already introduced in regard to theoretical and applied chemistry, and to treat of matters relating to analysis in a special work. When it is considered, moreover, that analysis is an art that can only be acquired by actual practice, there seems to be still greater reason for adopting that course.

The general character of the articles in this volume of the 'Dictionary of Applied Chemistry' shows that considerable care has been given to their preparation. In several instances the subject matter of these articles is altogether new in regard to manufacturing industry, as, for instance, in the articles on alizarin and allied colouring matters, azines and azo colouring matters, dealing with the comparatively novel industry of coal tar colours. The very important additions that have lately been made to the technical chemistry of ammonia, aluminium and chlorine have also been thoroughly dealt with in the articles under these heads. The 'Dictionary' will be an indispensable requisite for those engaged in manufacturing operations involving knowledge of chemistry, and as a source of information on various branches of manufacturing industry; it should also find a place on the bookshelves of pharmacists and many others who are less directly concerned with the subjects it treats of.

Précis d'Analyse Microscopique des Denrées Alimentaires. By V. Bonnet.*

The work now before us treats of the microscopical analysis of the ordinary articles of food and diet, together with many of the condiments employed in cookery to give relish to food and to gratify the palate.

M. Bonnet now occupies the position of assistant and draughtsman in the microscopical department of the superior School of Pharmacy in Paris, but was formerly engaged in the municipal laboratory, where such articles would be brought under his notice; these positions would naturally tend to qualify him for the authorship of such a work as the present summary.

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* London: Longmans, Green and Co.

* Paris: J. B. Baillière et Fils. 16mo. Pp. i.-viii. 1-200; Plates xx.

It can scarcely be said that alimentary substances are of any immediate or direct interest to the pharmacist especially, but at the same time even a pharmacist can ill afford to neglect them, more especially if he aspires to qualify himself to conduct analyses in either a public or private capacity.

Chemistry with all its resources is frequently unable to determine the existence of a falsification in food or to indicate its nature, and under these circumstances the microscope must remain *par excellence* the instrument in researches of this description.

The author has illustrated his book with a good variety of useful wood engravings, and in addition to these it has twenty plates in colours. This is a somewhat novel feature in microscopical delineations, and the differentiation of the several cells and tissues by colouring certainly enhances the value of the work to the student. But the colouring is rather too pronounced if, as stated by M. Guignard, the writer of the preface, it is to be accepted as a happy idea of M. Bonnet to represent the elements in their *natural colours*, so as to make their distinction the more easy.

The question is often asked by a student desirous of acquiring a practical knowledge of the microscope, how shall I proceed with the view of initiating myself into its mysteries, and what work shall I consult on the subject. Perhaps no better could be placed in his hands than this one just issued by M. Bonnet. It commences with the cereals, goes carefully through the starches belonging to each, giving their leading characters; and these, with the tissues, will go far to enable the student to determine to what grain or grains the sample under his notice must be referred. It treats also, as fully as space will permit, of the several condiments or spices, some of which, as ginger, cinnamon, mustard and saffron, have a special interest for the pharmacist, forming in fact a part of his materia medica.

Even the trichina is represented as safely ensconced in the cystic state in the muscular fibres of a fragment of pork.

The recognition of ergot when present in flour is provided for, although it is rarely met with in this country. Attention is also directed to various spores and fungi, the presence of which indicates an unwholesome condition of flour or bread.

Just sufficient of this little work, and that is only a few pages, is occupied with the construction of the microscope, and in enumerating the various accessories necessary to practical work. A few more pages are occupied indicating the various reagents and selective colorants now generally employed in microscopy, and in giving concise directions as to their use. Simple as the work may appear when looking at the coloured plates, nevertheless, to separate those tissues and to isolate the various cells of which they are composed, as shewn in the drawings, must always be a matter of intelligent and delicate manipulation, requiring great care and judgment in its accomplishment.

There is very little omitted within the scope of such a work as this that is necessary to the student's progress, and having practically followed the author through the consecutive chapters, which may be considered as so many progressive lessons, he may rise from the completion of the work and feel that he can day claim to be considered a fair microscopist.

It is difficult to conceive a work of the same size with more workable information and better adapted to the needs of a student until he is enabled to pass out of leading strings into the work of original investigation on virgin soil.

M. Bonnet's book is not without some faults, but on the whole these are few, and are mainly the result of accepting statements as facts and reproducing them. An error, when printed, becomes a hydra-headed monster which takes a good deal of killing. Colouring mustard with saffron and mixing "brains" with milk may be safely relegated to the department of ancient history.

Obituary.

Notice has been received of the death of the following:—

On the 3rd of August, Mr. Thomas Barker Hopkins, Chemist and Druggist, Tulse Hill, London, S.W. Aged 91 years.

On the 5th of August, in London, Mr. John Peter Willmott, Chemist and Druggist, late of Plymouth. Aged 80 years.

On the 8th of August, Mr. Paul Havill, Chemist and Druggist, Fore Street, Tiverton. Aged 81 years. Mr. Havill was Local Secretary to the Pharmaceutical Society, of which he had been a member since 1869.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A MODIFICATION OF THE ADAM'S COIL IN MILK ANALYSIS.

Sir,—I have only just noticed the letter in the issue of July 19, under the above heading.

If your correspondent will refer to the *Pharmaceutical Journal*, [3], xiv., 512, or to the *Analyst*, 1884, p. 20, he will find the original suggestion made by me for the drying of milk solids upon an absorbent substance.

The substance I recommended was "Parker's Paper Fibre Lint," and I think he will find this has many advantages over the Gamgee tissue which he mentions. Adam's paper, although published long after mine, was, I believe, published in entire ignorance of my previous publication; indeed, I have Dr. Adam's assurance to that effect.

Liverpool. A. C. ABRAHAM.

Mr. G. W. Sargent writes to complain that the President, in referring at the Council meeting last week to a communication that had been received from him, "grasps the opportunity of referring to a totally distinct letter of mine which has been placed before several influential members of the retail trade and proved to be substantially correct." As neither of the communications referred to have been published, and have therefore not come within the cognizance of ourselves or our readers, we do not think any useful purpose will be served by initiating a discussion as to their merits or how far it was correct to speak of them as "similar."

Cheltonian.—(1) *Linaria spuria.* (2) *Galeopsis Ladanum.* (3) *Mentha aquatica.*

D. S.—*Verbascum nigrum*, probably. It is impossible to identify such a plant by a fragment of a leaf and a single flower. A portion of the spike and a piece of stem with leaves, should be sent.

T. H. G.—Hooker's Primer is a very good one. Holmes' 'Botanical Note-Book' for Practical Botany.

W. H. Wilkinson.—*Melilotus arvensis* (Field Melilot

E. F. Young.—(1) *Mentha aquaticus.* (2) *Pyrol arenaria.* (3) *Alisma Plantago.*

F. H. Davis and G. Woodruff.—All advertisements should be sent direct to Messrs. Churchill, 11, New Burlington Street, W.

Poole.—An attempt will be made to carry out your suggestions when the present series of articles has been completed.

COMMUNICATIONS, LETTERS, etc., have been received from Naylor, Dodgson, Short, Grierson, Doin, Diaphragm.

LESSONS FROM FIELDS AND LANES.

AUGUST.

During the present month the student may expect to find representatives of most of our native orders either in flower or fruit. Some of these have already been noticed, while many are too local in their distribution to come within the scope of the present series of articles. There is an order, however, one of whose members has been in flower ever since summer set in, and which perhaps we have unduly neglected in deference to the popular idea that it is not a wild flower but "only a weed." The order *Plantaginaceæ* is nevertheless a most interesting one, showing as it does the transition from *anemophilous*, or wind-fertilized flowers, to *entomophilous*, or insect-fertilized. The ribwort plantain (*Plantago lanceolata*) is a common weed everywhere. Its conspicuously ribbed lanceolate leaves and long *scape* terminated by a spike of minute flowers, conspicuous only when the anthers are ripe and hung out, cannot be mistaken. The flowers are *proterogynous* (pistil mature before stamens), and if the spike be examined it will generally be found that when the stamens of the upper flowers are at maturity the styles of the lower have withered and the fruit has begun to form. A closer examination will reveal the fact that inconspicuous as are the flowers each is in itself perfect, being provided with a *bract*, a four-lobed *calyx* and *corolla*, four *stamens* and a *pistil*. The great wayside plantain (*P. major*) shows by its strongly ribbed leaves and the general similarity of its inflorescence its relationship with the ribwort; it is readily distinguished from it by its broader leaves, shorter scape and longer spike. The hoary plantain (*P. media*) is not so common as the species just mentioned, and its coloured bracts and long slender pink or purple filaments, terminated by lighter coloured anthers, give the inflorescence a very distinctive appearance not to be mistaken; the scape is longer than that of the greater plantain, but the leaves are in appearance very similar. Soils containing much lime are the most likely places to meet with the hoary plantain. The seaside plantain (*P. maritima*) and the buck's horn plantain (*P. coronopus*) are both common by the sea, and the form of the inflorescence will dispose of any doubt as to their affinities; the former has linear leaves, while in the latter they are narrow and *pinnatifid*. These are certainly the most attractive looking members of the genus and brighten up many a rocky corner which would without them have been dull and uninteresting. *P. lanceolata*, as found in this country, is invariably wind-fertilized, as might be inferred from its dull colour, powdery pollen and slender filaments; but a form of it has been found in the Appenines which appears to be more adapted for insect-fertilization. *P. media* is intermediate between a state of anemophily and one of entomophily; its slender filaments and powdery pollen point to a weakness for wind-fertilization, while its coloured filaments and bracts and slight perfume show a distinct tendency upwards, and as a matter of fact it is visited by numerous insects.

The order *Polygonaceæ* is another order which embraces a number of troublesome weeds; it is interesting to the pharmacist as being the order to which rhubarb belongs. Its best known members are the docks, of which the most common species are *Rumex obtusifolius* and *R. crispus*—the latter readily distinguished by the margins of its leaves being *crisp* (undulating). The common sorrel (*R. acetosa*) and the sheep's sorrel (*R. acetosella*) are common in every field and are now in fruit. Their inflorescence is similar in appearance to that of the docks, but they are readily distinguished by the smoother character and *hastate* shape of the leaves; the flowers, moreover, are unisexual, the sexes being on different plants (*diœcious*)—those of the ordinary docks being *hermaphrodite*. The mountain sorrel (*Oxyria reniformis*) is a pretty and interesting little plant which should be looked for by students who spend their annual holiday among the mountains; it is readily recognized by its dock-like inflorescence and *reniform* (kidney-shaped) leaves. The genus *Polygonum* is the one most likely to attract attention in the fields and lanes during the present month. The common knot-grass (*P. aviculare*) will be recognized by its linear-lanceolate leaves, having in their axils one to three tiny white or pink flowers—only expanding in bright weather. The stems are very slender and when growing on open ground are content with a prostrate position; if growing among corn, however, they become quite erect, a result of the competition for light characteristic of their environment. We have already had examples of the differences produced in the habits of plants by variation of the surroundings, and especially when this variation takes the form of an increasing struggle for light. The student should lose no opportunity of comparing this difference of habit, often so well marked in plants of the same species. The spotted persicaria (*P. Persicaria*) is most common on or near cultivated ground, and although much larger and more robust than the knot-grass resembles it in many of its characters; the leaves are similar in shape, although larger, and the pink and white flowers, although generally in spike-like racemes, are frequently produced in the leaf-axils; the dark blotch a little above the centre of the leaves of the persicaria, which is so characteristic of it, may sometimes be traced in a less marked form in the knot-grass. There are many species of *Polygonum* now to be found in moist places, but it will be impossible to enter into descriptions of them here. The most likely to be met with are the bistort, or snake-root (*P. bistorta*), with oblong obtuse leaves, the radical being long-stalked, and long *scape*, terminated by a dense *raceme* of pink flowers; the amphibious buck-wheat (*P. amphibium*), and the water-pepper (*P. hydropiper*). The black bindweed (*P. convolvulus*) will be found twining round the stems of corn, and may readily be recognized by its angular stem and *sagittate* leaves.

The order *Polygonaceæ* illustrates many points of very great interest to the student of development as well as to the student of structure. In the docks and sorrels, as might be inferred from the absence of bright colours in the flowers, fertilization is effected solely by the wind. The flowers of the knot-grass, besides being inconspicuous, are almost devoid of honey and are self-fertilized. In persicaria the flowers, although in themselves not likely to attract the notice of insects, become capable of doing so by their close aggregation; they have been shown to receive insect visits and are sometimes cross-fertilized by their means, although they retain the power of self-fertilization and frequently make use of it. In bistort, the most conspicuous and most highly adapted member of the genus, the flowers not only secrete an abundance of honey and receive numerous insect visits, but are quite incapable of being self-fertilized, because they are *proterandrous* (stamens ripening before pistil). The membranous *ochreate* (sheathing) *stipules* of the *Polygonaceæ* should be noted and the *triquetrous* (triangular with three concave faces) fruit well seen in the docks is another noteworthy feature; the three inner sepals, which are the conspicuous part of the fruit, enlarge after flowering and appear to accommodate their shape to that of the ovary which they enclose. The order is a good example of the sub-class of dicotyledons, known as *Incompletæ*, from the fact of the flowers being destitute of corolla. The presence of oxalic acid is a remarkable feature characteristic of many members of this order. The pleasant acidity of the leaves of the sorrels is well known and is due to the presence chiefly of the acid oxalate of potassium. The presence of the same acid in garden rhubarb has been proved in a striking manner by a recent writer in the *Lancet*, who attributed the formation of a renal calculus of calcium oxalate in himself—he now keeps the calculus in a tube as a warning—to eating largely of this plant and at the same time using a hard water. The *raphides* or crystals of calcium oxalate present in "*Rad. Rhei*" are known to all students of *materia medica.*

Accompanying the *Polygonums* on cultivated lands, representatives of two orders are almost invariably to be found. The *Euphorbiaceæ* and the *Chenopodiaceæ*, like the docks and plantains and many of the other weeds which worry the farmer, are possessed of flowers which although in themselves inconspicuous, yet succeed in attracting a certain amount of attention from their numbers and aggregation. The latter is the order to which the beet belongs, and like the former is one of the *Incompletæ*. Several of the goosefoots (*Chenopodium*) may now be met with in cultivated fields and gardens, the most common being *Chenopodium album*, whose tall mealy stems, *deltoid* (triangular) leaves, and whitish inflorescence consisting of numerous minute *hermaphrodite* flowers, closely resemble *Atriplex hastata*, another member of the same order. A closer examination, however, will show that in the latter the leaves are *hastate* and the flowers *unisexual*.

The order *Euphorbiaceæ* is of pharmaceutical interest, as being the order which furnishes *Cascarilla*, *Croton* and *Castor* oils. One of its early flowering members, the dog's mercury, we have already considered. The genus now to be found in flower, however, is that of *Euphorbia*, the spurge genus. The *Euphorbias* are *monœcious* (male and female flowers on the same plant). *Mercurialis*, it will be remembered, is *diœcious*. The commonest spurges are the petty spurge (*E. Peplus*) and the sun spurge (*E. Helioscopia*). It will well repay the student to dissect the latter of these plants very carefully, and to note particularly the peculiar structure of the inflorescence. The delicate yellowish-green tint of the foliage is a characteristic feature of the plant. From the base to a little above the middle of the stem there is a tendency to *trichotomous* (dividing into three) branching, while higher up the branching takes place repeatedly in a *dichotomous* manner. In the upper forks will be found here and there a female flower, consisting of a stalked ovary (stalk known as a *gynophore*) leaning over so as to be entirely outside the *perianth*, which consists of four *lunate* (crescent-shaped) *glands*: the horns of the crescent have hard tips (*cuspidate*), and are generally somewhat curved. As we get towards the apex of the branches we come to the *inflorescence* proper, consisting of numerous *ovate entire bracts*—the leaves, especially the lower ones, are *obovate*—getting smaller as we go upwards, and having in their axils numerous male and few female flowers, the latter being of similar structure to those found in the forks of the stem, and the former having the same kind of perianth, surrounding one or more stamens; the stamens are said to be *didymous*, from the fact that the anthers are divided, and apparently borne on branches of the filament. If the stem of a spurge be broken across an abundance of milky juice will be seen to exude. This juice is of a particularly acrid nature, and is characteristic of the genus as well as of many members of the order; the slightest trace of it on the tongue produces in about half an hour a burning sensation, which makes the taster wish he had asked someone else to make the experiment. Among country people the spurges enjoy a reputation as a cure for corns and warts. The *Euphorbium resin* of pharmacy is the dried milky juice obtained from incisions in the stem of *E. resinifera*, a native of Morocco; its powerful irritant and cathartic properties are similar to those of our native spurges. *Kamala*, which consists of the glands from the fruit of a *Euphorbiaceous* plant, possesses to a great extent the irritant properties of the order, and it is to these it owes its value as a cure for tape-worm. The irritant properties of croton oil are well known, and some parts of the castor seed have recently been shown to produce similar effects.

The St. John's worts are an interesting order (*Hypericineæ*) and for the last month have been doing their best to brighten lanesides and waste ground. Perhaps the commonest of all is the perforate St. John's wort (*Hypericum perforatum*), so called from the apparent perforations which dot the leaves, but which are in reality oil glands. The flowers, as in all the members of the genus, are yellow and the stamens are united by the bases of the filaments to form three bundles (*triadelphous*). The plant varies in height from one to three feet and is decidedly bushy in habit. An oil prepared by steeping the plant in oil and so, presumably, extracting its oil, was much vaunted a few years since as a remedy for bed-sores, but appears to have died a natural death. The square-stalked St. John's wort (*H. quadrangulum*) resembles the one just considered very closely, but may be distinguished by its four-winged stem and the almost total absence of pellucid oil glands in the leaves. The tutsan (*H. Androsæmum*) is the noblest looking member of the genus and is more common in the southern counties than further north; its stamens are in five bundles (*polyadelphous*). The trailing St. John's wort (*H. humifusum*) is common in dry places, especially of a moorland nature; it is in habit *decumbent* (lying on the ground but rising towards the extremities) with small flowers, but slender and ill-nourished as it looks it bears a distinct resemblance to its more robust relations. The prettiest of all the St. John's Worts is the small upright one (*H. pulchrum*), which also loves the moorland and the hillside. It has slender stems from one to two feet in height, obtuse and somewhat cordate leaves, and the petals in addition to being tipped with pink are fringed with black glands; the leaves also are dotted in the same way as the leaves of the perforate St. John's Wort.

Our never-failing friends the *Scrophulariaceæ* and *Labiatæ* still vie with one another in making attractive railway embankments, dry roadsides, and mountain pastures. Of the former the yellow toadflax (*Linaria vulgaris*) is now the most conspicuous (see *Pharm. Journ.*, xx., p. 182). The figworts fringe watery places and embankments (*Pharm. Journ.*, xx., p. 182); and the tall scapes of the foxglove, now loaded with fruit, with here and there a red solitary looking flower, are still conspicuous in woods and hedgerows (*Pharm. Journ.*, xx., p. 22). The little labiate corollas of the red Bartsia may be found peeping out from among their linear bracts by roadsides and on waste ground almost everywhere; the plant is almost sure to attract attention from the somewhat one-sided (*secund*) appearance of its inflorescence. The great mullein (*Verbascum Thapsus*), from the reputation it has recently attained as a remedy for phthisis should be looked for, although it is somewhat local in its distribution. Its large woolly leaves and dense woolly spike of yellow, almost regular flowers cannot be mistaken. Among the *Labiatæ*, the self-heal (*Prunella vulgaris*) and the wood-sage (*Teucrium Scorodonia*) are now to be found almost everywhere. The former sends up from a creeping rhizome a stem generally four to eight inches high, bearing at its apex a dense cylindrical bracteate spike of purple flowers; the purple edged bracts are the most conspicuous feature of the plant, and almost hide the flowers. The wood-sage is a dense, tufted plant, with *rugose* (wrinkled), ovate-cordate and crenate leaves and numerous one-sided conspicuous racemes of whitish flowers. The *exserted* (projecting beyond the corolla) stamens ripen before the pistil, and after dehiscing bend backwards out of the way; large quantities of honey secreted at the base of the ovary, lodge in the corolla tube and attracts numbers of insects, with the result that cross-fertilization is always effected. The common white horehound (*Marrubium vulgare*) is a plant of pharmaceutical interest belonging to this order, but is more common in gardens than in a wild state. It is too well known to require description; its most noteworthy features are the very woolly stem and leaves and the ten-toothed calyx, each of the teeth being terminated by a hooked bristle.

Canterbury bells are now the most conspicuous ornaments in many of our English lanes, while their less aristocratic but no less pretty relatives, the hare-bells, ornament many a rocky pasture and moorland roadside. The heaths, the ling, and the gentians are making their annual show on the moors, while in the rockier places there is an equal abundance of the wild thyme. The fruits of the juniper and the leaves of the bear-berry should also be gathered in the course of a mountain ramble, and it may be that their structure will prove of greater interest in their native haunts than when gathered from a shop drawer or a dry-room cask. A full description of all these will be found in the article of August last (*Pharm. Journ.*, xx., p. 101).

SWEET PELLITORY.

BY DAVID HOOPER.

A Persian drug is annually imported into Bombay in the Spring under the names of *Bozidan* (Persian) and *Mitha-akkalkara* (*Bombay*). Bozidan is also applied to *Caucalis orientalis*, the *βουσαιδαν* of the later Greek physicians, and *Mitha-akkalkara* signifies "sweet pellitory," *akkalkara* being the Indian term for the root of pellitory of Spain as sold in the bazaars. Dr. Dymock has a notice of this drug in the appendix to his 'Materia Medica of Western India,' and it is doubtfully referred to a species of pyrethrum in Sakharam Arjun's 'Catalogue of Bombay Drugs.' Dr. Dymock has been able to examine some freshly imported parcels of the root, and from some specimens of the flowers and fruit, he has identified the plant to be *Tanacetum umbelliferum*, Boissier. The native doctors consider it to be aphrodisiac, tonic, deobstruent, useful in rheumatism and gout, and in enlargement of the liver and spleen. They also regard it as having abortifacient and anthelmintic properties.

The root has some resemblance to pellitory, but it is larger and lighter in colour. It is rough and furrowed longitudinally; internally it is hard and whitish, and breaks with a tough, close fracture. The microscopic structure also resembles that of pellitory root. The corky layer is made up of thick-walled cells and oil cells occur in the middle layer of the bark and in the medullary rays. Some of the parenchymatous cells were loaded with granular matter, which however did not show the sphæroidal character of inulin when the root had been immersed for four months in alcohol. The root was sweetish and mawkish to the taste, with a very slight degree of acridity, and the odour was like chaulmoogra oil, especially when powdered or boiled with water. A proximate analysis of the powdered root separated ether extract 1·0, alcoholic extract 8·6, water extract 25·1, crude fibre 56·9, and 6·8 of ash in one hundred parts. The ether extract, having the peculiar odour of the drug, was evaporated to dryness and digested in rectified spirit for several months; this separated a whitish insoluble granular fatty substance, and a light reddish brown liquid. The insoluble portion examined under a microscope was seen to consist of radiating crystalline tufts of wax, tasteless, and neutral in reaction. It dissolved in petroleum ether, and to some extent in boiling alcohol, solidifying in the cold. It softened a little above 70° C., at the temperature of boiling water melted to a brown liquid, and with sufficient heat it burnt away on platinum foil with a smoky flame. The soluble portion of the ether extract was evaporated; the residue was acid in reaction, and produced a numbing sensation on the tongue, and at the same time caused a copious flow of saliva. This fatty residue was treated with petroleum ether, which dissolved some fatty acid, crystalline and fragrant, and left a brown resin. The resin had the properties of pyrethrin. Besides its action on the tongue, it was soluble in proof spirit, ether, chloroform and bisulphide of carbon; insoluble in ammonia, caustic and carbonated alkalies, and but slightly soluble in cold petroleum ether. It dissolved in nitric acid with evolution of gas, and in sulphuric acid with a reddish brown colour and evolving the odour of butyric acid.

The alcoholic extract contained an organic acid in addition to some saccharine matter reducing Fehling's solution, and no traces of an alkaloid. The organic acid was darkened in colour with ferric salts, gave an orange precipitate with plumbic acetate, and caused no deposit in gelatin solution. The water extract contained 15 per cent. of a carbohydrate precipitated in a pulverulent form with three volumes of alcohol.

Pellitory root contains 5 per cent. of pyrethrin,[*] with certain oily and fatty matters, about half its weight of inulin, and a small quantity of tannin (?). The sweet pellitory contains a minute proportion of pyrethrin (the entire ether-extract amounting to only one per cent.), with fat and wax, an organic acid possessing pigmental properties, glucose and inulin. The sweet pellitory is so named not so much, I should consider, from the amount of sugar it contains as from the small amount of the acrid and pungent principle.

ECONOMIC PLANTS IN CEYLON.

The following information respecting the cultivation of economic plants in Ceylon is taken from the annual report on the Royal Botanic Gardens in that island, by the Director, Dr. Trimen:—

Tea.—The export for the commercial year ending September, 1889, reached over 32½ million pounds (32,516,682 lb.), nearly 12 million lb. more than in the previous twelve months. For the calendar year 1889 it amounted to 33,383,035 lb. The Australian Colonies took of this somewhat over 1¼ million pound (1,134,156 lb.), a considerable increase over the year before, but still a very small proportion of the 24 million pounds annually consumed in those Colonies.

The price of Ceylon tea in the London market has been subject to remarkable fluctuations during the year, being very low in the middle, but more than recovering towards the end; and the average for the whole year may be put at somewhat over 11*d.* per lb., which is very little less than that of the year before. Bearing in mind the greatly increased quantity, this must be considered a decidedly satisfactory position.

Encouraging, too, is the general absence at present of any serious drawbacks to cultivation in the way of insect or fungus enemies. Green bug is troublesome in a few places, and at least one attack of *Helopeltis* ("Mosquito Blight") has been recorded, but these are of little account. It is, however, most earnestly to be hoped that this present general immunity from any serious pests will not blind planters to the necessity of providing against future possibilities by paying attention to other cultivations.

Cinchona.—The export for Ceylon for the commercial year has been 10,498,487 lb., a further fall of over a million pounds in the gradual lessening which has been going on since 1886. The diminution is further exhibited if we take the figures for the calendar year 1889, which are only 9,179,280 lb., and the process must now continue at a rapidly increasing progression. As a consequence, the price of bark may be confidently expected to rise, though it must be remembered that our place as dominating the market is being taken by Java. The question, however, arises whether a revival of cultivation here should be recommended, and it is well worthy of consideration. Speaking generally, I consider it has been sufficiently proved by experience that neither the soil nor the climate of Ceylon are well suited for cinchona trees, which have shown themselves here to be, as a rule, short-lived and unhealthy. I refer especially to the wet and windy localities so frequent in the planting districts; the mortality here is indeed so great among young trees as to render it almost impossible to cultivate cinchona with success. But in the drier districts the case is different, and in places where *C. officinalis* and *C. robusta* hybrid do well the cultivation is likely to again prove very profitable. But with the large consignments of bark of high quality from Java to compete with, it will be more than ever useless to grow inferior varieties.

Coffee.—An export of 86,440 cwt. for the commercial year—84,749 for the year 1889, a decrease of over 50,000 cwt.—shows coffee to have at length come down to the position of a quite secondary product. Nor—in spite of the encouragement of high prices—are there any signs of a general attempt at a revival of this cultivation. Reports, however, of the great improvement of coffee under shade in Coorg and Mysore have led to the planting up of some estates with trees, especially with the native *Ficus glomerata*, which is considered in India to be peculiarly suitable. The effects of shade on the appearance of coffee are undoubtedly striking, and in very dry climates (as the districts of India mentioned) particularly so; diseased and exhausted bushes are doubtless kept living and retain their leaves longer when shaded, but the quantity of blossom and crop is, I should suppose, not likely to be increased. Moreover, it should be remembered that the shade-trees themselves are an additional burden on the land (an important matter on a poor soil). On the other hand, they undoubtedly afford some protection against continual and excessive infections by the spores of *Hemileia*; and their general absence in Ceylon in the past doubtless helped on the very rapid spread of leaf-disease through the Island.

Cacao.—There has been a considerable increase in the export of this for the commercial year 1888–89, 14,461 cwt.; and that for the year 1889, 17,164 cwt., is the largest yet recorded. It is much to be regretted that so small an area of the country appears suited to this cultivation. Even in suitable localities cacao still suffers somewhat from the attacks of *Helopeltis*; and larger enemies that have to be kept down are squirrels and wild cats.

Caoutchouc Trees.—With reference to the remarks I offered in my last report as to the great desirability of Government taking up the cultivation of *Hevea* (Para rubber) on a large scale, I have now the satisfaction of being able to record that the Forest Department has made a commencement by the selection of land near Námbápana, in Sabaragamuwa, a portion of which is to be cleared and planted during the ensuing season. This decision was not come to till too late in the year to enable the seed of 1889 to be used for the purpose. We had a large crop at Henaratgeda, and a smaller one at Pérádeniya. As I have often had occasion to point out, these seeds quickly lose their vitality and have to be sown immediately. About 8000 were sold, a considerable number sent properly packed to Queensland, and the remainder sown at Henaratgoda, where there are now several thousand seedlings, which, when "stumped," can be rendered available for planting out.

I have supplied the Forest Department with such information as our experience of this tree at Henaratgoda has afforded us. It may be useful, as showing the rate of growth, to bring together the records taken at the end of each year of one tree at Henaratgoda for the past ten years. The tree was four years old in 1879; the circumference is taken at 3 foot from the ground.

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[*] C. J. S. Thompson, *Pharm. Journ.*, [3], xvii., 567.

	ft.	in.
1880	1	4
1881	1	9
1882	2	1½
1883	2	6
1884	3	0
1885	3	7
1886	4	1
1887	4	5½
1888	5	0
1889	5	5

The Panama rubber trees (*Castilloa*) do not now grow rapidly; the best tree at Henaratgoda has increased during the year half an inch only, being now 3 feet 5 inches in circumference. At Péradeniya the trees of this species are not looking healthy or thriving well.

In March last the conductor at Henaratgoda experimented on the rapidity of the flow of rubber from a Para, a Castilloa, and a Ceara tree respectively, and reports that to obtain 4 oz. rubber it took, from a Para tree 3½ hours, from a Castilloa 2 hours, and from a Ceara 5 hours.

To illustrate the importance of caoutchouc trade, I may quote some figures of the imports from Brazil into the United Kingdom. In 1887 no less than 113,955 cwt. were imported, valued at £1,605,115, or about £14 per cwt.; the greater part of this was Para rubber, the price of which during the past three years has varied between 2*s.* and 3*s.* 6*d.* per lb. This enormous quantity is wholly obtained from wild trees, and additions to the sources of supply are urgently needed; indeed, there is every probability that in the long run, as with cinchona so with caoutchouc, it is upon systematic plantations in the Old World that we shall have to depend for our supply.

Guttapercha.—The increase in these slow-growing trees is but slight. *Payena Leerii* is 23 feet high and 10 inches in circumference, and *Dichopsis pustulata* 14 feet 9 inches high, with a circumference of stem of 9 inches.

Cotton.—The mills of the Ceylon Spinning and Weaving Company at Colombo being now in working order, the company is prepared to purchase at certain rates any quantity of Ceylon-grown cotton; and a considerable quantity of the Tinnevelly sort and smaller quantities of Egyptian and New Orleans has come in from the Jaffna, Batticaloa, and Anurádhapura districts.

Tobacco.—A large quantity of tobacco, chiefly of the Sumatra sort, has been grown and cured in the Mátalé and Dumbara districts, and at the present time (February, 1890) as much as 62 tons of cured leaf is being sorted and stacked on one estate in the latter district, where most of the curing is carried on. It remains to be seen how Ceylon high-class tobacco will fare in the home market.

Cubebs.—My efforts to obtain this plant for the Gardens have been continued. On June 5, we received from our correspondent at Soerabaya, Java, a Wardian case containing twelve plants and six cuttings, with the assurance that the greatest care had been taken to insure the acquisition of the right plant. The cuttings were dead, but nine of the plants were in good order, and these were at once planted out, and are doing well both at Péradeniya and Henaratgoda. None have yet flowered, but from the foliage alone I fear that again we have failed to obtain the true *P. Cubeba*. I still, however, hope to get from Java ripe seed (as to which there could scarcely be any doubt) sown in a Wardian case and allowed to germinate before leaving.

Sarsaparilla.—The "Jamaica sarsaparilla" of commerce is the product of *Smilax officinalis*, and comes chiefly from the Cordillera of Chiriqui in the Isthmus of Panama. It derived its name "Jamaica" from being formerly brought from Central America to that island, whence it was exported to Europe. Of this plant next to nothing is known, but a *Smilax* has been cultivated in Jamaica itself for many years, and affords a sarsaparilla which is exported to a small extent. A local nurseryman having recently forwarded a sample grown in Ceylon from plants of this kind imported from Jamaica, attention has been again called to the plant, of which several specimens from Kew are in cultivation at Péradeniya. I gave a woodcut illustration of the base of the stem and roots of this *Smilax* in 'Medicinal Plants' (sub. t. 289), in an account of *S. officinalis*, to which species the late D. Hanbury considered it to belong: but as I there pointed out, the specimens do not well agree with De Candolle's description of the type-specimens of that species. Quite recently also Sir J. Hooker has expressed his opinion (*Bot. Mag.*, sub. t. 7054) that the cultivated Jamaica sarsaparilla and *S. officinalis* will prove, when their flowers are known, to be different species.

SOME RELATIONS BETWEEN HOST AND PARASITE IN CERTAIN EPIDEMIC DISEASES OF PLANTS.*

BY H. MARSHALL WARD, F.R.S.

Professor of Botany, Royal Indian Engineering College, Cooper's Hill.

(*Concluded from page* 130.)

The conidia vary in infective power according to their nutrition—*i.e.*, according to the substratum on which the mycelium grows—and according to the generation to which the conidium belongs, *i.e.* (as I interpret it), according to the increasing vigour of the successive mycelia which produce the conidia.†

This latter fact is best demonstrated as follows: A crop of conidia is grown on a given pabulum, *e.g.*, on the moist sclerotium; the conidia are sown on the cut surface of ripe, sweet pears, and produce mycelia, whence conidia again arise; these are again sown on pears, and produce a still more vigorous mycelium and crop of conidia, and so on. Calling the first crop of conidia generation I., and the second crop generation II., the third generation III., and so on, it was found that if the conidia of generation I are sown on similar leaves of a *Sempervivum* in a tiny drop of sap they do not infect the leaf; whereas those of generation II., similarly sown, infect the leaf at once, and those of generation III. are still more virulent.

Kissling,‡ who has paid special attention to this point, and has carried the matter much further than other observers, measures the infective power of the conidia by the size of the disease spot they produce in a given time.

As I have shown, the penetrating germinal hypha causes the cells in its neighbourhood to collapse and turn brown, because the excreted ferment or poison destroys the cellulose, and makes the protoplasm unable to retain the sap, which consequently suffuses and browns the area concerned. Now it is obvious that the rapidity with which this browning occurs may be taken as a rough measure of the progress—and, therefore, of the destroying power—of the infecting hyphæ, other things being equal. Well, Kissling took the necessary precautions, and set the conidia of succeeding generations I., II. and III. to work on the surface of various fruits and other parts of plants, of course using the same substratum in any one series of experiments. In a day or two the infected circular areas, as marked by the brown colour, were large enough to measure in millimetres, and by measurements on successive days he was able to judge of the progress of this extraordinary race, and he comes to the conclusion that on the same substratum the conidia vary, according to their generation, in their power of destroying the tissues. Those of the third generation, for instance, not only germinate more rapidly and vigorously—indications that they start in the race better equipped in the matter of food-materials and ferment-yielding substances—but they also destroy the cells of the host which they compete with more rapidly—which, no doubt, indicates that they are able to produce or manufacture more poison in the same time.

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* Croonian Lecture. From the 'Proceedings' of the Royal Society.

† Kissling (*op. cit.*, p. 31) has proved this for *Botrytis cinerea*.

‡ *Loc. cit.*, pp. 22–29.

SUMMARY OF THE FACTORS OF AN EPIDEMIC—BEARING OF THE DISCUSSION ON OTHER PARASITIC DISEASES—CONCLUSION.

It will be clear from the foregoing that in the case of an epidemic fungus disease, such as we have been considering, there are several classes of factors to be regarded, and I may sum up the chief points somewhat as follows. First, we have the normal healthy host-plant, with all its hereditary (internal) and adaptive peculiarities; secondly, we have the parasitic fungus, also with its disposition. Then we find, thirdly, that, apart from its inherent powers of variation, the host is subject to variable external influences during its life, which may produce such changes in the cell-walls and contents, etc., that the plant approaches nearer and nearer the limits of health, wide as we may regard these. On the other hand, we have, as a fourth consideration, the parasite also varying under the influence of changes in the factors of the environment, and its variations may, of course, be also dangerous to its welfare; but they may, on the contrary, be in such directions that it is enabled to profit by the counter-variations of the host. When the combined effects of the physical environment are unfavourable to the host, but not so or are even favourable to the parasite, we find the disease assuming a more or less pronounced epidemic character.

It is not pretended that we have here a totally new idea, because it has long been known that some organisms which bring about parasitic diseases do vary in the intensity of their effects, and can be made to do so artificially, and we know that some of the most brilliant results in biology have been obtained in connection with certain lower organisms; but I have simply sought to show some of the links in the chain of causes and effects in the definite case of certain epidemic diseases of plants produced by the parasitism of some of the more highly developed fungi, and this, I think, has not been done before. If the preceding argument is admissible, new light will be thrown not only on the cases of parasitism referred to, but also on the behaviour of the host in its struggle for existence with the factors of the inorganic environment, generally.

The question as to how far this view of the matter may be extended to other parasitic diseases of plants cannot be answered at present. Obviously the reflections excited will suggest lines of inquiry, and I may appropriately bring these remarks to a conclusion by a few brief comments on what is known as to the behaviour of other classes of parasitic fungi in this connection.

Omitting the *Schizomycetes*, partly because they have a literature to themselves, and partly because they rarely[*] occur as parasites in the cells of plants, possibly owing to the acidity of the sap; and the *Myxomycetes*, of which Woronin's *Plasmodiophora*[†] is the best and most curious case; we have pronounced parasites (capable of producing epidemics) among the *Peronosporeæ*, one of which (*Phytophthora infestans*) has been more studied, probably, than any other true fungus parasite, at any rate so far as its life-history is concerned.[*]

Much that has been stated in this lecture would, apparently, apply to the potato disease, and in view of the extreme interest that necessarily attaches to that malady, I draw attention to the following points of interest.

Suppose we take a potato plant the leaves of which are very slightly marked with minute disease spots, and divide it into two halves as exactly alike as possible, and place each half in a tumbler of water; the two tumblers, with their half-plants, are then placed in an ordinary room, side by side, at a temperature of about 20° C., and one is covered close with a bell-jar and the other left uncovered. In a short time—often a few hours—the covered leaves become black and rotten with the disease, whereas the uncovered one will go on looking fresh for several days, though it also succumbs at once if covered.[†]

The question arises whether the rapid spread of the fungus and the rot it causes here are simply owing to the increased supply of water, as the tissues become turgid in the saturated atmosphere under the bell-jar; or whether we have not here again, in addition, a case where the diminished access of oxygen to the interior of the tissues of the host results in an accumulation of organic acids and other substances which make the excessively turgid cells and thin, watery cell-walls more than usually easy prey to the parasite.

I ought to add, that if a potato plant is grown in a pot and kept under a bell-jar (untouched by *Phytophthora*) normally lighted, in the summer, the excessively watery dark-green shoots often develop hump-like outgrowths, composed of very large thin-walled cells, which may be regarded as due to the excessive turgescence and hypertrophy of these cells. Presumably they contain relatively large quantities of organic acids, etc., and everything indicates that such a shoot would easily succumb to the *Phytophthora*, as in fact it does.

Kühn long ago noticed[‡] that there are two periods when the potato shoot is most easily infected by the *Phytophthora*. The first is while still young—fully developed internodes are much more difficult to infect than young growing ones, a fact well known and easy to confirm; the second period is said by Kühn to occur after the tissues are far advanced, at the end of July or the beginning of August, and this would seem to be borne out by the experience of cultivators generally. I am inclined to regard this second period as coincident with the time when the plant is particularly rich in the products of assimilation on their way down to the tubers. They travel chiefly as glucose, and one consequence of the abundance of this carbohydrate, and the increased metabolism it supports, is an increase in the organic acids. If wet and dull weather sets in when the tissues are thus, so to speak, overflowing with such substances, the *Phytophthora* is peculiarly favoured, and can spread through the plant with the rapidity characteristic of an epidemic. In the allied genus *Pythium*, the phenomena are so similar that we may assume that the fungus behaves like Peronospora: the species are often saprophytes, however.

The question now arises, can these ideas be extended to the case of other parasitic fungi? It would be difficult to say with regard to the *Saprolegnieæ* and the *Mucorini*, because so little is known of their parasitism. As regards the *Ascomycetes* generally, we may expect great differences in respect to types like the *Gymnoasceæ*, *Rhytisma*, *Hysterium*, the *Erysipheæ* and the *Sphærias*, and they certainly occur.

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[*] Exceptions probably occur in the case of Wakker's hyacinth rot, the American "pear-blight," the "peach yellows," and a few others. See de Bary's 'Lectures on Bacteria,' 1887, p. 177, and the 'Reports of the United States Department of Agriculture,' especially No. 9, 1888.

[†] Pringsheim's 'Jahrb. f. wiss. Bot.' (1878, vol. xi., p. 548).

[*] See de Bary 'Morph. and Biology of the Fungi' for the chief literature.

[†] See de Bary, 'Die gegenwärtig herrschende Kartoffelkrankheit,' 1861, p. 55.

[‡] 'Ber. aus dem Physiol. Lab. u. d. Versuchsanstalt des Landw. Instituts. d. Univ. Halle,' 1872, pp. 81—82, quoted by Sorauer, vol. i., p. 140.

Some *Nectrias* at any rate ([*]*e.g.*, *N. cucurbitula*, *N. cinnabarina*, and *N. ditissima*) behave so differently towards the host that we may probably conclude that the mode of procedure is unaffected by such variations on the part of the latter as have been sketched; and the same may be said of the wood-destroying *Hymenomycetes* (*e.g.*, *Agaricus melleus*, *Trametes radiciperda*, *Polyporus sulphureus*, etc.).

In all these cases the tree, as a whole, suffers in an indirect manner: these various cankers and rots, etc., destroy, for the most part, structures which are already dead, and so interfere with the transpiration current, and other large groups of functions, more by the mechanical injury done than by direct injury to living cells.[†]

In the group of the *Ustilagineæ* we have some of the most remarkable parasites known, and the relation of the host-plants (chiefly species of Gramineæ and Cyperaceæ) to them must be very different in detail.

In the more typical cases we find that the sporidia or conidia germinate in artificial nutritive media, and go on producing generation after generation of their like,[‡] and this undoubtedly occurs in the open fields, etc. Brefeld states that he has cultivated one form through more than a hundred successive cultures in the course of a whole year, and that this corresponds to about 1500 successive sprout-series or generations,[§] but towards the end of the period the *germinating* power of the successive conidia became weaker and weaker, and at last failed.

He also found that the conidia germinate, by developing a germinal tube only at a given period, and not at any indefinite time they may happen to be sown: consequently they are unable to infect the host unless they happen to be on the proper spot at the right time.

Now Kühn showed long ago[‖] that the infection of the cereal by *Ustilago* can only occur near the "collar" of the young germinating seedling, and although differences have arisen[¶] as to the exact spot in this region which alone can be infected, there is one point on which all are agreed, namely, that the germinal tube can only enter the young actively growing tissues in that region. Immediately the first internode is completed, the seedling is proof against infection in the open.[**]

That it is really a matter of the age and condition of the tissue is beautifully demonstrated by Brefeld, who showed that if the conidia are forced into the bud by means of a syringe, so that they can germinate in contact with the embryonic cells at the growing point, infection may be ensured at any time.

But far the most interesting point about these fungi is that when the germinal hypha is once inside the tissues it goes on growing with them, keeping between the cells. Although we have almost no information as to details here, it can hardly be doubted that the chief agent in maintaining the balance of position in this case is the living substance in the cells of the host; but I know of no explanation for this beyond the general one, that so long as the cells of the internodes are actively performing their normal functions, the hyphæ have to be contented, so to speak, with a sort of suppressed existence in the intercellular spaces and middle lamella of the walls.

True, when the young fruits begin to fill out, the mycelium accomplishes a sharp revenge by destroying the whole fruit; but it is obvious that the relations which determine the epidemic or sporadic character of the disease are those between the tissues and the germinal hyphæ and young mycelium, and there are great variations in these matters, even in the group of the *Ustilagineæ* itself.

Very different again must be the relations in detail between host and parasite in the case of those *Uredineæ* which cause epidemic leaf diseases, especially those which form haustoria, and it is almost impossible to say anything about their nutrition beyond the general statement that they must have established such close temporary relations with the living cells of the host that their protoplasm and that of the host can go on absorbing nutriment from the same sources. This would seem to be proved by the curious phenomena of hypertrophy which they induce, *e.g.*, the young shoots of *Euphorbia cyparissias* are entirely altered in habit by the *Æcidium* of *Uromyces Pisi*, and the well-known "witches' brooms" of the silver fir, for although the changes induced imply that the cells are carrying out their functions in a modified manner, still they grow, divide, and evidently discharge their main duties much as usual. Consequently it is impossible to believe that any individual cell suffers much direct injury, and at least the protoplasm and nucleus, and even the chlorophyll corpuscles, etc., may remain intact for weeks or months. No doubt in these cases also the entrance of the hyphæ or haustoria into the tissues is aided by any factors which cause the cell-walls to be softer or thinner than in the normal condition; and it is certain that many failures by those who have experimented with Uredinous fungi are attributable to their sowing the spores on older, well-matured tissues.

We are here, however, abandoning the subject of the present lecture, because, in the first place, the phenomena just referred to appertain to sporadic rather than epidemic diseases; and because, secondly, they tend to the subject of *symbiosis* proper, where the relations between the host and the parasite have become so arranged that both may be said to benefit by the commensalism, as exemplified in the lichens, and some of the recently described cases of mutualism between fungi and the roots of Phanerogams.

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[*] 'Unters. a. d. Forstbot. Inst. zu München,' vol. i., pp. 88 and 109, and vol. iii.; also R. Göthe (Thiel's 'Landw. Jahrb.,' 1880, vol. ix., pp. 837).

[†] The germinal hyphæ developed from the spores of such fungi often find their way into the wood, cambium, etc., by means of wounds, caused by mechanical breakage, the nibbling of mice, squirrels, the punctures of insects, frost-cracks, the blows of hailstones, and so forth, which introduce us to a different aspect of the relations between host and parasite.

[‡] Brefeld, 'Bot. Unters. über Hefenpilze,' part 5, Leipsig, 1883.

[§] Brefeld, in a lecture before the *Klub der Landwirthe zu Berlin*, 1888 ('Nachrichten aus. d. Klub d. Landw. zu Berlin,' 1888, Nos. 220, 222).

[‖] 'Krankh. d. Kulturpflanzen,' 1859, p. 46.

[¶] *Cf.* Wolff, 'Brand des Getreides,' Halle, 1874; Hoffmann, 'Bot. Unters.,' 1886; 'Ueber den Flugbrand,' p. 206; Kühn, 'Beobachtungen ü. d. Steinbrand d. Weizens' ('Oesterr. Landw. Wochenschr.,' 1880).

[**] This no doubt explains the fact that in a wet spring nearly all seeds with spores attached become infected, because the tissues remain in a youthful condition longer than in a dry season.

THE INFLUENCE OF DIFFERENT FOODS AND MEDICINES UPON THE HUMAN GASTRIC JUICE.[*]

BY DR. WOLFF.

The author in making a series of experiments upon the influence of various articles of diet and medicine upon the gastric juice first ascertained the ordinary amount of acid present in the stomach of the person experimented upon and the time of its disappearance after Ewald's test meal, consisting of a roll weighing about an ounce and a quarter and ten ounces of water, and used the results as a standard for comparison.

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[*] Abstract of paper published in *Zeitschr. f. Kiln. Med.* from the *Medical Chronicle* for August.

When certain quantities of alcohol were added in the shape of 50 per cent. cognac or Munich beer, the conclusion arrived at was that small quantities of alcohol, about 20 per cent., have a slight power of raising the HCl secreted, but in larger doses, 30 per cent. or over, they hinder the secretion and peptonization. Besides, the experiments seem to show that when regularly used, the stomach, after a time, fails to respond to its usual stimulus, the food; the required amount of stimulant becomes greater, the use of alcohol more frequent, the glandular function of the stomach becomes more and more affected, and the way is opened to the whole train of dyspeptic symptoms, ending at last in atrophy.

Concerning the influence of coffee in infusion, he can give no information, because the colour of the beverage interferes with the reaction of colour tests. He substituted, therefore, caffeine, which he administered in the form of powders along with rad. altheæ. The result is, that in doses of 20 c.g., and still more in larger quantities, it has the property of lessening the total acidity at the height of indigestion; it also lessens the secretions of HCl, and delays peptonization. Since that amount of caffeine exists in the quantity of coffee taken usually by men, and more especially by women, we may assume that it has a similar action upon them.

Nicotine was next experimented with, a certain quantity—one mg.—being introduced by the sound after a test meal. Only three patients were tested, and of these, in two cases, there was a very slight rise in the acidity; in the third, a slight rise also at first, but after several days' use, a material lessening of the secretion and delay in peptonization. The experiments are admitted to be too few to draw safe conclusions from.

Turning to the action of bitters on the secretion, Dr. Wolff refers to the experiments of Tschelzoff on animals, and Jaworski on men, which show that these drugs lessen the secretion of acid to such a degree that Jaworski attributes the commonly supposed beneficial employment of them in dyspepsia to their influence in lessening the acidity where hypersecretion exists. Wolff tested first the action of nitrate of strychnia in doses of 0·5—1·5 c.g. The effect was found to be that where the acidity was below the normal, strychnia considerably raised it, but where HCl was habitually absent, the drug failed to call it forth. Infusion of condurango seemed to have no, or very little, influence on the acidity, but a slight increase of the secretion of pepsin may be produced. Reichmann's experiments, a review of which was published in the *Chronicle*, gave nearly the same result. Bitter infusions poured into the fasting stomach produced less secretion than plain water, but when administered along with food, the bitter quickly disappears, and the secretion is afterwards considerably increased; where, however, alkaline or neutral juice is ordinarily present, bitters are unable to provoke the secretion of HCl.

Three persons were experimented on with 15 to 20 ccm. of ox gall, administered along with a test meal. It was found that the acidity was thereby lessened, but there was no considerable diminution of the HCl or hindrance to peptonization.

Administering 5 g. of common salt with the test meal to patients either with lessened or increased secretion of HCl invariably lessens the amount of HCl present, in cases of hyperacidity to one half, with a corresponding improvement in the symptoms. The beneficial action of such waters as Wiesbaden and Kissingen must therefore be chiefly attributed to the lessening of the secretion of HCl; but their influence on absorption and the motor function of the stomach may be beneficial, and that on metabolism generally must not be neglected.

The author cites, before making experiments of his own on the action of Carlsbad salts, the results of the latest experiments of Jaworski, "that small quantities of Carlsbad water or salt stimulate the secretion of acid and the digestive activity, but when used in large quantity they stop the secretion and digestive power for several hours; that under this medication from day to day the activity of secretion and digestion constantly diminish, and at last the sensibility of the stomach to irritants is lessened to such an extent that no kind of food suffices to produce acid and frequently not even pepsin-secretion." Ewald found, however, that in ten persons subjected to a course of thermal water, and tested at frequent intervals during the time, half had slightly lessened acidity, the other half increased, and the lessening occurred in those who before the treatment had a high acidity. Jaworski has also found borax to act primarily as an irritant in small doses, but in large doses it causes a lessening or total drying up of the secretion.

Wolff, on the ground of the experience obtained of the action of common salt, Carlsbad salt, and borax, has administered a powder of the following composition in cases of hyperacidity, with or without hypersecretion, with great success: Sulphate of soda, 30 g.; sulphate of potass, 5 g.; chloride of soda, 30 g.; carbonate of soda, 25 g.; sodæ bibor., 10 g.; half a teaspoonful three times a day in half a glass of lukewarm water, fasting, and two hours before dinner and supper. In a typical case of hypersecretion the quantity of fluid in the fasting stomach was reduced, by four weeks' treatment, from 50 c.c.m. to a few cubic centimetres, and the acidity, at the height of digestion, by one-third.

Referring to the influence of acids on the secretion, Wolff found that when hydrochloric acid was administered to three patients in whom it was habitually absent, for periods of eight days, there was not in a single case any distinct action on the HCl secretion. A distinction ought to be made perhaps, according to the results of Jaworski's experiments, between ordinary acids and carbonic acid, since the latter exercises a purely mechanical influence, and in some raises the acidity considerably, and increases the peptic power of the gastric juice.

ALGÆ AS A CAUSE OF IMPURITY IN DRINKING-WATER.

Mr. G. W. Rafter has contributed to the 'Transactions of the American Society of Civil Engineers' an interesting article containing the result of observations on freshwater algæ, and their relation to the purity of public water-supplies. He finds that a number of algæ may contribute to rendering drinking-water unpotable, producing a nauseous or "fishy" smell, generally due to the decomposition of their mucilaginous envelope, or of the starch or oil contained in their cells. In addition to the well-known "sewage-fungus," *Beggiatoa alba*, which has the remarkable property of withdrawing sulphur from sulphates in solution, the following may be mentioned as especially deleterious when present in large quantities:—*Cladophora*, *Vaucheria*, *Eudorina*, *Pandorina*, *Volvox*, *Batrachospermum*, *Draparnaldia*, *Chætophora*, *Hydrodictyon*, *Palmella*, *Crenothrix*, *Oscillaria*, and diatoms generally, especially *Meridion circulare*. Desmids appear mostly to be innocuous.

The Pharmaceutical Journal.

SATURDAY, AUGUST 23, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE NEW PHARMACY ACT FOR IRELAND.

AT length, after a somewhat chequered experience, the Pharmacy Act (Ireland) Amendment Bill has passed through both Houses of Parliament and having on Monday last received the royal assent it has become law. Since its first introduction into the House of Commons it has been the subject of numerous amendments and during its course through the House of Lords the opponents to the Bill in its original form succeeded in modifying it to an extent that at one time seemed scarcely probable. Even in its final form it will alter considerably the law relating to pharmacy and especially to the sale of poisons in Ireland, so that although the full text of the new Act will be found in another part of this Journal, it may be convenient to summarize here the principal changes that it will introduce.

The chief object of the Act is to legitimize in Ireland, under certain conditions, dealings in poisons by a class other than the pharmaceutical chemists, to whom, with the apothecaries, this business, as well as the compounding of medical prescriptions, would otherwise have become restricted. This it does by providing for the registration as "chemists and druggists" of persons who were practising as such as principals at the time of the passing of the principal Act in 1875, by which their rights were reserved, and as "registered druggists" of other persons who shall comply with certain conditions, and by giving to these two classes the right to keep open shop for the sale, retailing or mixing of poisons, but not the right to compound medical prescriptions. This is the portion of the Act which has been the subject of the most earnest contention. As originally introduced the Bill would have extended the use of the title "chemist and druggist," without examination, to other persons who between 1875 and 1889 had, as was contended, illegally entered the business, and, subject to examination, it would have also given the title "chemist and druggist" to the persons who will now be known as "registered druggists." As it stands the Act entitles all persons who were in business as chemists and druggists at the time of the passing of the principal Act to registration as "chemists and druggists" within the next twelve months, upon making an application, accompanied by a statutory declaration and payment of a fee of one guinea. But persons who have commenced the business of chemist and druggist as principals since the passing of the principal and before the passing of the present Act, to become entitled to registration will have to make application, accompanied by a statutory declaration, before the 1st of June, 1891, and pass an examination in reading and writing, elementary arithmetic, the appearances of the poisons, drugs and chemical salts in common use, and in the Sale of Poisons Act (Ireland), 1870. If they have hitherto styled themselves "chemists and druggists," they will be entitled to be registered as such, but otherwise only as "registered druggists." The examiners for this particular examination are to be appointed by the Lord Lieutenant, who is also to fix the places where it is to be held and the fees payable. Other persons, who have served an apprenticeship of not less than four years to a licentiate apothecary, pharmaceutical chemist, chemist and druggist or registered druggist, are to be entitled to registration as "registered druggists" after passing an examination in English orthography and composition, arithmetic and the weights and measures of the British Pharmacopœia, the appearances and properties of the various drugs and chemicals in general use and the Poisons Act, on payment of a fee of two guineas for examination, and a further fee of two guineas for registration. If in addition to the four years, as specified, a person has served an assistantship of two years to a pharmaceutical chemist or a licentiate apothecary keeping an open shop he will be entitled to present himself for examination as a pharmaceutical chemist under the principal Act. The duty of providing for these examinations is vested in the Pharmaceutical Society of Ireland, but the examinations for registration as "registered druggist" are not to be at longer intervals than those for registration as pharmaceutical chemist, and may be held at other places than Dublin.

Other sections of the Act regulate the relations of the newly created class and the Pharmaceutical Society of Ireland. It fixes an interval of three months for making the necessary arrangements, after which all persons registered under the new Act will become entitled to election as "associate druggists" and to exercise practically the same privileges as members. At a date to be fixed by the Council, but not later than the 15th of January next, an election is to be held of seven persons registered under the Act, who are to be additional members of the Council until October, when a new Council is to be elected consisting of twenty-one members, not more than seven of whom are to be associate druggists. The power of voting in the election of the additional members of Council is limited to persons registered before that date as chemists and druggists or registered druggists, who shall have paid a subscription of one guinea for the year 1891; but the right of voting at subsequent elections will be common to both members of the Society and associate druggists.

The remaining sections of the Act provide for the enforcement of the law. The fifteenth section is an important one and its possible construction appears worthy of a remark. It provides that "from and after the passing of this Act it shall be "unlawful for any person to assume, and from and "after the first day of January, 1892, it shall be "unlawful for any person to use the title of a "registered druggist or chemist and druggist in "any part of Ireland, *or to sell poisons*, unless such "person shall be registered as a chemist and druggist or registered druggist under this Act," the penalty for each offence being a fine not exceeding five pounds. Before the time fixed for this section to come into force it may be worth while to take into consideration what may be the effect of the words in italic upon the pharmaceutical chemist, in respect to dealings in poisons, unless he be also registered under this Act as a chemist and druggist or registered druggist. In January of each year the Registrar is to send printed copies of the registers of pharmaceutical chemists, chemists and druggists and registered druggists to the inspector of weights and measures in each constabulary district, whose duty it will be to report to the Council any offence against the Pharmacy and Poisons Acts committed in his district, and in the event of a conviction he will be entitled to receive one-third of the penalty. Every person keeping open shop for selling or mixing poisons is required, under a penalty not exceeding five pounds, to personally manage and conduct such shop and the retailing and mixing of poisons therein, or to employ for the purpose an assistant or manager who is a duly registered chemist and druggist, registered druggist, pharmaceutical chemist or licentiate apothecary. In like manner the keeper of an open shop for selling poisons and compounding medical prescriptions is required to personally manage and conduct such shop and the retailing, dispensing and compounding of poisons and medical prescriptions therein; or to employ as assistant or manager, a pharmaceutical chemist or licentiate apothecary. Power is however given to the Council to examine for the qualification of assistants to pharmaceutical chemists, the holder of which would be entitled to take temporary charge of a pharmaceutical chemist's business, but not to manage a business or to keep open shop on his own account. In any case, however, the owner of the shop is to be held to be the retailer or compounder of poisons or medical prescriptions as the case may be. Finally, the Registrar is empowered to address a letter to the proprietor of any premises where poisons are sold or medicines compounded, asking to be informed within seventeen days of the date of its delivery, as to the name and address of the *bonâ fide* proprietor or proprietors of such shop, or in the absence of personal management those of the duly qualified manager and the description of his qualification. Neglect to supply this information will involve liability to a penalty of one pound a day whilst it lasts, besides a penalty of five pounds if any poison be supplied or medicines compounded on the premises during the default.

BRITISH PHARMACEUTICAL CONFERENCE.

We are informed by the Honorary Secretaries that the following titles of papers to be read at the forthcoming meeting at Leeds have been received in addition to those published last week:—

14. Note on a Sample of Adulterated Saffron. By W. KIRKBY, F.L.S.

15. Note on the Comparative Medicinal Values of the Three Buchus. By C. J. S. THOMPSON.

16. Notes on some Alkaloidal Tinctures. By E. H. FARR.

17. The Alkaloidal Values of Annual and Biennial Henbanes. By A. W. GERRARD, F.C.S.

The Sheffield School of Pharmacy will commence a sixth session on Thursday, October 9, when the Inaugural Address will be delivered by Mr. William Martindale. We have been requested to say that the syllabus is in course of preparation, and when ready will be sent to anyone applying to the Honorary Secretary, Mr. C. O. Morrison, 137, West Street, Sheffield.

* * *

It will interest many of our readers to learn that the Mayor of Beverley, Mr. Alderman Hobson, who is a pharmaceutical chemist and for many years filled the office of Local Secretary to the Pharmaceutical Society, has invited the members of the British Association to visit that town during the annual meeting in Leeds next month, and that the invitation has been accepted by the General Secretaries. The Mayor will entertain his guests at luncheon in the Corn Exchange on Thursday, the 11th of September, and the members of the corporation have been requested to meet the visitors. As Beverley boasts of possessing two of the finest churches in England and is otherwise rich in objects of antiquarian and historical interest there is every prospect of the visit proving pleasant and successful.

* * *

Remarking upon the decline in the exports of gum arabic from Alexandria from the value of £131,000 in 1884 to *nil* in 1889, Mr. Vice-Consul Alban reports that large quantities of gum arabic and other valuable products are spoiling in the Soudan, where there is no possibility of exporting or properly storing them.

* * *

Another substance that has enormously increased in price recently, namely camphor, is referred to in a report on Japanese trade by Mr. Consul Longford. Speaking of fears that have been entertained that the supply of camphor in Japan is becoming exhausted, he says that even if this be true of certain districts new forests of camphor trees appear to become available in others to an extent which prevents any diminution in the aggregate export.

British Medical Association.

GASTRIC DYSPEPSIA.

BY D. J. HAMILTON, M.B., F.R.C.S.E., F.R.S.E.

(Concluded from page 138.)

Peptone is in abundance within such stomachs after a mixed meal, and so is propeptone, but the starchy matters are practically unaltered. The latter give a blue, or at most a red, reaction, with iodine after an hour's residence in the stomach, whereas by this time any reaction should in great part fail, seeing that the stage of achroodextrine ought to have been reached. The pain from which such individuals suffer is due to the ends of the sensitive nerves of the cardia being stimulated by the excess of acid and by the undigested amylaceous remains.

Conclusions.—In summarising the foregoing results we find that:

(1) The acid which gives the disease its peculiar character is usually lactic, but in rare cases may be hydrochloric. In still other cases, the acidity due to lactic acid is augmented by the presence of various volatile organic acids.

(2) The excess of lactic acid may be a result of prolongation of the natural lactic acid stage of digestion, or it may be furnished by the grape sugar developed from the sugars in a dietary. A small part of it possibly is grape sugar, resulting from the action of salivary diastase upon starch.

(3) The cause of the prolongation of the lactic acid stage of digestion is the deficiency in hydrochloric acid, which ought naturally to take the place of the lactic.

(4) The fermentation of the grape sugar into lactic acid is brought about by living vegetable organisms, always more or less abundant in the stomach. This fermentation most likely is permitted by deficiency in the quantity and proteolytic quality of the gastric juice. The carbohydrates consequently undergo a wrong decomposition, while the proteids remain undissolved.

(5) In those cases where the acidity is caused by superabundance of hydrochloric acid the excess of acid manifests itself in two ways: (*a*) where the acid is secreted in a gush immediately on the introduction of food, and (*b*) where it accumulates in the stomach during fasting. In both cases the effect is to neutralize the alkalinity of the saliva too soon, and thus hinder the digestion of starchy food, which accordingly accumulates in the stomach and acts as an encumbrance.

Quantitative and Qualitative Analysis of Acids.—From what has been said it is evident that the detection and quantitative estimation of the gastric acids become matters of great therapeutic importance, more especially the detection of hydrochloric acid. So much depends upon the period at which the hydrochloric acid manifests itself that any method which will facilitate its detection must always be a step in the right direction. Happily, of late years, the means of recognizing small quantities of hydrochloric acid have been much improved upon.

Let us suppose a case in point. An individual is suffering from acid dyspepsia. We wish to know the link in the chain of natural events which is broken. How do we proceed? The stomach ought in the first place to be thoroughly washed out with distilled water. A test meal consisting of proteids and carbohydrates should then be given—say bouillon, meat, and a quantity of bread, boiled rice, or potato. This must be drawn off on occasion with the stomach pump at different intervals of time up to six or eight hours, and be tested for the presence of the different acids.

Granted that we have the facilities for doing so, the most satisfactory procedure is to separate the various acids that may be in the contents. This is now usually accomplished by Cahn and v. Mering's method. Distil 50 c.c. of the filtrate from the gastric contents till three-fourths have passed over. Bring up the quantity again to 50 c.c. and repeat the distillation to the same extent. By doing so the volatile acids are carried off and may be quantitatively estimated by ordinary titration methods. Shake up the residue six times with large quantities of ether. The ether dissolves out the lactic acid, and the remaining liquid contains the hydrochloric. These two acids may now also be estimated by titration.

The ether and the liquid form two strata, and can be readily separated by means of a Geissler's funnel. The ethereal solution of lactic acid is placed in a flat dish and allowed to evaporate, the evaporation being aided by blowing over the dish. The residue of lactic acid is dissolved in a given quantity of distilled water.

It is to be borne in mind, however, that the acidity of the remaining liquid may, in part or wholly, be due to acid salts, more particularly phosphates. A wrong estimate may thus result on titration, and the quantity of acid be exaggerated or free acid indicated where none exists. Leo has discovered a means of getting over the difficulty. It depends upon the fact that dry carbonate of lime does not decompose solutions of the acid phosphate of potash or soda at an ordinary temperature, while a free acid such as hydrochloric or lactic is readily neutralized by the lime salt. This principle is applied to the estimation of the HCl in the gastric liquid in the following manner. A little of the liquid, a few drops, is placed in a watch-glass. A pinch of powdered calcium carbonate is added, and mixed with a glass rod. The reaction is then taken with blue litmus paper and compared with that of the original liquid. If the litmus is not coloured red, we have to do with free acid only. If the reddening of the litmus has become less intense than in the original liquid, free acid and acid salts have been simultaneously present. And if the reaction does not change, acid salts have been the exclusive source of the acidity.

Without entering into the reasons for its adoption the following is the procedure he employs for the purpose of estimating quantitatively the free hydrochloric acid in the liquid where both salts and acids are contained in it. We will suppose that the lactic and volatile organic acids have been separated by the before described means. Take 10 cubic centimetres of the remaining liquid and mix with 5 cubic centimetres of a saturated solution of $CaCl_2$. Titrate with $\frac{1}{10}$ normal solution. Mix a second portion of the original liquid with a few grams of $CaCO_3$ and filter. Boil 10 cubic centimetres of this so as to expel the CO_2, and after addition of 5 cubic centimetres saturated $CaCl_2$ solution titrate as before with a $\frac{1}{10}$ normal solution. The difference between the first and second titration represents the amount of free hydrochloric acid in the liquid.

The method of titration for the HCl, as given by Kinnicut, is to take, say, 50 cubic centimetres of the liquid and ascertain how many cubic centimetres of a standard alkaline solution are necessary to neutralize it. The alkaline medium of neutralization generally employed is a decinormal solution of sodium hydrate. Each cubic centimetre of this contains 0·004 gram of caustic soda and will neutralize 0·00364 gram absolute hydrochloric acid. Litmus may be used as the indicator of neutralization.

The number of cubic centimetres so used, multiplied by 0·00364 gram, gives the number of grams of absolute hydrochloric acid contained in 50 cubic centimetres, from which the percentage may be derived. He regards 0·22 to 0·28 per cent. as the average amount of HCl present in the stomach under a mixed diet when digestion is at its height.

To estimate the amount of lactic acid in the ethereal solution evaporate the combined washings of ether, dilute the residue with a convenient quantity of distilled water, neutralize as in the estimation of HCl, and multiply the number of cubic centimetres of the test alkali used by 0·009 to determine the number of grams of absolute lactic acid in the residue.

Having obtained the acids apart, tests for their detection may be employed:—

(*a*) A solution of gentian violet always has a reddish tint when seen with transmitted light, especially if held against a white background. The smallest quantity (0·024 per cent.) of hydrochloric acid, diluted with distilled water, introduced into this strikes a more or less blue colour. One detraction, however, from its reliability is that it is interfered with by the presence of peptone. When free from this drawback, the comparison of the colour with that obtained from standard solutions is a pretty close index of the amount present. Other mineral acids (nitric or sulphuric) give very much the same reaction, but lactic and acetic do not. Hence it is only an indication of a mineral acid being present, presumably hydrochloric. Further proof is required to confirm this.

(*b*) Ewald and Boas employ tropæolin 00, obtained from the manufactory of Th. Schuchardt, of Görlitz. A saturated distilled water or alcoholic solution, in presence of very minute quantities of hydrochloric or lactic acid, changes from its natural brown or golden-red colour to a ruby-red or dark brownish-red not altered by standing. The basic, neutral, and acid salts of phosphoric, hydrochloric and lactic acids convert these colours into a straw-yellow. It is only in the presence of free acid that the reaction is forthcoming.

(*c*) A modification of the above is recommended by Uffelmann, which is said to possess the additional advantage of differentiating between hydrochloric and lactic acids: A few drops of a concentrated watery or alcoholic solution of tropæolin containing an undissolved excess are poured into a porcelain dish. By moving the latter about the tropæolin solution is spread in a uniform film over its surface. If a drop of the filtered stomach contents is now allowed to run over the coated surface of the dish a dark lilac-red stain follows if HCl be present, which in time becomes more or less brown in colour. If, on the other hand, lactic is the acid present, the lilac colour fails, and the only alteration perceptible in the colour is that it becomes a little darker at the time of application of the liquor. If organic and inorganic acids are simultaneously present, tropæolin will not give a differential indication of the presence of HCl when the total acidity amounts to 0·05 per cent. If it sinks below this, the presence of HCl is indicated, because the small amount of organic acid or acids fails to change the colour.

(*d*) Another delicate test for HCl is sulphocyanide of iron solution (Rheoch's reagent). To 2 cubic centimetres of a 10 per cent. solution of sulphocyanide of potassium a saturated solution of neutral acetate of iron is added until a somewhat ruby-red colour is obtained. A few drops of this mixture are placed in a porcelain dish and moved about so as to diffuse it. The hydrochloric acid containing liquid being now allowed to run down the sides of the dish a light violet colour ensues, becoming mahogany brown on further admixture.

Where the quantity of acid is small, Ewald and Boas recommend the following modification. The sulphocyanide of iron solution is dropped on white filter paper, whereby a completely homogeneous yellowish-red spot ensues. If after a few seconds one or two drops of the gastric liquid containing HCl be allowed to fall upon the spot, the centre stains of a cherry or peach tint surrounded by a colourless zone. Neither peptone nor salts appear to influence it.

(*e*) Of all methods, however, in the testing for very dilute solutions of HCl, that of Günzburg is universally acknowledged to be most reliable. The reagent consists of 2 grams phloroglucin, 1 gram vanillin, and 100 cubic centimetres absolute alcohol. If a few drops of this are added to an equal quantity of a hydrochloric acid containing liquid, and the mixture be gently heated in a white porcelain dish over a flame, a delicate rose-red blush becomes perceptible on the porcelain as the liquid evaporates. It is capable of detecting 0·06 per cent. of hydrochloric acid, while the tropæolin test is sensitive only to 0·1 to 0·2 per cent. Organic acids, moreover, do not give a reaction with it, nor do they interfere with the HCl reaction. Albuminous substances and peptone have in both these respects a like negative effect.

For the detection of small quantities of lactic acid, the following are most reliable: Uffelmann's method consists in preparing a fresh mixture of 10 cubic centimetres of a 4 per cent. carbolic acid solution, 20 cubic centimetres distilled water, and a drop of officinal liq. ferri sesquichloridi. The resulting amethyst-blue liquid becomes yellow in presence of from one-third to one-half its volume of diluted lactic acid, up to an attenuation of 1 per mille. Hydrochloric acid somewhat disturbs the reaction, albumen or phosphates still more so. If hydrochloric acid alone is present the solution merely parts with its colour. It must be remembered, however, that coffee gives somewhat the same reaction as lactic acid, and decoction of roll bread, when neutral, destroys the blue colour of the reagent.

Another good test is simply a mixture of one drop liq. ferri sesquichloridi in 50 cubic centimetres distilled water. The colourless solution becomes yellow on addition of lactic acid, and the reaction is not interfered with by peptone, and only slightly by albumen and hydrochloric acid.

We have supposed, in recounting the foregoing tests, that the acids have been isolated, and in order to make a thoroughly satisfactory examination of vomit this must be done. The necessary manipulation may, however, be looked upon by the general practitioner as tedious. One of the most important points to know is whether hydrochloric acid is present and whether it comes upon the scene at the proper time. It may therefore be asked whether one cannot employ any of the tests mentioned for its detection without going to the trouble of separating the individual acids. The answer, I think, is decidedly in the affirmative if all that is required is the detection of the acid. Günzburg's phloroglucin-vanillin test seldom gives a fallacious result. As a matter of assurance, however, other tests should be employed as well. The lactic acid can be easily separated in a pure state with ether, and the tests for it then applied.

The fatty acids form a third variety of acid found in the stomach contents. Butyric acid is readily detected by its odour; and 0·1 per cent. gives with the chloride of iron and carbolic acid reagent an ash-grey discoloration, which is readily distinguished from that induced by free hydrochloric acid as well as by the yellow colour forthcoming in the presence of lactic acid. It is indifferent to the tropæolin reaction. Shaking with ether dissolves the fatty acids, and if the solution be plunged in water and a little chloride of calcium added, oil globules are set free.

Digestive Capability.—The testing of the digestive capability of the gastric secretion must always be a matter of difficulty and uncertainty from the fact that it is almost impossible to obtain the gastric juice in a pure condition. We should require to know in the first place what are the capabilities of the filtered gastric liquid taken from an individual in health (on a stated diet and after a given period), before being able to draw reliable conclusions. Such data, so far as I am aware, we do not possess.

The stomach contents are drawn off with the pump and filtered, and the test object usually employed is washed fibrin. Wille prefers coagulated egg-albumen from the fact that a piece of exact dimensions can be readily punched out of it so as to present the same amount of surface to the action of the liquid. A small piece of this, of known dimensions, is placed in 10 cubic centimetres of the liquid and kept at a body temperature within a culture chamber. To make the inquiry as searching as possible, four tests, according to Wille, should be employed. The first is to place the piece of albumen in the pure liquid; the second, in the liquid with an admixture of eight to ten drops of a 25 per cent. hydrochloric acid solution; the third, with the addition of 0·3 per cent. pepsin; and the fourth with the acid and pepsin combined. By a comparison of results not only may a disturbance in the digestive capability of the gastric liquid be indicated, but the cause of the same made manifest.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At the meeting of the Chemical Society on Thursday, June 19, Dr. W. J. Russell, F.R.S., President, in the chair, the following papers were read:—

Invertase: a Contribution to the History of an Enzyme or Unorganized Ferment. By C. O'Sullivan, F.R.S., and Fred. W. Tompson.—The substance present in yeast, etc., known as *invertase*, which possesses the power, under suitable conditions, of inducing the hydrolysis of cane-sugar, has been studied by the authors with the object of determining the precise manner in which it acts and its constitution. The method adopted in determining the functions of invertase is essentially that developed by Vernon Harcourt in his paper "On the Observation of the Course of Chemical Change." A solution of cane-sugar was mixed with a measured amount of invertase, and the action was allowed to take place at a known temperature during a definite time; action was then stopped by the addition of alkali, and its extent determined. The authors arrive at the following conclusions:—1. The rate of hydrolysis of cane-sugar by means of invertase may always be expressed by a definite time-curve; this curve is practically that given by Harcourt as expressing a chemical change "of which no condition varies excepting the diminution of the changing substance." There are, however, some slight and apparently constant deviations from the theoretical curve. 2. Whatever the conditions may be under which hydrolysis is taking place, as long as these conditions remain unchanged, this curve is adhered to. 3. When the degree of acidity is that most favourable for the action of invertase, the rapidity of the action is in proportion to the amount of invertase present. 4. The most favourable concentration of the sugar solution at a temperature of 54° C. is about 20 per cent. Below that there is a rapid decline in the speed of hydrolysis. Greater concentrations are only slightly less favourable until about 40 grams per 100 c.c. is reached. In saturated solutions hydrolysis only proceeds with extreme slowness. 5. The speed of hydrolysis increases rapidly with the temperature until 55—60° C. is reached. At 65° C. the invertase is slowly destroyed, and at 75° C. it is immediately destroyed. At the lower temperatures the speed of the action increases with rise of temperature in accordance with Harcourt's law; the rate being about doubled for 10° rise; but above 30° C. the increase is not nearly so rapid. 6. Elevated temperatures have no permanent effect on the activity of the invertase so long as they are not sufficiently high to destroy it. 7. The caustic alkalis, even in very small proportions, are instantly and irretrievably destructive of invertase. 8. Minute quantities of sulphuric acid are exceedingly favourable to the action, but a slight increase of acidity beyond the most favourable point is very detrimental. The most favourable amount of acid increases to some extent with the proportion of invertase and decreases with rise of temperature, but the authors have not been able to discover on what it depends. 9. In studying the action of invertase it is of the utmost importance that the most favourable amount of acid should be employed; otherwise correct results cannot be obtained. At a temperature of 60° C. the action is almost stopped unless exactly the right amount of acid is used, whilst if this factor is properly adjusted hydrolysis proceeds at (probably) the maximum speed. 10. The influence of alcohol varies in direct proportion with the amount present. Five per cent. of alcohol decreases the speed of the action by about one-half. 11. The dextrose formed by the action of invertase is initially in the birotary state. 12. The optical activity of a solution undergoing hydrolysis is no guide to the amount of hydrolysis that has taken place. 13. If a caustic alkali be added to a solution undergoing hydrolysis, and the optical activity be allowed sufficient time to become constant, it is a true indicator of the amount of inversion that had taken place at the moment of adding the alkali. 14. A sample of invertase which had induced hydrolysis of 100,000 times its own weight of cane sugar was still active. 15. Invertase itself is not injured or destroyed during its action on cane sugar. 16. There is no limit to the amount of sugar which can be hydrolysed with the aid of invertase. 17. The hydrolysis of cane sugar by means of invertase is a simple chemical change differing in no important way from those which inorganic substances undergo. 18. The products of hydrolysis have no influence on the rate of the action. 19. A solution of invertase will withstand a temperature 25° C. higher in the presence of cane-sugar than in its absence. 20. The authors are of opinion that when invertase inverts cane-sugar combination takes place between the two substances, and that the invertase remains in combination with the invert sugar. This combination breaks up in the presence of molecules of cane-sugar. 21. A means of estimating the activity of a material containing invertase has been devised which consists in recording the result by means of the time factor $\pm 0 = x$ min. In this equation $\pm 0 =$ a certain definite amount of work and $x =$ the time necessary to perform it. The expression means that the given inverting material takes x minutes to invert a standard amount of cane-sugar under standard conditions. The number x varies in inverse proportion to the actual amount of invertase contained in the material or materials under examination. 22. If sound brewers' yeast be pressed and then kept at the ordinary temperature for a month or two it does not undergo putrefaction, but changes into a heavy, yellow liquid; the product possesses no power of fermentation, but an apparent increase takes place in the invertive power. 23. From such liquefied yeast it is easy to filter off a bright solution of high hydrolytic power. It is shown that all the invertase of the yeast is in this solution, which is termed yeast liquor. 24. Yeast liquor has a relative density of about 1080. It will remain for a long time unaltered, excepting that the colour darkens. If exposed to the air it may slowly become covered with mould. 25. If spirit be added to yeast liquor until the mixture contains 47 per cent. of alcohol, the whole of the invertase separates with only a slight loss of power. This precipitated invertase may be washed with spirit of the same strength and then the residue either dehydrated with strong alcohol and dried *in vacuo*, or else it may be extracted by means of 10 to 20 per cent. alcohol and then filtered. The filtrate contains the invertase. On one occasion the extent of the loss involved by this process was determined and it was found that all the invertase of the yeast liquor was present in the filtrate except 12·3 per cent. 26. The authors have not succeeded in further purifying invertase preparations carefully made in this manner. The slightest attempt at purification destroys the invertase. 27. They have prepared invertase almost free from ash. 28. The inverting power of pressed English yeast varies from $0=1000''$ to $\pm 0 = \pm 3000''$, or about ¼ of these amounts if calculated on the dry solid matter of the yeast. 29. The inverting power of the most active invertase preparation made was $\pm 0 = 25{\cdot}1$ on the dry solid matter. It is believed that pure invertase would approximately have $\pm 0 = 22{\cdot}5$ min. 30. The dry solid matter of yeast contains from 2 to 6 per cent. of invertase. 5·8 per cent. of invertase was separated from one sample of yeast. 31. During the preparation of invertase from yeast liquor an albuminoid is obtained, which is not redissolved by water. This is termed yeast albuminoid. 32. Invertase when it approaches a pure state is a very unstable substance. The products of its decomposition have been carefully examined and are found to constitute a new series of substances belonging to *the invertan series*. 33. The invertan series is a homologous series of substances which on analysis yield numbers which may be expressed in terms of an albuminoid and a carbohydrate. Seven members of the series are described. 34. The authors consider that invertase itself is a member of the invertan series, and call it β-invertan. 35. If the products of the decomposition of β-invertan are examined, it is usually found that they consist of α- and δ-invertan. The former contains more, and the latter less, nitrogen than invertase. 36. α-Invertan is insoluble in water, and in all its other properties seems to resemble yeast albuminoid. It contains 8·35 per cent. N. It is a very stable substance. 37. β-Invertan or invertase is soluble in water, and is the only member of the series which has the power of inverting cane-sugar. It contains about 3·69 per cent. N. and its optical activity is $[\alpha]j = +80^\circ$ (?). 38. γ- and δ-invertan are the products of the simplification of invertase. One or other of these two substances seems invariably to be formed. They both contain less nitrogen than invertase, and are always accompanied by α-invertan. Both are readily soluble in water. They contain respectively 3·15 and 2·43 per cent. N. and their optical activity is $[\alpha]j = +45^\circ$ and $+54^\circ$. 39. ε-Invertan is formed from the slow breaking down of δ-invertan. At the same time an insoluble substance, resembling α-invertan, is formed. This probably consists of another member of the series coming between α- and β-invertan. ε-Invertan is soluble in water, and has $[\alpha]j = +65^\circ$. It contains 2·07 per cent. N. 40. ζ-Invertan results from the splitting up of ε-invertan in the same way that the latter is formed from δ-invertan. Its optical activity is $[\alpha]j = +75^\circ$, and it yields 1·61 per cent. N. 41. η-Invertan is formed by the action of boiling sulphuric acid on ζ-invertan. It contains less nitrogen than the latter substance, but the substance has not yet been sufficiently investigated to give reliable figures. 42. The further products of the action of sulphuric acid on ζ-invertan, are two soluble substances, one containing a considerable amount of nitrogen, and the other with little or no nitrogen, a high cupric reducing power and a low (dextrorotatory) optical activity. 43. The properties of all the members of the series, except α-invertan, are very similar. They are all soluble in water, forming bright solutions, which do not cloud on boiling. They are all readily thrown out of solution by alcohol, provided a little acid is present; the precipitates so formed are transparent, colourless syrups, miscible with water in all proportions. The solutions are all dextrorotatory. 44. All the members of the invertan series, except η-invertan, yield a pink coloration on boiling with Millon's reagent. 45. All the members of the invertan series, except α-invertan, when submitted to the action of an alkaline copper solution, readily yield a very characteristic copper compound, from which the invertan (except β-invertan) may be separated unaltered. Invertan can probably form several such copper compounds, all having a similar appearance, but affording different percentages of copper oxide. 46. In the presence of a very large excess of alkali, a copper compound is also formed from α-invertan, but on examination it is found that the α-invertan has been split up into an albuminoid and ζ-invertan, the copper compound being that of ζ-invertan. 47. It is believed that the members of the invertan series are combinations of yeast albuminoid with η-invertan, and that yeast albuminoid itself is probably a combination of yeast albuminoid with a carbohydrate. 48. According to this theory the composition of the carbohydrate present in the invertan series, calculated from the average of all the analyses, would be $C = 43{\cdot}22$ per cent. and $H = 6{\cdot}28$ per cent. These numbers agree very closely with those required by a hypothetical carbohydrate coming midway between the *in* and the *on* groups. 49. It is thought that η-invertan contains 18 parts by weight of this carbohydrate to 1 of albuminoid, and that α-invertan contains 3 parts of the carbohydrate to 4 of albuminoid. 59. The other members of the series are formed by the union of these two substances according to the general formula $\eta + \alpha n$, where η represesent η-invertan and α represents α-invertan. In this way we look upon invertase (β-invertan) as $\eta\alpha_5$. This splits up into α- and γ-invertan according to the formula $\eta\alpha_5 = \eta\alpha_4 + \alpha$. $\eta\alpha_4$ represents γ-invertan, and this may be further transformed by elimination of α into $\eta\alpha_3$, or δ-invertan. 60. The numbers calculated for the constitution of the above theoretical homologous series agree with considerable closeness with those obtained from the analysis of members of the invertan series. 61. The number obtained from a single determination by Raoult's freezing process for the molecular weight of ζ-invertan is considerably less than the possible molecular weight of ζ-invertan, according to the authors' theory of its constitution.

The Action of Carbon Monoxide on Nickel. By LUDWIG MOND, C. LANGER, Ph. D., and F. QUINCKE, Ph. D.—When carbon monoxide is passed over finely-divided nickel, such as is obtained by reducing nickel oxide by hydrogen at about 400°, at a temperature between 350° and 450°, carbon dioxide is formed, and the nickel is gradually converted into a black, amorphous powder, consisting of carbon and nickel; the composition of this deposit varies widely with temperature and time. A small quantity of nickel can thus change a very large amount of carbon monoxide, the action being complete and rapid at first, and continuing, although at a diminishing rate, for several weeks. A product containing as much as 85 parts carbon to 15 parts nickel has been obtained. Acids only partially remove the nickel; the carbon is very readily acted on by steam, carbon dioxide and hydrogen without a trace of carbon monoxide being formed at a temperature of 350°. On allowing the substance to cool in a current of carbon monoxide, it was noticed that the flame of a bunsen burner into which the escaping gas was introduced became luminous, and when the tube through which the gas passed was heated, a deposit of nickel, mixed with a small quantity of carbon, was obtained. The authors were thus led to discover the existence of a volatile nickel compound. To prepare this compound a combustion-tube is filled with nickel oxide and this is reduced by hydrogen at about 400°; after cooling the nickel to about

100°, pure dry carbon monoxide is passed over it without further heating, and the issuing gas is led through a tube placed in a freezing mixture: the major portion of the nickel compound condenses as a colourless liquid, but the gas retains about 5 per cent., and is therefore collected, dried and again passed over the metal. When no more liquid condenses, the nickel is again heated to about 400° in a slow current of pure carbon monoxide; it is then cooled to about 100°, and again submitted to the action of the gas. Nickel carbonoxide thus prepared is a colourless liquid, which boils at 43° under 751 mm. pressure; its relative density at 17° is 1·3185. It solidifies at $-25°$ to a mass of needle shaped crystals. Its composition is represented by the formula $Ni(CO)_4$. It dissolves in alcohol, and more readily in benzene and chloroform; dilute acids and alkalis have no action on it, but it is oxidized by concentrated nitric acid. It reduces an ammoniacal solution of cupric chloride, and it also causes the separation of silver from an ammoniacal solution of silver chloride. It interacts with chlorine, forming nickel chloride and carbon oxychloride. It is decomposed at 180° (in boiling aniline vapour) into nickel and carbon monoxide. The atomic weight of the deposited metal was found in three experiments to be 58·52—58·64, a result closely corresponding with Russell's value, 58·74. Numerous experiments to obtain similar compounds with other metals, notably with cobalt, iron, copper and platinum, led to negative results. On experimenting with specially purified cobalt, in the beginning a slight coloration of the Bunsen flame into which the gas was led was noticed, but after a time this was no longer observed. Commercial cobalt afforded a gas which deposited a mirror of pure nickel, it being possible, in fact, to purify cobalt from nickel by carbonic oxide. The nickel mirrors obtained by heating the carbonic oxide compound do not appear to contain any trace of cobalt.

The Interaction of Iodine Water and Potassium Chlorate. By HENRY BASSETT.—The author finds that the usual statement that the chlorine in potassium chlorate is directly displaced by iodine when subjected to treatment in accordance with Millon's directions is incorrect; he considers that the evolution of chlorine observed by Millon is due to a secondary interaction, $HIO_3 + 5HCl = 3H_2O + ICl + 2Cl_2$, which takes place when the iodine is added all at once, and is due doubtless to the rapid formation of iodic acid and hydrogen chloride within the dense mass of iodine. His experiments show that the iodate is formed in accordance with the equation—

$$6I_2 + 10KClO_3 + 6H_2O = 6KHI_2O_6 + 4KCl + 6HCl;$$

and that on evaporating the solution to dryness on the water-bath, decomposition of a portion of the biniodate takes place:

$$KHI_2O_6 + 12HCl = KCl + 6H_2O + ICl + ICl{\cdot}HCl + 4Cl_2.$$

The Milk of the Gamoose. By A. PAPPEL and H. D. RICHMOND, Khedival Laboratory, Cairo.—The milk of the Egyptian gamoose or buffalo (*Bos Bubalus*) is distinguished from that of the cow by its white colour and peculiar musk-like smell. The authors find the average composition to be as follows:—

Water	84·10		
Fat	5·56		
Sugar	5·41		
Casein	3·26	containing N	0·511
Albumin	0·60	„ „	0·094
Nitrogen bases	0·09	„ „	0·035
Salts	1·03		

The fat was found to vary from 7·35 to 5·15 per cent., and the solids not fat from 10·67 to 10·07 per cent. The average relative density at 15·5° was 1·0354; the increase in eight hours after milking was 0·0006, and in twenty-four hours 0·0007. Gamoose milk, therefore, differs from that of the cow, both in the high percentage of fat and of solids not fat, the increase in the latter being largely due to the sugar. Comparing the fat with that of cows' milk. the chief differences noted by the authors are, (1) the presence of small quantities of sulphur and phosphorus; (2) the presence of fatty acids soluble in boiling water but not volatile in much larger amount than in cows' milk; (3) the presence of fatty acids giving lead salts soluble in ether but not members of the oleic series; (4) the difference in the ratio between caproic and butyric acid—4 : 1 instead of 2 : 1. Other alcohols than glycerol do not appear to be present. The sugar appears not only to be different from milk sugar, but novel, its rotatory power being $[\alpha]_D = 48·7$, and its cupric reducing power $\kappa = 73·7$; it yields only dextrose on hydrolysis. It is proposed to name it *tewfikose.* The authors also state that the milk contains a small amount of citric acid.

Parliamentary and Law Proceedings.

PHARMACY ACT (IRELAND) (1875) AMENDMENT ACT.

The following is the text of the Act to amend the Pharmacy Act (Ireland) of 1875, which received the Royal Assent on Tuesday last:—

Be it enacted by the Queen's most excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this Parliament assembled, and by the authority of the same as follows:—

1. *Short Title.*—This Act may be cited as the Pharmacy Act (Ireland), 1875, Amendment Act, 1890.

2. *Extent of Act.*—This Act shall apply to Ireland only.

3. *Interpretation.*—In this Act—

"The principal Act" means the Pharmacy Act (Ireland), 1875.

"The Society" means the Pharmaceutical Society of Ireland.

"The council" means the council of the Society.

"The registrar" means the registrar of the Society,

"The treasurer" means the treasurer of the Society.

"Poisons" mean all articles deemed to be poisons within the meaning of the Act thirty-three and thirty-four Victoria, chapter twenty-six, intituled "An Act to regulate the sale of poisons in Ireland."

4. *Repeal of* 38 *and* 39 *Vict. c.* 57 *s.* 15.—Section fifteen of the principal Act, and all other provisions of that Act empowering the Pharmaceutical Society of Ireland to create a grade of chemists and druggists legally qualified to dispense medical prescriptions are hereby repealed.

5. *Register of Chemists and Druggists and Registered Druggists.* — The registrar shall, in the manner by this Act provided, from time to time make out and maintain complete lists, to be called "the register of chemists and druggists and the register of registered druggists in Ireland," containing the names of all persons who have made application to be registered and are entitled to be registered as chemists and druggists and registered druggists respectively under the provisions of this Act and the provisions of the principal Act with respect to the registers thereby authorized shall *mutatis mutandis* extend and apply to such registers, except so far as such provisions are altered by or are inconsistent with the provision of this Act. All persons so registered shall be entitled to keep open shop for the sale, retailing or mixing of poisons: Provided that nothing in this Act shall be deemed to confer on such persons any right to compound medical prescriptions.

6. *Chemists or Druggists practising as such on their own account at passing of* 38 *and* 39 *Vict. c.* 57 *entitled to be registered.*—Every chemist and druggist or che-

mist or druggist who was practising as such in Ireland as a principal at the passing of the principal Act, shall be entitled to be registered as a chemist and druggist under this Act on complying with the following provisions:—

(1) He shall, within a year from the passing of this Act, make application in writing to the registrar to be registered under the provisions of this Act.

(2) Such application shall be accompanied by a statutory declaration of the applicant in the form set out in schedule A to this Act or to the like effect: Provided that it shall be lawful for the Council to require from any such applicant such evidence as they may think fit of the truth of the statements contained in the statutory declaration so made by him, and to require such other confirmatory evidence as they shall think sufficient.

(3) He shall pay to the treasurer of the Society a fee of one guinea.

(4) Notwithstanding the provisions of section thirty-one of the principal Act, no person shall be entitled to keep open shop for the selling, retailing, or mixing of poisons by reason that he was a chemist and druggist practising as such in Ireland on his own account at the time of the passing of the principal Act, unless he shall be registered as a chemist and druggist under this Act.

7. *Chemists or Druggists in Business before passing of Act entitled to be registered.*—Every chemist and druggist, or chemist or druggist, who has gone into business as a principal after the passing of the principal Act and before the passing of this Act, shall be entitled to be registered as a druggist on complying with the following provisions:—

(1) He shall on or before the first day of June, one thousand eight hundred and ninety-one, make application in writing to the registrar to be registered under the provisions of this Act.

(2) Such application shall be accompanied by a statutory declaration of the applicant in the form set out in schedule B to this Act, or to the like effect.

(3) He shall be examined with respect to his knowledge of reading and writing, elementary arithmetic, and the appearances of the poisons, drugs, and chemical salts in common use, and the Act of the session of the thirty-third and thirty-fourth years of the reign of Her present Majesty, chapter twenty-six, and shall obtain from the examiner or examiners appointed by the Lord Lieutenant of Ireland to hold such examination a certificate of having satisfactorily passed the same.

(4) The Lord Lieutenant in Council shall appoint examiners to conduct the examinations prescribed by this section for applicants, and shall fix the fees to be paid to such examiners, and to the Society respectively in respect of such examinations, and the examinations shall be held in Dublin and at such other places as the Lord Lieutenant in Council shall consider necessary.

(5) Every person who went into business as a chemist and druggist as a principal between the passing of the principal Act and the passing of this Act, and who has styled himself chemist and druggist, and has complied with the provisions of this section, and passed the examination under this section, shall be permitted to retain the title of chemist and druggist.

(6) Every person who having styled himself as a chemist and druggist shall claim to retain the title of chemist and druggist under the provisions of this section shall, at the time of his application to be registered, make a statutory declaration stating when and where he was in business as a chemist and druggist styling himself as such.

(7) It shall be lawful for the Council to require from any such applicant such evidence as they may think fit of the truth of the statements contained in the statutory declaration so made by him, and to require such other confirmatory evidence as they shall think sufficient.

8. *Registration of Registered Druggists.*—Every person who shall duly have completed, or shall duly complete, a term of service as apprentice or assistant of not less than four years to a pharmaceutical chemist, or to a licentiate apothecary, or to a person or persons who shall have become, or who had he or they survived or continued in business would have been entitled to become, a registered chemist and druggist, or registered druggist, under this Act, shall be entitled to be registered as a registered druggist under this Act on complying with the following provisions:—

(1) He shall make application in writing to the registrar to be registered under the provisions of this Act.

(2) Such application shall be accompanied by a statutory declaration of the applicant in the form set out in schedule C to this Act, or to the like effect, with an additional declaration in the form set out in schedule D or to the like effect.

(3) He shall be examined with respect to his knowledge of English orthography and composition, arithmetic, and the weights and measures of the British Pharmacopœia, the appearance and properties of the various drugs and chemicals in general use, and the Act of the session of the thirty-third and thirty-fourth years of the reign of Her present Majesty, chapter twenty-six, and shall obtain from the examiners appointed by the Council to hold such examination a certificate of having satisfactorily passed the same.

(4) He shall pay to the Treasurer of the Society, on presenting himself for such examination, a fee of two guineas, and a further fee of two guineas on being registered.

Provided that if he shall fail to satisfy the examiner, he may present himself for subsequent examinations on paying the examiners' fees.

Provided also that evidence shall be adduced to the satisfaction of the Council that the applicant has completed a term of apprenticeship such as hereinbefore described; and provided also that if the term of apprenticeship be continued after the expiration of one year from the passing of this Act it shall not entitle the applicant to present himself for examination, unless the term shall have been completed with a pharmaceutical chemist, a licentiate apothecary, or a registered chemist and druggist, or registered druggist under this Act.

9. *Examinations of Intending Druggists.*—It shall be the duty of the Society to provide for examinations being held at which applicants for registration as registered druggists may present themselves for examination. Such examinations shall be held at not greater intervals than the examinations of persons desirous of being registered as pharmaceutical chemists under the principal Act, and shall be held at Dublin, Belfast, Cork, and such other places as may be convenient.

Provided that it shall not be compulsory on the Society to cause any such examinations to be held outside Dublin unless at least twelve persons make application for examination thereat.

10. *Apprentices having passed Examination entitled to Registration as Pharmaceutical Chemists.*—Every person who shall have served an apprenticeship of four years with a pharmaceutical chemist, a licentiate apothecary, a registered chemist and druggist, or a registered druggist shall be entitled to present himself for examination under this Act, and shall be entitled on passing his examination to be registered as a re-

gistered druggist under this Act, and every person who shall have served such apprenticeship to a registered chemist and druggist, or a registered druggist not being a pharmaceutical chemist, and who shall comply with the regulations of the Society in force for the time being, and in addition shall have served an assistantship of two years to either a pharmaceutical chemist or a licentiate of the Apothecaries' Hall keeping open shop, shall be entitled to present himself for examination under the principal Act as a pharmaceutical chemist, and shall be entitled on passing his examination to be registered as a pharmaceutical chemist.

11. *Provisions of Principal Act as to Examinations to extend to Examinations authorized by this Act.*—The provisions of the principal Act with respect to the examinations therein mentioned shall extend and apply to the examinations by this Act authorized, except so far as such provisions are altered by or are inconsistent with the provisions of this Act.

12. *Persons who may be elected Associates of the Pharmaceutical Society.*—(1) Within three months after the passing of this Act, the Society shall, subject to the provisions of the principal Act, make regulations for the election of registered chemists and druggists and registered druggists as associates of the Society under the title of associate druggists.

(2) Every person who shall be registered under this Act as a chemist and druggist or registered druggist shall be qualified to be elected an associate druggist, subject to any regulations made in pursuance of the principal Act and this Act, and every person so elected and continuing as such associate shall have the same privileges of voting for members of the Council and of attending all meetings of the Society and of voting thereat and otherwise taking part in the proceedings of such meetings as members of the Society, and shall be qualified to be elected and when elected to act as a member of the Council of the Society. Provided always that such associates contribute to the funds of the Society the same annual subscriptions as members contribute for the time being under the regulations thereof, and provided also that such associate druggists shall not style themselves associates of the Pharmaceutical Society, and any druggist making use of such title shall be liable to have his name erased from the Register of Associate Druggists.

13. *First Election of Representatives of Chemists and Druggists to Council.*—At a date to be fixed by the Council, but not later than the fifteenth day of January one thousand eight hundred and ninety-one, an election shall be held of seven persons (who shall be registered as druggists or chemists and druggists) to be additional members of the Council of the Society, and such election shall be held in like manner in all respects as an election of members of the Council of the Society in the place of retiring members held under the principal Act: Provided that the persons entitled to vote at the election of such seven members on the said Council shall be persons who shall be then registered as chemists and druggists, or registered druggists. And every such person so voting at such election shall pay to the Society a fee of one guinea as an annual subscription in respect of the year 1891.

14. *Election of New Council in* 1891.—At the annual election in October one thousand eight hundred and ninety-one, under the principal Act and this Act, the Council of the Society shall go out of office, and a new Council shall be elected consisting of twenty-one members, not more than seven of whom shall be associate druggists, and the right of voting for members of Council at this and all subsequent elections, shall be common to both members of the Pharmaceutical Society and associate druggists. Provided nevertheless that the President and Vice-President shall remain in office to conduct the election of October one thousand eight hundred and ninety-one, and declare the votes, but not longer unless duly elected, and the retiring rotation of members shall be determined in the same manner as is provided by section 9 of the principal Act. Provided also that in the event of the death or resignation of the said President and Vice-President, or either of them, or their inability or unwillingness to conduct such election, it shall be lawful for the Lord Lieutenant to nominate and appoint some other person to conduct such election who shall have the same power with respect thereto as if he had been elected chairman of the meeting.

15. *No Person to assume Title of Registered Druggist, or Chemist and Druggist, or sell poisons unless registered.*—From and after the passing of this Act it shall be unlawful for any person to assume, and from and after the first day of January, 1892, it shall be unlawful for any person to use the title of a registered druggist or chemist and druggist in any part of Ireland, or to sell poisons, unless such person shall be registered as a chemist and druggist or registered druggist, under this Act, and any person acting in contravention of this enactment shall for every such offence be liable to pay a penalty not exceeding five pounds.

16. *Printed copies of Registers to be sent to Inspectors of Weights and Measures, who shall Report any Person infringing Act.*—In the month of January in each year, the registrar shall send printed copies of the register of pharmaceutical chemists and of the register of chemists and druggists and of the register of registered druggists, to the inspector of weights and measures in each constabulary district in Ireland, and it shall be the duty of such inspector to report to the Council any offences against the provisions of the principal Act or this Act or the Act thirty-three and thirty-four Victoria, chapter twenty-six, entitled "An Act to regulate the sale of poisons in Ireland," committed within his district, and one-third of every sum of money recovered as a penalty against any person so offending shall be paid to any such inspector who shall be the means of bringing such person to justice.

17. *Shop for Sale of Poisons, or Compounding Medical Prescriptions, to be personally managed by Owner or Qualified Assistant.*—Any person or persons lawfully keeping open shop for selling, retailing, or mixing poisons shall personally manage and conduct such shop and the retailing and mixing of poisons therein, or shall employ for the purposes aforesaid, as an assistant or manager in such shop, a duly registered chemist and druggist, or registered druggist, or pharmaceutical chemist or licentiate apothecary, and such person or persons lawfully keeping open shop as aforesaid shall, for the purposes of this Act and of the principal Act, be held to be the retailer and compounder of poisons aforesaid therein; and every person or persons lawfully keeping open shop for selling and retailing poisons, and dispensing and compounding medical prescriptions, shall personally manage and conduct such shop and the retailing, dispensing, and compounding of poisons and medical prescriptions therein, or shall employ for the purposes aforesaid as assistant or manager in such shop a duly qualified pharmaceutical chemist or licentiate apothecary, and such person or persons lawfully keeping open shop as aforesaid shall, for the purposes of this Act and of the principal Act, be held to be the retailer and compounder of poisons or medical prescriptions as aforesaid therein; and any person or persons acting in contravention of this enactment shall for every such offence be liable to pay a penalty not exceeding five pounds.

18. *Registrar may require name of Proprietor of*

Premises where poisons are sold, or Medical Prescriptions compounded, to be furnished to him.—It shall be lawful for the registrar at any time to write a letter addressed to the proprietor or proprietors of any premises where open shop is kept for the selling, retailing, dispensing, or mixing of poisons or compounding of medical prescriptions (such letter to be delivered on the premises, or to be forwarded by post as a registered letter according to the post office regulations for the time being in force), requiring such proprietor or proprietors, within seventeen days from the delivery of such letter, to furnish in writing to the registrar a statement of the name and address of the *bonâ fide* proprietor or proprietors of such shop, and if such proprietor or proprietors do not personally manage and conduct such shop, the name of the duly qualified manager or assistant managing or conducting the same, and the description of his qualification; and in case such proprietor or proprietors neglect to furnish such information to the registrar within the time aforesaid, he or they and each of them shall be liable to pay a penalty not exceeding one pound for every day during which such default shall continue, and so long as such default shall continue it shall be unlawful for any person to sell or retail, dispense or mix poisons or compound medical prescriptions on such premises, and every person or persons acting in contravention of this enactment shall for every such offence be liable to pay a penalty not exceeding five pounds unless he or they shall prove to the satisfaction of the court or justices having jurisdiction in the case that he or they did not know of such default. Every person who shall make a false statement in writing with intent to mislead in reply to any inquiry addressed to him by the registrar under this Act, shall be held to have made a false declaration, and shall be liable to the penalty provided under section twenty-eight of the principal Act.

19. The Council may cause examinations to be held at such times and in such manner as may be prescribed by them from time to time for the purpose of examining assistants to pharmaceutical chemists, and such assistants as shall pass such examination shall be competent to transact the business of a licentiate of the Pharmaceutical Society in his temporary absence, but shall not be entitled to conduct or manage a business or to keep open shop on their own account.

20. *Amendment of* 38 *and* 39 *Vict. c.* 57 *s.* 11.—Section eleven of the principal Act shall be read and have effect as if the words "the second monthly meeting" were substituted for the words "ten days" in that section.

21. *Application of Moneys Paid to Treasurer.*—All sums payable to the Treasurer under this Act shall be applied by him under the direction of the Council to the purposes of the principal Act and this Act.

22. *Penalties.*—All penalties recoverable under this Act shall be recoverable and applied in the same manner as penalties recoverable under the principal Act.

23. *Construction of Act.*—This Act and the principal Act shall be read together and construed as one Act.

SCHEDULES.

Schedule A. Form of Declaration.

To the Registrar of the Pharmaceutical Society of Ireland.

I, , residing at , in the county of , hereby declare that I was in business as a chemist and druggist on my own account (*or* that I was in business in the years), at in the county of , on or before the eleventh day of August one thousand eight hundred and seventy-five.

(Signed)

Dated this day of , 18 .

Schedule B. Form of Declaration.

To the Registrar of the Pharmaceutical Society of
Ireland.

I, , residing at , in t
county of , hereby declare that I was
business as a chemist and druggist, as a principal,
the years , at in the county of

(Signed)

Dated this day of , 18 .

Schedule C. Form of Declaration.

To the Registrar of the Pharmaceutical Society of
Ireland.

I, , residing at , in th
county of , hereby declare that I ha
completed a full term of service as apprentice (*or* assi
tant) of years to , a pharmaceuti
chemist (*or* a licentiate apothecary, *or* a register
chemist and druggist, *or* a registered druggist who h
been *or* would have been entitled to be duly registe
under the Pharmacy Act (Ireland), 1875, Amendme
Act, 1890.)

(Signed)

Dated this day of , 18 .

Schedule D.

Declaration to be signed by a pharmaceutical ch
mist, a licentiate apothecary, a registered chemist a
druggist or registered druggist, to whom an appren
(*or* assistant) seeking registration has served as ap
prentice (*or* assistant).

To the Registrar of the Pharmaceutical Society of
Ireland.

I, , residing at , in th
county of , hereby declare that
has completed with me a
full term of years as apprentice (*or*, assistant)
ending 18 .

(Signed)

Dated day of 18 .

SUPPOSED POISONING BY OVERDOSE OF QUINI

At Weston-super-Mare, on the 13th inst., Mr. Cr
dock inquired into the circumstances attending t
death of John Macdonald Robertson, proprietor of t
Globe Hotel, James Street, which had taken pl
somewhat suddenly.

Elizabeth Robertson, wife of deceased, said h
husband had been a sailor for thirteen years, and h
from time to time been troubled with ague an
sluggish liver. About four o'clock on Monday aft
noon he was seized with ague, and witness imm
diately sent for Dr. Blundell, who at once came a
saw deceased. At five o'clock in the morning he t
a double dose of quinine—as much as could be put
a three-penny piece. At twelve o'clock he had tw
grains, which was the last he took. Deceased did n
seem any the worse for the second dose. At hal
past three, when witness went to see him, he w
shaking all over; she was certain he could not ha
taken more quinine than stated. When the doct
saw deceased he ordered stimulants, and witness g
him some brandy, after which he was slightly bett
Between nine and ten o'clock deceased got wor
being much weaker and unable to swallow. He di
about half-past ten the same day. Deceased had h
several attacks of ague. He had travelled in vario
parts.

Dr. Blundell stated that he saw deceased abo
half-past three on Monday afternoon. He was in
formed that he had ague, but the only symptom of
was a profuse sweating, such as would take place i
the third stage of ague. His face, eyes and ears we
extremely congested. He was very deaf, and h

at difficulty in breathing. Deceased was perfectly less, and there was no sound of the heart beating. se were not symptoms of ague, but of excessive s of quinine. From what he could gather the s taken by deceased were very large ones, and he ved he had been in the habit of taking such doses e or less during the past week. Deceased was g when he saw him.

he Coroner said the jury could not do other than n a verdict to the effect that deceased died from oning, occasioned by repeated doses of quinine.

n reply to Mr. Payne, Dr. Blundell said quinine was proper remedy for ague, but if deceased had died that complaint he would have had a high pulse.

he jury returned a verdict in accordance with the ner's suggestion.—*Weston Mercury*.

POISONING BY A LINIMENT.

r. Wynne E. Baxter, Coroner for East London, held quiry on Monday, August 18, at the Poplar Town , respecting the death of John Howard White, 47, an engineer.

he widow deposed that her husband had latterly ered from bronchitis and "doctored himself with am of aniseed." She kept this in a cupboard re some liniment was also kept. On Wednesday, ust 13, deceased returned home from work the e for drink, and shortly after she found him g on the floor apparently asleep. There was a fluid ing from his mouth which smelt like a liniment.

r. Boyle gave evidence showing that the cause of th was pneumonia, accelerated by belladonna and oroform poisoning.

he jury returned a verdict of "death from misad- ture."—*Evening News and Post*.

SUPPOSED POISONING OF TWO CHILDREN BY A "SLEEPING MIXTURE."

At the inquiry held at Shipley concerning the th of two twin infants, referred to last week (p.), the father gave evidence of a dose of sleeping xture being given to the children before bedtime on turday, and said that at two o'clock on Sunday ning he fed the children with milk, and they then e quite lively. He found them dead at 8·30. The ping mixture was known as "Betsey," but there e no directions on the bottle as to the dose to be en. A neighbour had told them three or four drops, this dose had been given habitually for the past weeks. The children were both insured, but died days before they were in benefit. Unless the ldren got this mixture the parents could get no , and that was why it was given every night.

Dr. Rutherford said the symptoms corresponded with th from opium or an opiate. He knew nothing of mixture, but if there were opium in it it was possible that there would be a sediment of this drug at the ttom of the bottle, and the last dose might be suffi- ent to cause death.

It was then decided to adjourn the inquiry for an alyst's report.

A solicitor appeared on behalf of a person who s alleged to be the patentee of the mixture, but bottle with his name on was put in, and there s no evidence respecting it.

Obituary.

Notice has been received of the death of the fol- owing:—

On the 6th of July, at Adys Road, East Dulwich, r. Charles Woodward, Chemist and Druggist, for- erly of Ryde, Isle of Wight. Aged 66 years.

On the 16th of August, at Woodford, Mr. William ox, Pharmaceutical Chemist, Bethnal Green Road, London. Aged 75 years. Mr. Fox was one of the Founders of the Pharmaceutical Society, having become a member in 1841.

On the 18th of August, Mr. Richard Hammersley Forrester, Chemist and Druggist, Merthyr Road, Abergavenny. Aged 56 years.

Reviews.

A LABORATORY COURSE OF PHARMACY AND MATERIA MEDICA. By WILLIAM ELBORNE, M.P.S., F.L.S., F.C.S.*

The subject of this book is one on which Mr. Elborne has special qualifications to speak, from his experience as assistant curator of the Pharmaceutical Society's Museum, and since that time as Assistant Lecturer in Materia Medica and Pharmacy in Owens College. The scope of such a work is, however, rather difficult to delimit, as so much of the ground is partially covered by other sciences, *e.g.*, chemistry and botany. The author has here included a good deal of matter generally studied as part of those sciences, but which has a special bearing on pharmacy and really forms part also of that subject; in fact, he includes a chemical laboratory as forming part of a pharmaceutical one. After an introductory portion concerning weights and measures, thermometers, specific gravities, etc., a section of the book is devoted to chemical pharmacy, and, after a brief explanation of elementary chemical processes and terms, exercises are given in the preparation of typical products by various methods. These exercises are chosen so as to involve the use of each typical chemical process, such as precipitation, crystallization, distillation, sublimation, etc., in the preparation of one or more salts, and they form a suitable course for acquiring a general acquaintance with manufacturing methods. Analytical practice is then given by typical volumetric operations, the assay of opium, saffron, manna, jalap, extract of nux vomica, belladonna and aconite roots, ipecacuanha, etc. Some miscellaneous operations, such as the determinations of melting points and microscopic examination of starches conclude the section of "chemical pharmacy."

The "galenical pharmacy" includes a tabulated summary of the origin, natural orders, preparations, etc., of vegetable and animal substances included in the Pharmacopœia, followed by a chapter of elementary botany, and descriptions of various galenical operations, such as percolation, maceration, infusion, etc.; the galenical preparations of the Pharmacopœia are also classified under different headings, with their compositions and strengths. The laboratory course attached to this, the more strictly pharmaceutical portion of the book, is extremely short, consisting only of about a dozen experiments; these are far too few to give a sufficient familiarity with the subject. This is a matter for regret, as it is in this department of pharmacy that most room existed for a good textbook of laboratory instructions, the chemical portion being already fairly well covered in the ordinary practical chemistry text-books and other works, and the tables of strengths and compositions, although useful and handy for reference, not being very instructive from an educational point of view.

In the dispensing section the general remarks on the subject present no features of novelty, being for the most part quoted verbatim from other works; in fact the very free use of quotations is rather a noticeable feature throughout the book. There are, however, plenty of exercises in dispensing prescriptions which are accompanied by remarks on the important or noteworthy features of each. The whole of the book is copiously illustrated, even to an unnecessary extent, perhaps, for an illustration of a full set of grain and drachm weights for instance can scarcely be of sufficient use to compensate for the space occupied. In some points the matter is not quite brought up to date, as for example in the carbohydrates (p. 60), which are described as six-carbon compounds, arabinose, which Kiliani has shown to be a five-carbon sugar, being still given as $C_6H_{12}O_6$; seven carbon sugars are now also known. Many of the author's quotations from older literature too would be all the better for a little modernizing or a few additional remarks; the description of a burette, taken from the British Pharmacopœia, "a graduated tube which when filled to 0 holds 100 c.c. and is divided into 100 equal parts," applies to an instrument which many chemists have never seen and gives an erroneous impression of the burette as actually used. The main idea of the book, however, that of providing instruction for the practical study of pharmacy in the laboratory, is very good, and if it were carried out still more thoroughly in the galenical portion would make it a valuable work for students of pharmacy.

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* London: Charles Griffin and Co. Small 8vo. Pp. i.-viii., 1-276.

PRACTICAL CHEMISTRY AND QUALITATIVE ANALYSIS adapted for use in the laboratories of colleges and schools. By FRANK CLOWES, D.Sc., Lond., etc., etc. Professor of Chemistry at University College, Nottingham. 5th edition.*

A new edition of this useful and thoroughly practical treatise is now being issued, and has evidently been very carefully revised, as it is remarkably free from the misprints and oversights which are so liable to occur in books of this description, and which are sometimes so perplexing or misleading to those using them. As might be expected in a book dealing with qualitative analysis, in which few or no facts of fundamental importance are of very recent discovery, and when the book itself has proved so acceptable, as in the present case, no very great alterations have been made since the previous edition; the principal of them consists in an extension of the short section dealing with organic substances so as to make it cover the syllabus of the medical examinations. This now includes tests for formates, citrates, succinates, benzoates, tannates, gallates, urates, salicylates, meconates, malates, hippurates, cinchonine, quinine, morphine, strychnine, narcotine, brucine, alcohol, starch, glucose, sucrose, glycerol, chloroform, chloral, phenol, aniline, urea, and albumen, and a systematic table for the detection and identification of these substances.

The plan on which the book is written is exceedingly good, the opening portion being devoted to the simpler operations of making and fitting together simple pieces of apparatus, bending glass tube, the use of the blowpipe, etc., and care being taken to make the explanations very clear, often with the aid of illustrations. The second section contains a well-arranged and complete course of experiments with gases, the performance of which will not only give a thorough practical acquaintance with gaseous elements and compounds, but enable the student to become proficient in the manipulation of apparatus. The third section consists of exercises in various operations to familiarize the operator with precipitation, filtration, decantation, the use of the spectroscope, and other analytical processes. These first three sections are especially well written for their purpose, which is to ensure that those taking up the study of chemistry shall *begin* in the right way; experience shows that making a good beginning and acquiring habits of neatness and thoroughness at the outset is of supreme importance and becomes especially evident in the study of chemistry.

The other sections deal in succession with the tests for the various metals and acid radicles, the systematic examination of single salts, and the qualitative analysis of mixtures. They are characterized by the same thoroughness and attention to details as the above mentioned earlier portions, and are plentifully besprinkled with tables containing directions for proceeding with the examination of salts and mixtures both in the "dry" and "wet" way. There are finally many useful hints as to the fitting up of a laboratory, preparation of reagents and other matters, and the whole book is extremely well adapted for use in colleges and schools "to furnish a course of laboratory instruction in practical chemistry, which may precede the higher training of the professional and pharmaceutical chemist, and the medical man, and the more special training of the technical chemist and the chemical engineer."

MANUAL OF PHARMACEUTICAL TESTING FOR THE MAN OF BUSINESS AND HIS ASSISTANTS. By BARNARD S. PROCTOR, F.I.C.*

Mr. Proctor's manual is intended to give such simple instructions for testing the chemicals of the Pharmacopœia, etc., as may be carried out with the materials and appliances that are in common use at the dispensing counter. It is the work of a practical pharmacist, and although in many instances the official tests seem to be needlessly altered, the 'Manual' will no doubt serve its purpose. We can only endorse the hope of the author that it will encourage the habit of testing the chemicals used in medicine, and that this habit will in many cases be developed into a higher class of investigation.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE CHELSEA BOTANIC GARDEN.

Sir,—Now that London has no longer the old botanical gardens of Gerard and Tradescant, cannot something be done to save Sloane's botanic garden at Chelsea, which bids fair to be inundated with bricks and mortar?

If the Apothecaries' Company can actually bring themselves to sell such a valuable oasis, cannot an effort be made to secure it for the future use of pharmacists?

It seems to me to be just what the Pharmaceutical Society wants—a garden of its own for the culture and study of medicinal plants and for experiment. Having seen no reference to this matter in any of the journals, I thought it proper to make mention of the fact before it might be too late. WM. BAXTER, Junr.

THE CONFERENCE MEETING.

Sir,—I cannot help thinking it would be better for chemists if we were to hold the Conference at some other town, or some other time, than that of the meeting of the British Association. The meeting might then be utilized similarly as has been done in different parts of London and Devonshire.

I hope to go to Leeds, and all who can possibly do so should, as all who have attended the meetings know how enjoyable they are.

48, *High Street, Notting Hill.* HENRY LONG.

Sulphonal.—Melilotus officinalis.

Diaphragm.—It would be impossible to give useful advice upon your description. For instance, a large number of substances, besides tartrates, reduce silver nitrate on heating.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Tranter, Grierson, Douglas, Blount, Baxter, Pinhey, Thresh, Austen, One of the Dissentients.

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* London: J. and A. Churchill, 1890. Small 8vo. Pp. i-xvi., 1-896.

* London: Office of *Chemist and Druggist*. Small 8vo. Pp. i.-vii., 1-176.

"THE MONTH."

Trional and Tetronal.

It will be remembered that a few months since (*Pharm. Journ.*, [3], xx., p. 161) Messrs. Baumann and Kast published the results of a number of experiments made upon dogs with compounds allied to sulphonal, from which they drew the conclusions that the hypnotic action of this class is a function of the ethyl groups in the compound and proportionate in intensity to their number, and that the SO_2 group exercises no influence in this direction. Messrs. Barth and Rumpel have attempted to ascertain how far this statement is confirmed by the effects produced upon human patients by the administration of trional and tetronal, containing three and four ethyl groups respectively, as compared with those produced by sulphonal, which contains two (*Deut. med. Woch.*, Aug. 7, p. 32). In order to make the comparison as close as possible the experiments with trional and tetronal were made upon patients that had already taken sulphonal with advantage. The results obtained corresponded to the experience obtained upon dogs only so far as to show that both trional and tetronal possess pronounced hypnotic properties when administered to human beings; but they did not confirm the theory as to their quantitative action, as practically the same doses of the new compounds as of sulphonal were found to be required to produce a certain effect, instead of one-half or two-thirds as expected. In a few cases where sulphonal was slow in its action trional or tetronal produced a full hypnotic effect; but it was remarked that when any one of the three compounds had been administered several days in succession a change to one of the others almost invariably intensified the action. At present, Messrs. Barth and Rumpel content themselves with saying that probably the indications for the use of trional and tetronal correspond with those for the use of sulphonal, but that in certain nervous conditions which are refractory towards sulphonal the other compounds might prove more effective. Neither trional nor tetronal produced any perceptible effect upon the outbreak or course of delirium alcoholicum even when given to the extent of 4 grams daily. As a hypnotic tetronal was in fourteen cases superior to sulphonal, in six cases equal and in four cases inferior. Trional in seventeen cases was superior, in six cases equal, and in seven inferior. No injurious bye-effects were observed in any of the 220 cases in which trional and tetronal were administered.

Chloral-Antipyrin.

At a recent meeting of the Société de Biologie M. Schmidt reported the results of some experiments with monochloral-antipyrin and bichloral-antipyrin (see *Pharm. Journ.*, May 31, p. 977). He stated that he had found monochloral-antipyrin to present the advantage over chloral hydrate of being more easy of administration, whilst it produced a more decided soporific effect and exercised a less deleterious influence on the circulation (*Répertoire*, Aug. 10, p. 394). Bichloral-antipyrin, on the other hand, presented no advantage over the monochloral compound or chloral hydrate. In addition monochloralantipyrin had been ascertained to be more toxic than the chloral it contained, and the bichloral-antipyrin a little more toxic still, the difference, however, being exceedingly slight.

Antiseptol: Cinchonine Iodosulphate.

Under the name "antiseptol" M. Yvon recommends cinchonine iodosulphate as a substitute for iodoform (*Répertoire*, Aug. 10, p. 357). It may be prepared by dissolving 25 grams of cinchonine sulphate in two litres of water, and precipitating this with a solution of 20 grams of potassium iodide and 10 grams of iodine in a litre of water. The light voluminous kermes brown precipitate that is produced is described as being inodorous, insoluble in water, soluble in alcohol and in chloroform, and as containing 50 per cent. of iodine.

Diuretin.

The compound recently introduced under the name "diuretin" has generally been regarded as a double salicylate of theobromine and sodium comparable to the so-called soluble salts of caffeine, a view that has been favoured by the use of the alternative designation "theobromine - natrium - salicylicum" (*Pharm. Journ.*, [3], xx., 501). But in attempting to prepare a solution of such a compound by dissolving theobromine in water with the aid of sodium salicylate or benzoate M. Marette found that although the salicylate augmented the solubility of the base, complete solubility was not obtained by using the proportions indicated as the composition of diuretin (*Journ. Pharm. Chim.*, Aug. 15, p. 159). It was then found that a commercial sample of diuretin, occurring as a non-crystalline powder, very soluble in water, tasting at first very alkaline but afterwards freely bitter, formed a solution that had a strongly alkaline reaction and gave an abundant precipitate when this alkalinity was neutralized by an acid. The precipitate had the characters of theobromine and the solution gave the reactions of salicylic acid. Theobromine is known to be freely soluble without decomposition in caustic soda solution and Würtz has described a "sodium-theobromine" so obtained as occurring in white deliquescent crystals that are decomposed by carbonic acid. The conclusion arrived at by M. Marette is that diuretin is a mixture containing this sodium-theobromine and sodium salicylate. Its solutions alter rapidly in the air.

Pharmacology of the Cocaine Group.

Although a complete synthesis of cocaine has not yet been effected, the recent researches upon its chemical constitution have discovered a group of bodies the study of which can but throw light upon the relation between the chemical constitution and the local and general action of this alkaloid upon the body. According to Einhorn (*Pharm. Journ.*, [3], xx., 1057), the basis of the "cocayl" group is a methyltetrahydropyridine, with the methyl group in the N position. The introduction of a β-lactic acid residue in the α position yields ecgonine, to which the cocaine bears the relation of a methyl ester having the hydroxylic hydrogen of the side chain replaced by a benzoyl group. As will be at once seen homologues of ecgonine can be made by replacement of the methyl by other alkyl groups, whilst the introduction of different acid radicles into different esters of ecgonine affords a wide field for the study of the pharmacological value of the different groups. During the month two independent investigators have published results of their work in this direction. Dr. P. Ehrlich (*Deut. med. Wochensc.*, Aug. 7, p. 717) has carried out his experiments upon mice and found the most characteristic feature of cocaine poisoning to be the formation of numerous vacuoles containing serous fluid in the cells of the liver, causing an enormous increase in its size. The products obtained by the introduction of only an alcoholic group or an acid radicle into ecgonine were found to possess not only a far less toxic action than cocaine, but also the characteristic appearance of the liver was absent. On the other hand, higher esters of benzoylecgonine produced results similar to or even more marked than its methyl ester, cocaine, so that although it appears necessary that an ester and an acid radicle shall be present in the molecule in order to produce the specific action of cocaine, yet the nature of the ester is of little importance. Greater interest was attached to the determination of the value of the acid radicle on account of Filehne's theory that the anæsthetic action of cocaine is due solely to the benzoyl group, and the observation of Liebreich that isotropylcocaine is a heart poison, and does not produce anæsthesia. As a matter of fact, Dr. Ehrlich, though hampered by insufficient material, found that cocaines containing different acid radicles all call forth the same pathological and anatomical change in the liver, and that this biological reaction is therefore a safer criterion for bodies of the cocaine group, *i.e.*, ecgonine-esters containing an acid radicle, than their anæsthetic function. Since the latter is only possessed by cocaines containing certain acid radicles, the author proposes to call these radicles "anæsthesiphores." Dr. Ehrlich has also experimented with the "homococaine" of Einhorn, a lower homologue of cocaine obtained by careful oxidation of the lactic acid residue in ecgonine to an oxyacetic acid residue and esterification and benzoylizing of the product. He endorses Einhorn's statement of its high anæsthetic property, and states further that its toxicity is at least as great as that of cocaine, so that it is evident the lactic acid residue in cocaine can be replaced by lower or higher homologues without alteration of the nature of the biological reaction of the product. Dr. E. Poulsson has also published (*Arch. Path. Pharm.*, xxvii., p. 301) the results of his studies on the local and general action of homococaine and benzoylhomoecgonine. In ascertaining the local action the author experimented upon eyes of rabbits, cats and dogs, but his further experiments were made upon frogs (*R. temporaria* and *R. esculenta*). He has arrived at conclusions similar to those of Dr. Erhlich that neither the substitution of an oxyacetic for a lactic acid residue, nor the employment of different esters of benzoyl-ecgonine, produces any important change in the local or general action of the bodies, and that non-etherified products do not possess anæsthetic properties, whilst the poisonous character in them is altered and weakened. In a note Dr. Poulsson mentions that dextro-cocaine (see *Pharm. Journ.*, xx., 790, 889) has the same biological action as ordinary lævo-cocaine, but that he found it to act more quickly and intensely and for a shorter period.

Cocaine Reaction.

A reaction of cocaine, the characteristic of which is a particular odour evolved, has been communicated to the Academy of Sciences by M. da Silva (*Compt. Rend.*, cxi., 348). He states that if a small quantity of cocaine, or one of its solid salts, or a residue from the evaporation of a solution containing it, be treated with fuming nitric acid, sp. gr. 1·4, the mixture evaporated to dryness on a water-bath and the residue stirred well with one or two drops of strong alcoholic solution of potash a distinct and peculiar odour is evolved, recalling that of peppermint. The reaction is said to allow of distinguishing cocaine from any other member of the group of alkaloids that can be removed from an ammoniacal aqueous solution by benzine, which includes atropine, brucine, cinchonine, codeine, delphinine, eserine, hyoscyamine, narcotine, pilocarpine, quinidine, quinine, sabadilline, strychnine and veratrine. Of these atropine, hyoscyamine, strychnine, codeine and eserine, when so treated, give colour reactions and the last-mentioned gives off a disagreeable odour, recalling that of phenylcarbylamine. Delphinine, brucine and veratrine evolve only slight odours that cannot be confounded with that given by cocaine. The other alkaloids of the group do not give any characteristic reaction with the test. M. da Silva says that the test is so delicate that he has been enabled by it to detect the presence of as little as half a milligram of cocaine hydrochloride.

Atropamine.

"Atropamine" is the name given by Dr. O. Hesse to a new alkaloid which he has found in not inconsiderable quantity in belladonna root (*Pharm. Zeit.*, July 30, p. 471). It is described as being at ordinary temperatures a colourless, tolerably hard varnish, but liquid at 60°; and as being precipitated from its salts by ammonia, or caustic potash or soda solution, as an oil, dissolving readily in alcohol, ether and chloroform. The composition is represented by the formula $C_{17}H_{21}NO_2$, and differs therefore from that of atropine, hyoscyamine and hyoscine in containing H_2O less. It has the same formula as pure belladonnine, but differs from that alkaloïd in forming beautifully crystalline haloid salts, which form a ready means of separating it from all the other belladonna alkaloids. Atropamine is optically inactive and, which is of more importance, a 2 per cent. solution has no mydriatic action. It is only after boiling for a long time in alcoholic baryta that it is split up into tropine and an acid that is neither tropic, atropic or isatropic acid. The same decomposition takes place when hydrochloric acid is used, but there is a previous rearrangement of the molecule to form belladonnine. The alkaloid is, however, very delicate towards mineral acids in excess, especially hydrochloric acid, and this is thought to be the cause of it having been hitherto overlooked. The crude acid resulting from the decomposition, when treated with potassium permanganate, sometimes gives off a distinct odour of oil of bitter almonds, which seems to indicate that under certain conditions it is converted into cinnamic or isocinnamic acid. This seems the less improbable since in a normal decomposition of atropamine the acid split off would have the same composition as those acids.

Lobeline.

Although several chemists have occupied themselves with the constituents of *Lobelia inflata*, considerable uncertainty still exists with regard to its active principle. In a preliminary note Messrs. Paschkis and Smita speak of having obtained lobeline as a thick yellow liquid, with an odour recalling those of tobacco and honey, and state that benzoic acid was one of the products of the oxidation of the alkaloid by means of potassium permanganate (*Monatshefte*, xi., 131). More recently Herr Seibert has reported (*Apot.-Zeit.*, Aug. 13, p. 464) that he has obtained an alkaloidal substance both from the herb and from the seed by exhausting with water containing a little acetic acid, saturating the extract with sodium bicarbonate and shaking it with ether. After evaporation of the ether the alkaloid in both cases was left as a pale yellow strongly alkaline syrupy liquid, which could not be crystallized. Analyses of the crystallized hydrochloride and platinum salt gave in each case results corresponding to the formula $C_{18}H_{23}NO_2$, showing that the supposition that lobeline belongs to the series of alkaloids containing no oxygen is incorrect. The two products from the herb and from the seeds showed a similar and very characteristic behaviour towards vanadium-sulphuric acid and Froehde's reagent, and the platinum salts corresponded closely in form and melting-point. But at present it is uncertain whether the two products are identical or isomeric.

Daturic Acid.

An oil obtained by extracting seeds of *Datura Stramonium* with ether has yielded to M. E. Gérard an organic acid having the general characters of the fatty series, and which he represents by the formula $C_{34}H_{31}O_4$, or $C_{17}H_{34}O_2$ in the notation now generally in use (*Compt. Rend.*, cxi., 305). According to this it would be an acid ranking in the $C_nH_{2n}O_2$ series between palmitic and stearic acids and occupying the vacant place formerly supposed to be taken by "margaric acid" until the substance passing under that name was found to be a mixture. An acid of this composition has been prepared synthetically, but M. Gérard says that it is not identical with the newly discovered natural compound, to which he has given the name "daturic acid." It is described as possessing properties very analogous to those of its nearest homologues, palmitic and stearic acids, but as being more fusible than either.

Dibasic Acids from Hexadecylene and Dekamethylene.

Two recent communications from the laboratory of Professor Krafft (*Berichte*, xxiii., pp. 2352 and 2356) have increased our knowledge of the derivatives of the higher hydrocarbons of the fatty group. The hexadecylene (cetene) bromide, $C_{16}H_{32}Br_2$, employed in the one case was first prepared from spermaceti some twenty years ago in Wurtz's laboratory, but an attempt made at that time to obtain the hexadecylene glycol failed, partly owing to the bromide being impure, partly to the use of too high a temperature in the saponification of the acetic acid ester. Messrs. Krafft and Grosjean have now prepared this glycol, $CH_3\cdot(CH_2)_{13}\cdot CHOH\cdot CH_2OH$, and describe it as a crystalline body that possesses only a slightly higher boiling point than ethyleneglycol. The same experimenters have also, by substitution of the bromine atoms in the cetene bromide by cyanogen groups, obtained the dicyanide, and from this body a hexadecylenedicarboxylic acid, which from its synthesis must be a tetradecylsuccinic acid, $CH_3\cdot(CH_2)_{13}\cdot CH(COOH)\cdot CH_2(COOH)$. In a similar way, from undecylenic acid, an acid of the oleic series found by Krafft among the distillation products of castor oil, Herr Noerdlinger has by addition of a molecule of hydrobromic acid, substitution of the bromine atom by a cyanogen group and saponification of the cyanide, obtained a dekamethylenedicarboxylic acid, $COOH\cdot(CH_2)_{10}\cdot COOH$, which from its synthesis must form the next higher homologue to brassylic acid in the oxalic series, and in fact agrees with the theoretical acid in all physical and chemical properties.

Eugenol in Oil of Sassafras.

According to Messrs. Grimaux and Ruott (*Compt. Rend.*, lxviii., 928) oil of sassafras consists of about 10 per cent. of a terpene ($C_{10}H_{16}$), 90 per cent. of saffrol ($C_{10}H_{10}O_2$) and a small quantity of a phenol-like compound that can be removed from the oil by means of dilute potash solution. This phenol has recently been more closely investigated by Dr. Pomeranz, who reports that he has proved it to be identical with eugenol (*Monatshefte*, xi., 101).

New Synthetic Sugars.

Reference has already been made (*Pharm. Journ.*, May 3, p. 891) to the synthesis of sugars containing an increasing number of carbon atoms in the molecule, as well as to the proposed nomenclature of these compounds and their corresponding alcohols and acids. Messrs. E. Fischer and F. W. Passmore have now published (*Berichte*, xxiii., p. 2226) a detailed account of their progression from d-mannohexose, $C_6H_{12}O_6$, to d-mannononose, $C_9H_{18}O_9$. The heptose, $C_7H_{14}O_7$, has been obtained pure and its physical constants determined. Octose, $C_8H_{16}O_8$, however, appears to possess very bad crystalline properties and its physical characters have therefore only been approximately described. On the other hand, the lactone of its carboxylic acid can be obtained crystalline comparatively easily, and yields a well-crystallized sugar, the nonose, upon its reduction with sodium amalgam. The octose also yields by direct reduction a very stable octavalent alcohol, the mannoctite, $C_8H_{18}O_8$, a beautifully crystallizable product, which melts above 250° C. and volatilizes at a higher temperature. The nonose, beyond which the authors do not propose to carry the synthesis at present, owing to the extreme tediousness and loss of material that arise from the numerous processes, derives additional interest from its fermentability, the heptose and octose not being fermented by yeast. Messrs. Fischer and Passmore indeed point out as a fact of considerable physiological importance that although sugars containing three, or a multiple of three carbon atoms in the molecule—as glycerose, $C_3H_6O_3$, most sugars with the formula $C_6H_{12}O_6$ and the nonose—are fermentable, yet solutions of the intermediate sugars containing four, five, seven and eight carbon atoms in the molecule do not afford a suitable pabulum for the ordinary yeast plant. In reference to the possibility of these higher atomic saccharic compounds occurring in the vegetable kingdom the authors instance the already recorded identification of the mannoheptite with the heptavalent alcohol from *Persea gratissima*. Moreover, if, as probable, the ordinary six-carbon sugars are produced in plants by the condensation of two molecules of glycerin aldehyd, the discovery of a nine-carbon sugar in plant-life as a condensation product of three molecules of the same body is by no means an improbability. Indeed as the mannononose not only resembles grape sugar closely in its melting point, crystalline form and fermentability, but also produces a very similar rotation of the plane of polarized light, its presence can easily have been overlooked, as even a practised observer would have to employ the recently introduced phenylhydrazine test in order to establish its identity. The formation of a characteristic insoluble phenylhydrazone suffices to distinguish mannononose from glucose. In conclusion, the authors tabulate the specific rotatory powers of the new products, but owing to the apparent irregularity of the results they cannot in the present state of knowledge of the subject make any further deduction than that it is possible to synthesize their optical antipodes from l-mannose.

Cetrarin.

In a paper read before the Pharmacological Section of the Berlin Congress (*Pharm. Zeit.*, Aug. 13, p. 504), Professor Kobert contradicted the prevalent opinion that cetrarin, the bitter principle in Iceland moss, increases the blood pressure. From experiments on animals he found that its action is to excite movements in the stomach and intestines, whilst in too large doses it is antiperistaltic. Its beneficial influence upon patients affected with chronic constipation has also been observed by Professor Kobert. A further effect of cetrarin is stated to be the numerical increase of both red and white blood corpuscles in the human blood, especially if their number has been abnormally diminished through sickness, and finally in small doses it acts as a mild stimulant upon the central organs of the nervous system. Its use appears therefore to be indicated in the case of chlorotics suffering from loss of appetite, constipation and languor, the dose recommended by Professor Kobert being 0·1 gram.

Potassium Tellurate in Phthisis.

Potassium tellurate has been experimented with by Dr. Neusser in the treatment of phthisis, in the expectation that it might act as a bactericide (*Lancet*, Aug. 16, p. 365). He reports that he administered it in about fifty cases, and that in by far the greater number one-third of a grain given daily in a pill was sufficient to arrest the night sweats or moderate them very perceptibly. In a few instances it was necessary to double the dose, but this quantity was usually sufficient to produce the result desired. Toxic symptoms were never observed until at least a grain had been given daily for a considerable time, indigestion being then set up. The remedy has, however, the drawback of imparting to the breath the disagreeable garlic odour characteristic of tellurium compounds.

Action of Sulphurous Anhydride on Metals.

A series of experiments carried out by Herr Uhl, in the Giessen laboratory, relating to the action of sulphurous anhydride upon metals (*Berichte*, xxiii., p. 2151) has generally substantiated and supplemented the work of Hugo Schiff upon the subject, and has also led to an observation which throws suspicion upon a well known modification of Berzelius's method for estimating copper as subsulphide. Herr Uhl found that although palladium, platinum and gold are not attacked at ordinary temperatures, yet when heated in a stream of sulphur dioxide the first two are covered with a superficial layer of sulphide, whilst any gold sulphide, if formed, is at once decomposed into the free elements, fumes of trioxide passing over in each case. That the sulphides of palladium and platinum are formed was proved by the evolution of sulphuretted hydrogen when dry hydrogen was led over the heated residue after removal of all sulphurous anhydride. When, however, copper was substituted for the above metals no sulphuric anhydride fumes were observed, but the metallic surface darkened. Upon analysis sulphuric acid was found to be present, whilst the production of sulphuretted hydrogen by the action of hydrogen indicated the presence of a sulphide, so that probably the following reaction takes place:—

$$3Cu + 2SO_2 = CuSO_4 + Cu_2S.$$

Quantitative estimation, however, showed this to be also accompanied by subsidiary reactions. The above-mentioned evolution of hydrogen sulphide led Herr Uhl to investigate the behaviour of copper sulphide when heated in an atmosphere of hydrogen, and he states that he observed distinct traces of metallic copper after fifteen minutes heating, and within a half-hour a considerable portion of the sulphide had been reduced to the metallic state. As Rose's copper estimation is based upon the assumption that the sulphide is not reduced beyond the subsulphide under these conditions, the author appears to have good reason to challenge the accuracy of the method. Herr Uhl remarks further that silver and cadmium resemble copper in their behaviour towards sulphurous anhydride, whilst quicksilver and bismuth, as Schiff found, are not attacked. Antimony is oxidized to a mixture of the trioxide and trisulphide, and aluminium, zinc, nickel and cobalt are also susceptible to the reagent.

The Diamond.

The diamond has been so long regarded as a natural crystalline form of carbon that one remembers with surprise that this assumption rests on such slender scientific support as the similarity of atomic weight, and the property of its gaseous combustion product to cause a precipitate in baryta or lime water. As it appeared not incompatible with this knowledge that the diamond and carbon might bear the same relation to each other as nickel and cobalt, Professor Victor Meyer has suggested the further investigation of the subject. In order to obtain a derivative whose preparation entailed no loss of material and yet admitted of easy determination of its physical constants, Herr Krause led the product of combustion in oxygen gas over red-hot copper oxide and then into ammonia water, from which solution he made the neutral sodium salt. This salt was found to correspond to the chemically pure carbonate in its crystalline form, water of crystallization, solubility in water, melting point and electrical conductive power, so that there can remain no doubt as the identity of the two substances.

Electrification of Air by Water-Jet.

An interesting observation has been made by Messrs. Maclean and Goto (*Phil. Mag.*, Aug., p. 148) during some experiments on the passage of electrified air through narrow tubes, which throws light upon the well-known change of atmospheric electricity to negative during rainy weather. It was found that when water was allowed to drop through air confined in a sheet-iron vat, the electrometer connected with the water-dropper recorded an increasing negative potential inside the vat, so that in half an hour five volts negative was indicated, instead of the initial reading of ½ volt positive. The experimenters varied the conditions with always the same result, and therefore came to the conclusion that water rushing through the air electrifies it negatively, or at least does so electrify common air full of dust. The maximum potential obtained was 5½ volts negative, but this decreased with increased freedom of the air from dust. The initial reading of ½ volt positive, always observed after filling the water-dropper and allowing it to come to equilibrium, the authors consider to arise from the electrification of the water itself and not from the potential due to the internal arrangement.

Nepenthes not Carnivorous.

A communication from M. Dubois to the Academy of Sciences challenges the so-called "carnivorous" character generally attributed to the pitcher plants on the assumption that a liquid secreted by them in the pitchers possesses digestive properties (*Compt. Rend.*, cxi., 315). M. Dubois bases his objection upon the results obtained in a large number of experiments made upon plants of *Nepenthes Rafflesiana, Hookeriana, coccinea, phyllamphora, distillatoria, hybrida* and *maculata*. He states that the pitchers of these plants, before the opening of the operculum, were all filled with a limpid slightly acid liquid; but in the open pitchers the liquid was generally turbid, contained insect debris, and sometimes exhaled a strong putrefactive odour. When the liquid was withdrawn from a closed pitcher, or one just ready to open, by means of a sterilized pipette, it remained clear for months; it was free from micro-organisms, and had no effect upon cubes of coagulated albumen placed in it, the angles of which remained intact after several days. The liquid taken from pitchers opened a very short time was also still clear; but it attacked albumen at the ordinary temperature, and very vigorously at a higher temperature. The liquid became turbid and contained numerous micro-organisms; in some cases it developed a putrefactive odour and gave some of the reactions of peptones. Many of the pitchers contained insects not in the course of digestion, but of putrefaction. M. Dubois concludes therefore that the *Nepenthes* liquor does not contain any digestive constituent comparable to pepsin, but that the phenomena of disaggregation, or false digestion, observed by Sir Joseph Hooker, were due to the activity of micro-organisms coming from outside, and not to a secretion of the plant.

THE CHEMISTRY OF AUSTRALIAN PRODUCTS.

The following paragraphs are taken from a Presidential address to a section of the Australasian Association for the Advancement of Science, during its meeting this year in Melbourne:—

Among the more important products, those obtained from the "everlasting gum-tree" first claim our attention. In a remarkable series of researches carried out in the laboratory of the University of Bonn, Wallach has succeeded in reducing to something like order and system the confusion which has hitherto existed in our knowledge of that class of hydrocarbons known as the terpenes, and has revealed some most interesting facts about the relationship of these substances to one another, especially with reference to their optical properties. He has shown that some of these substances exist in what may be termed pairs, one of each pair dextro-rotatory, the other lævo-rotatory, in its effect on polarized light. Thus he has found two pinenes, two phellandrenes, and two limonenes, the only difference between the two members of each pair being the effect on the polarized light just referred to; but each set of two is characterized by the formation of derivatives distinct from those of any other two, and also from those of other hydrocarbons belonging to the terpene group. In the case of the two limonenes, however, there is a special and most peculiar characteristic. When simply mixed in equal proportions these two hydrocarbons unite directly to form another hydrocarbon, called dipentene, which is very different from either of the originals. This reminds one, of course, of the relationships between dextro and lævotartaric and racemic acids. There is, however, this distinction, that dipentene differs much more widely from the limonenes, than does racemic acid from the tartaric acids, and, moreover, there seems to be at present no known means of regenerating the original hydrocarbons from the product. My object in referring to these researches, however, is to point out that the oil of *Eucalyptus amygdalina* has supplied one of the missing links in the chain of discovery, Wallach having found that it contains lævo-rotatory phellandrene (this is at present the only source of this hydrocarbon), the dextro-rotatory variety occurring in the oil of *Phellandrium aquaticum*, and also in the oil of the bitter fennel in the south of France. The oil of *Eucalyptus globulus*, on the other hand, contains no phellandrene, but dextro-rotatory pinene, the two varieties of which are found in turpentines from different sources. The common constituent of both these oils is an oxygen-containing liquid called *cineol*, of formula $C_{10}H_{18}O$, and boiling point about 176° C., which is the chief constituent of oil of wormseed, oil of cajeput, and is also found in oil of rosemary and other essential oils. This substance is identical with the so-called "eucalyptol," about the presence or absence of which in oils produced by different firms there has, I understand, been a good deal of dispute. Wallach himself had at first some difficulty in isolating this substance from the oil of one of these (*Eucalyptus amygdalina*), apparently owing to the presence of some disturbing impurity. The fact that it appears to be more easily isolated from the oil of one variety than from that of the other may probably have caused the dispute referred to; at any rate there can be no doubt whatever of its presence in considerable quantities in the oils from both the varieties of eucalyptus I have named, and probably it exists in the oils from other species also. It is a very interesting fact, however, that there should be a considerable difference between the constituents of the oils from these two trees, and there are indications of still wider differences between the oils from other species. The oil from *Eucalyptus Staigeriana*, for example, according to a report by Messrs. Schimmel and Co., of Dresden, contains an oxygenated substance (a ketone $C_{10}H_{16}O$?) which imparts to it its pleasant lemon-like odour, and several other species of eucalyptus yield oils of a similar odour, probably due to the presence of similar substances. References to these will be found in Mr. Maiden's book, to which I have already referred. It is obvious that there is still abundant room for investigation in the direction indicated, an investigation, too, which has the additional merit of possibly leading to important practical results, some of the substances obtained having been highly spoken of as perfumes, while some, we know, possess considerable disinfecting power.

There are many other Australasian plants, besides the eucalyptus, the leaves of which yield essential oils, but scarcely any of these have received more than an imperfect examination, and here again is a wide field for work.

I may mention also here that some years ago I succeeded in getting a hydrocarbon, apparently a terpene of boiling-point 156° C., from New Zealand Kauri gum by passing steam over the roughly-powdered gum heated in a copper vessel. It would be interesting, perhaps, to re-examine this in the light of Wallach's researches, but up to the present time I have had no opportunity.

Leaving the essential oils and passing to other classes of products, we find that *Eucalyptus viminalis* yields the well-known "manna." This has been lately shown by Tollens to contain over 50 per cent. of *raffinose*, or *melitose*, one of the more recently investigated, and from a scientific point of view more interesting sugars, containing as it does at least eighteen atoms of carbon, and yielding a mixture of lævulose and galactose on treatment with dilute acids. I believe, though on this point I am not quite certain, that "manna" has also been found on other species of eucalyptus; if so, it would be well worth examining.

The alkaloids afford us a field almost untouched, so far as exact chemical investigation is concerned. So far as I know the only substances belonging to this class which have been at all carefully examined are those to be found in the bark of *Alstonia constricta* and the "*pituri*." Of the former several have been isolated and partially described by different observers, but especially by Hesse, who describes at least four; but all of them need further examination, especially as some, at any rate, possess very marked physiological activity. The alkaloid to which the peculiar effects of "*pituri*" are due has been isolated by Professor Liversidge, who describes it as a volatile liquid possessing characteristics closely allied to but distinct from those of nicotine, and having the formula C_6H_8N. This also needs further examination, but sufficient quantities of material are very difficult to obtain, and I understand Professor Liversidge had not had an opportunity to continue the investigation. There are numbers of plants which seem to contain principles of more or less poisonous nature, notably two natives of New Zealand, the *Coriaria ruscifolia* and *Corynocarpus lævigata*. The former is said to be excessively poisonous to sheep feeding upon it, and extraordinary stories are told of the powerful physiological effects produced by eating the nuts of the latter unless they are first pounded and washed with water, a practice always observed by the natives. Mr. Skey, who examined these nuts, states that he succeeded in isolating a crystalline poisonous substance, which, however, appeared to him to be more closely related to the glucosides than to the alkaloids.

It is scarcely necessary to say that the complete isolation and thorough chemical investigation of physiologically active principles, whether of the nature of alkaloids or not, is of the greatest importance, if such principles are to be usefully applied to medicinal purposes. The scientific world owes a debt of gratitude to Dr. Bancroft, of Brisbane, for the valuable results he has obtained by physiological experiments with a variety of Australian plants, but the statement will bear repetition that from a chemical point of view a great deal still remains to be done.

As an instance of a glucoside, we have the active principle of *Smilax glycyphylla*, which is asserted by some to have considerable medicinal value, but which has not yet, so far as I am aware, been tried medicinally in the pure state, and in larger doses than can be conveniently administered in the state of infusion. It is a crystalline substance closely allied to phlorizin. By the action of dilute acids it yields phloretin and isodulcite, the latter, I need scarcely tell you, a substance of considerable interest and importance in connection with the question of the constitution of the sugars, and hitherto obtainable with difficulty from a few rare sources.

Colouring matters are not wanting as products of the Australasian flora, and many of these would, without doubt, yield results of great interest, if not always of great practical importance, were they subjected to close examination. You may be interested in examining these specimens of colouring matters from *Drosera whittakeri*, a South Australian species. These materials are capable of being used as dyes, and appear to bear much the same relationship to one of the methyl-naphthalenes as alizarin and its congeners do to anthracene.

My attention has been recently drawn to the fluorescent infusion yielded by the leaves of *Bursaria spinosa;* the fluorescence proves, on examination, to be due to the presence of considerable quantities of *æsculin*, which, you will remember, is found in the horse-chestnut, and, as is stated, in the root of one other plant, the wild jasmine. This may prove to be an important source of this substance, should it ever prove to be of practical value.

Many of our gums and resins would doubtless repay close examination, and Mr. Maiden has done a great deal in collecting, classifying, and partially examining a large number of them, especially with reference to the quantities of tannin which they contain. One of the most closely examined of the resins is that obtained from the various species of *Xanthorrhœa*, which was at one time largely used as a source of picric acid. Its products of distillation, under different conditions, have not been thoroughly investigated, and might yield results of importance; and besides, the resin, originally examined by Stenhouse, appears to have been the product of one species only.

A great deal more might be said on this part of my subject, but I think I have said enough to show that there is still a wide field open if we can only find workers, but herein lies the difficulty. It has often occurred to me that outsiders may wonder why, in this land of great advantages, and with such an extensive field, there is not more original investigation. Why is there not an abundance of scientific papers, on all sorts of subjects, to be found in the proceedings of our scientific societies? It is true there are plenty of papers dealing with natural history, geology, and kindred subjects, but very few involving long, accurate and painstaking investigation in other branches of science. The reason is plain enough, viz., that those who have the will have either not the time or the means. Those of us who are most favourably situated as regards appliances have our hands full with the teaching, organizing and all sorts of outside work which is inevitable in colonies in a state of growth, and we have not, as yet, numbers of advanced students, such as we find in older countries, who are only too glad to be entrusted with new lines of research. May we not hope that one effect of this Association will be to so interest young and old alike in the cause of scientific investigation, that such of the younger members as have time and means will come to our aid, and such of the older members as have sons, and can afford, will endeavour to give us a chance of showing what Australians can do in this direction by sending us their sons to be trained in some branch of scientific work.

FORMULÆ FROM DR. UNNA'S CLINIC.

The following formulæ from Dr. Unna's clinic are quoted in the *Apotheker Zeitung* from an article in the *Monatshefte für praktische Dermatologie*:—

Gelatina Zinci Dura.

℞. Gelatinæ albæ	pts.	4
Zinci oxydati	„	3
Glycerini	„	5
Aquæ	„	9

F. l. a. gelat. pts. 21, quibus, si vis, admiscere potes:
Picis liquidæ,
vel
Extracti cannabis indicæ,
vel
Resorcini . . . . ptm. 1

Corporum supra dictorum cave ne majorem quantit. admisceas.

Massa Urethralis.

℞. Olei cacao	pts.	100
Ceræ flav.	„	5
Balsam. peruv.	„	2
Rad. curcum. plv.	„	5

Digere per 2 horas, filtra.

Olei filtrati.	pbus.	100

lenissimo adhib. calore admisce conquassando

Argent. nitr. in aquæ pauxillo soluti.	ptm.	1

vel quantum vis.

Pasta Zinci Mollis.

℞. Calcariæ carbonicæ,
Zinci oxydati,
Olei lini,
Aquæ calcis āā pts. æqual.
L. a. misceantur.

Gelatina Zinci Vulgaris.

℞. Gelatinæ albæ	pts.	3
Zinci oxydati	„	3
Glycerini	„	5
Aquæ	„	9

F. l. a. gelat. pts. 20, quibus, si vis, admiscere potes:

Sulphuris præcip.	ptm.	1
vel		
Amm. sulfoichthyol	ptm.	½—1

Pasta Calcii Chlorati cum Pice.

℞. Zinci oxydati	pts.	4
Olei cadini	„	4
Terræ siliceæ	„	8
Calcii chlorati	„	2
Aquæ destill.	„	20
Vaselini flavi	„	26

Solv. et misc. ut f. pasta.

Pasta Lithargyri cum Amylo.

℞. Lithargyri	pts.	6
Aceti crudi.	„	18

coquendo et evaporando inter agitationem, f. massa pultiformis, cui refrig. admisce

Amyli	pts.	5
Aquæ.	„	15

iterum coquendo et

Glycerini	pts.	20

admiscendo f. l. a. pasta ponderis

pts. 40

Pasta Zinci.

℞. Zinci oxydati	pts.	10
Terræ siliceæ	„	2
Adipis benzoati	„	28

L. a. terendo misceantur.

Spiritus Capillaris.

℞ Resorcini	pts	5
Spiritus 95°	„	150
Spirit. coloniens.	„	50
Ol. ricini	„	2

Solve ut f. liquor limpidus.

Unguentum Acidi Salicylici cum Kreosoto.

℞ Acidi salicylici	pts.	4
Kreosoti faginei	„	8
Ungt. simpl.	„	4 ad 5
Ceræ flavæ	„	4 ad 3

Leni calore colliquendo et probe subigendo, f. ungt. —Unguenti et Ceræ ratio inter se secundam aeris temperatum differt.

Ungt. compos. Pyrogalloli.

℞ Acidi pyrogallici	pts.	5
„ salicylici	„	2
Ammonii sulfoichthyolici	„	5
Vaselini flavi	„	88

M. f. ungt.

Unguentum pomadinum.

℞ Oleo cacao	pts.	2
Oleo amygdal	„	4 æst.
usque ad	„	6 hieme.

Olei rosar. q. s. ad grat. odor.
M.—

Ungt. pomadin. sulfuratum.

℞ Sulf. præcip.	pts.	2
Ungt. pomadini.	„	60

M.—

Unguentum simplex.

℞ Adipis benzoatæ.	ptm.	1
Olei benzoati vel olei styracinati	„	½

Non confundendo sed conterendo commisceantur.

Pasta Zinci sulfurata.

℞ Zinci oxydati	pts.	6
Sulfuris præcip.	„	4
Terræ siliceæ	„	2
Adipis benzoati	„	28

L. a. terendo misceantur.

Ungt. compos. Chrysarobini.

℞ Chrysarobini	pts.	5
Acid. salicyl.	„	2
Ammonii sulfoichthyol	„	5
Vaselini flavi.	„	88

M. f. ungt.

Unguent. compos. Resorcini.

℞ Resorcini Ammonii sulfoichthyol	āā pts.	5
Acidi salicyl.	„	2
Ungt. simpl.	„	88

M. f. ungt.

Unguentum pomadin. compos.

℞ Sulf. præcip.	pts.	4
Resorcini	„	2
Ungt. pomadini.	„	100

M. —

Unguentum Refrigerans.

℞. Ungt. simpl	pts.	12
Aquæ rosæ		
Aquæ naphæ āā	„	2
Lanolini.		pauxillum.

M. —

METALLURGICAL USE OF FLUORSPAR.*

BY DR. FOEHR.

Fluorspar was, until the commencement of this century, considered an indispensable flux; it diminishes the loss of metal and was then the only energetic means to reduce the melting point of slag from ores carrying a high percentage of clay and zinc. Without fluorspar very refractory ores could not be smelted at all.

Gradually, however, as the blast furnaces and smelting apparatus were improved, fluorspar was superseded by lime and other cheap fluxes, but of late its use has been reintroduced into nearly all branches of metallurgy.

While fluorspar is regarded as a mere means to unite with excessive silicic acid, the possibility of its adoption is surprising, in view of the fact that the cost of fluorspar is six to seven times greater than that of limestone, while the formulas for fluorspar and limestone respectively,

$$2CaF_2 + 3SiO_2 = 2CaSiO_3 + SiF_4 \text{ and}$$
$$3CaCO_3 + 3SiO_2 = 3CaSiO_3 + 3CO_2,$$

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* From *Chemiker Zeitung*. Reprinted from the *Scientific American*, July 26.

show that the quantitative economy in fluxing with fluorspar compared with limestone is as 156 to 300. The fact is, however, that one part of fluorspar goes further than ten parts of limestone. The former is specially effective in reducing the quantity of fuel; it forms two parts of slag where limestone forms three, and it forms possibly also fluorsilicate, whereby heat is likely to be liberated.

While the rather high price of fluorspar prevents its use in the production of ordinary white and gray pig iron, it has proved a rapid and energetic solvent in blast-furnace work, where it is blown in as powder through the nozzles.

In making silicon iron, fluorspar plays a more important part. A ferrosilicon iron, with 10 per cent. silicon, made specially in Upper Silesia, is almost indispensable for works that make very tough, deep-gray castings. This ferrosilicon can be obtained in any ordinary blast furnace from any silicious iron ore, if it is only fluxed with fluorspar and the slag is strongly basic. The fluorspar reduces the silicon energetically; at all events fluorsilicon is formed, which is reduced to silicon by the hydrogen contained in the furnace gases, and possibly also directly by the coke. It does not seem impossible that the greatly increased price for coke will result in a reintroduction of fluorspar as a fuel-saving flux in the manufacture of foundry pig, particularly as even a very small quantity of fluorspar, added to the charge, at once raises the product to No. 1 deep gray pig, rich in graphite.

The remarkable property of fluorspar, that it facilitates the reduction of the most different bodies—a property common to almost all the fluorides—makes it a valuable flux in the production of spiegeleisen. It has long been known that fluoride of manganese, as well as a mixture of a manganese combination with fluorspar, can comparatively easily be reduced to metallic manganese by means of sodium. This reaction served Brunner in his successful attempts, the first ever made, to produce metallic manganese in large quantities. The modern application of this method to the blast furnace substitutes carbon for sodium. A highly basic slag, rich in fluorides, seems nearly indispensable for the production of a rich ferromanganese in the blast furnace.

The property of fluorspar, to carry phosphorus into the basic slag, has never been of special importance as far as pig iron is concerned, but it is utilised by the Krupp and Rollet methods of dephosphorizing pig in the basic-lined cupola-furnace. While, at all events in the blast furnace process, the property of fluorcalcium to form an easily melting slag with phosphates is of some importance, fluorspar in the process of purifying the pig iron serves probably only as a flux for the highly basic limeslag saturated with phosphorus.

In the Thomas process too, and even in the Bessemer converter, fluorspar is in recent practice being added in small quantities for the purpose of concentrating the slag and reducing the loss of metal; very great care, however, is needed to prevent such a slag from attacking the acid lining. It is also said that in puddling in the various steel-making methods and in the Siemens-Martin process, fluorspar is added partly as a slag-forming flux. The details are, however, not known.

In foundry work, it is an astonishing fact that limestone, which, because of its cheapness, superseded fluorspar, of late is losing ground to the latter. The limestone flux in cupola-furnace work serves only to slag the ashes of the fuel, the sand adhering to the pig, etc., no chemical effect on the iron being intended. But fluorspar affects the iron noticeably, keeps it gray and soft by keeping the silicon as an alloy, while a limestone flux favours the tendency of the silicon to slag. Besides, fluorspar carries some phosphorus and sulphur into the slag. Fluorspar makes it possible to melt inferior kind of pig iron and a higher percentage of scrap. But, strange enough, practice has shown that too much fluorspar is rather injurious than advantageous; one reason for this being that the manganese contained in the iron is thereby prevented from slagging.

The quantity of fluorspar which is added to 100 kilograms of pig iron to be remelted is one-third or, at the most, one-half kilogram. The improvement of the product caused by this flux is specially manifest in the improved cupola furnaces, particularly the Herbert's furnace, which has much facilitated the utilization of inferior iron for soft castings. The property of fluorspar to protect manganese does not seem favorable enough to offset the injury due to its silicon-reducing power. Its use would, at least, require melting in a basic furnace or as cold as possible.

As the small quantity of the phosphorus and sulphur which is contained in Swedish charcoal iron is almost entirely carried off in the comparatively acid slag by fluorspar, this is of prominent importance for the treatment of very pure qualities of iron.

BARK OF XANTHOXYLON SENEGALENSE (ARTAR ROOT).*

BY P. GIACOSA AND M. SOAVE.

After a description of the known species of *Xanthoxylon* and of the literature of the subject, the following results are given of the examination of artar root, which presumably belongs to *X. Senegalense*, D.C.

The root is generally cylindrical, somewhat contorted, and covered with bark, the underlying wood is pale yellow with minute white spots, the annual rings are barely visible, the medullary rays are very fine and waving and meet at the centre, where, however, there is no pith; the wood is very close, tough, hard, and heavy, and has neither taste nor smell. The bark is covered with waving, longitudinal furrows; in colour it is reddish-brown, with bright, yellow spots, or yellow with greyish patches; it has a peculiar aromatic odour, and a taste which is aromatic at first, then burning, and causes itching of the tongue.

The authors have previously reported the occurrence in a specimen of this bark of a fixed oil, of a neutral, crystalline substance melting at about 120°, and of two alkaloids, the more abundant of which is amorphous; the other, which occurs only in small quantity, crystallizes in large blood-red needles soluble in hot water.

To isolate the alkaloids from fresh specimens of the bark, they are powdered, extracted with 94 per cent. alcohol, the extract condensed by distillation and evaporation to a syrupy consistency, made alkaline with soda and extracted with ether; on treating the washed and concentrated ethereal solution with hydrochloric acid, it yields an abundant deposit of minute needles soluble in cold water. On the addition of ammonia or soda to the cold aqueous solution of this hydrochloride, the base is precipitated as a light, amorphous, reddish-yellow, flocculent powder, the hot aqueous solution of which on evaporation does not yield the alkaloid previously mentioned as crystallizing in red needles. It would therefore appear that the latter is not a constant constituent of the bark. On purifying the alkaloid by repeatedly combining it with hydrochloric acid, recrystallizing, and decomposing the salt, the first portions of the hydrochloride which separate were found to be more insoluble than the succeeding portions. On collecting the former apart and treating them with alkalis, a perfectly white base is obtained. This appears to be crystallizable, and dissolves in acids forming pale yellow salts; the *hydrochloride* dissolves with difficulty in water and alcohol, and crystallizes out in pale yellowish needles which, on heating at 200° darken, and melt at 270°.

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* From *Gazzetta*, xix., 303–333. Reprinted from the *Journal of the Chemical Society*, August.

Artarine is the principal alkaloid in the bark of artar root, of which it forms 0·4 per cent. It is an amorphous, uncrystallizable, rosy-grey powder which darkens a little on exposure to light; it turns brown on heating to 210°, and melts with decomposition at 240°; when heated on platinum foil, it melts, decomposes, gives off white fumes having an odour of quinoline, chars, and is finally burnt away with difficulty, but without leaving any ash. It shows an alkaline reaction to damp reddened litmus paper, and is converted by acids into golden-yellow salts; it undergoes no change by prolonged keeping over sulphuric acid. It dissolves readily in ether, boiling amyl alcohol, and warm acetone, and also, when freshly precipitated, in warm methyl alcohol, only with difficulty in warm chloroform, and not at all in water or benzene. It is sparingly soluble in boiling 98 per cent. alcohol. The *hydrochloride*, $C_{21}H_{23}NO_4HCl$, may be purified by precipitating its alcoholic solution with an excess of ether. It crystallizes in large, slender needles, occasionally forming tufts or nodules; it is blackened on heating to 60°-70°, and melts at 189° with decomposition. It is freely soluble in methyl alcohol and in acetone, readily in warm chloroform and in amyl alcohol, moderately in warm alcohol, less so in warm water (0·514 per cent. at 14° C.), but is altogether insoluble in ether and in benzene. The presence of free acid considerably diminishes the solubility of the hydrochloride and of all the other artarine salts. Solutions of the hydrochloride in water or alcohol are inactive to light. There are probably three hydrates of this compound containing 2, 3, and 4 mols. H_2O respectively; the last of these is obtained by cooling an aqueous solution saturated in the cold; it melts at 194°. The *platinochloride* crystallizes in slender, pale yellow needles which do not melt at 290°, and are insoluble in water and alcohol. The *hydriodide* is obtained by the action of potassium iodide on the hydrochloride; it crystallizes in very slender, interlaced, yellow needles which dissolve freely in warm water and alcohol.

Another iodine derivative, $C_{21}H_{23}NO_4HI_3$, is obtained by treating the cold alcoholic solution of artarine with a solution of iodine in potassium iodide; it forms aggregates of greenish-brown, microscopic needles which are insoluble in water, and only dissolve with difficulty in boiling absolute alcohol. The *sulphate* is a white powder, consisting of microscopic needles; it darkens on heating to 60°-70°, and melts at 240°. The *nitrate*, obtained by adding potassium nitrate to an aqueous solution of the hydrochloride, is a thick, gelatinous, yellow mass containing a few microscopic crystals. It crystallizes from alcohol in thin plates, a little longer and thinner than those of uric acid, and melts at 212°. The *phosphate* and *arsenate* crystallize in dirty yellow aggregates of microscopic prisms which are only very sparingly soluble in water; the *chromate* forms very long, reddish-yellow needles grouped in tufts; the *hydrobromide*, *molybdate*, *benzoate*, and *salicylate* are yellow, semi-crystalline powders; the *oxalate* and *tartrate* occur in hemispherical aggregates of needles; the *picrate* forms dendritic groups of very bright yellow needles.

The analyses of the compounds of artarine agree equally well with the formulæ $C_{21}H_{23}NO_4$ and $C_{20}H_{17}NO_4$ (berberine); other points of resemblance and distinction between artarine and berberine are as follows:—

Artarine forms yellow salts, the solubility of which is diminished by the presence of acids; it also forms a periodide, and generally resembles berberine in its reactions. It differs from berberine in being colourless, uncrystallizable, and in the solubility, melting-points, and crystalline character of its salts. It also dissolves in sulphuric acid without any discoloration, and is coloured blood-red by the action of potassium nitrate and concentrated sulphuric acid. The hydrochloride acquires by the action of chlorine water at most a yellowish tinge which is dissipated on addition of ammonia. The double iodides of potassium and mercury or cadmium give yellowish, flocculent precipitates, and the iodide of potassium and bismuth gives a similar red precipitate, all of which are insoluble in excess of the reagent; phosphantimonic acid only occasions a slight turbidity which disappears in excess. If the formula $C_{21}H_{23}NO_4$ is adopted for artarine, its constitution is probably that of a methylhydroberberine.

The red alkaloid, previously obtained from a specimen of the bark, crystallizes in blood-red needles readily soluble in water, and forms yellow salts when heated with acids; the *hydrochloride* melts at 170°, the *sulphate* at 265°, and the *platinochloride* at 290°. Besides these alkaloids, the authors previously isolated from the light petroleum extract of the bark a neutral, crystalline substance which is either identical with cubebin ($C_{10}H_{10}O_3$), or has the formula $C_{14}H_{14}O_4$. This substance crystallizes in transparent, colourless prisms which melt at 123°, and dissolve readily in warm ether, chloroform, alcohol, and light petroleum, but are insoluble in water. Like cubebin, it is coloured dark-red by concentrated sulphuric acid; on the other hand, neither acetic nor pyrocatechuic acid was detected among the products of its fusion with potash. It is first coloured wine-red by concentrated sulphuric acid and then dissolved; in the presence of potassium chromate, it acquires a dull violet colour; it is not affected by potash or ammonia, even on heating. A mixture of sulphuric acid (4 vols.) and water (1 vol.) colours the crystals red and partially dissolves them in the cold; on gently warming, the liquid becomes violet and the crystals are charred. If sulphuric acid is added to the chloroform solution of the substance, an intense purple-red coloration is produced at the points of junction of the two liquids.

A neutral nitrogenous substance of unknown composition has also been isolated; it forms pale yellow crystals melting at 170°, and its alcoholic solution is coloured bright-green by ferric chloride.

NEW GREEN VEGETABLE COLOURING MATTER.

In a paper presented to the Royal Society of Edinburgh, Mr. C. M. Smith describes a green colouring matter obtained from the bitter green pulp of *Trichosanthes palmata*. The spectrum of the alcoholic solution of this substance differs from that of chlorophyll in its first absorption-band having its centre nearly midway between the two chief bands in the spectrum of true chlorophyll, while the bands III., IV. and V. are probably coincident with corresponding chlorophyll-bands. The behaviour of this substance with ammonium sulphide differs altogether from that of chlorophyll. It appears to be a substance in which the "blue chlorophyll" of Sorby, or the "green chlorophyll" of Stokes, is replaced by some other substance easily decomposed by reducing agents and by acids.

Mr. C. B. Atwell records, in the *Botanical Gazette*, the occurrence of true chlorophyll in the embryo of *Tilia americana* and *Ipomœa purpurea*. In the latter species the chlorophyll makes its appearance as soon as the first traces of cotyledons can be recognized in a cross-section of the seed, and it is abundant in the capsule while the seeds are developing.

The Pharmaceutical Journal,

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SATURDAY, AUGUST 30, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

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LEEDS.

Although it goes without saying that the business meetings of the British Pharmaceutical Conference that are to be held on the first three days of next week in Leeds will rank high in the estimation of all good pharmacists who are privileged to attend them, it is at least probable that the social meetings, and especially the excursion on Thursday, if the weather be fine, will attract a nearly equal number of votaries. Therefore, although the programme of the meetings has been already referred to in these columns, and the route and general arrangements for Thursday have been briefly described in the "pink" circular, it may serve a useful purpose if we again draw attention to some of the principal points of interest in the proposed excursion. At a quarter to ten in the morning a special saloon train will leave the Midland Station for Wharfedale. Very soon after starting the ruins of Kirkstall Abbey will be passed on the right, but those who have archæological leanings will no doubt secure an opportunity for a closer view by taking advantage at another time of the tramcars that run from Leeds up the valley of the Aire. The ruins represent all that is left of a Cistercian abbey founded in the twelfth century, and are claimed to be of especial interest to the antiquarian because more than any other of their kind they remain the same in their arrangements as at the date of the erection of the original buildings. This relic of the past has recently been presented to the town of Leeds by Colonel North at a cost of about £6000. Three or four miles further on, at Calverley, the train will leave the main line for the branch running past Ben Rhydding, Ilkley, Addingham and Bolton Abbey, and will arrive at Embsay at about a quarter-past ten. There carriages are to be provided to convey the party over Embsay Moor to Barden Tower, once the residence of Henry, "the good Lord Clifford." The journey over the high ground will afford many beautiful views, but at Barden the company will be in close proximity to the Wharfe with its "Strid" and the lovely Bolton woods. This will be the farthest point of the journey, from which the exploration of the beauties of Wharfedale will trend in a south-easterly direction until Bolton Abbey is reached, where at one o'clock lunch will be provided at the Devonshire Hotel. After luncheon the ruins of Bolton Abbey—famous in poesy and in picture—will be visited. This also was a Cistercian retreat, and its foundation in the twelfth century is associated—in legend, at least—with the fatal leap of young Romilly at the "striding place," a couple of miles higher up the river. Wordsworth says of the bereaved mother—

> " Long, long in darkness did she sit,
> And her first words were : ' Let there be
> In Bolton, on the field of Wharfe,
> A stately priory ! ' "

At four o'clock the carriages will leave Bolton Abbey for the station, and in about three-quarters of an hour Ilkley will be reached, where afternoon tea will be served in the Winter Garden of Wells House Hydropathic Establishment. Travelling by rail will be then resumed, and at 6.25 a special train will leave Ilkley and is timed to reach Leeds about seven o'clock.

It will be evident that the excursion should yield abundance of interest to the antiquarian as well as the lover of nature. Some of the geological features of the district are also particularly worthy of note. Owing to the dip of the strata under Leeds, several sections in quarries within the borough itself show in a most interesting manner the characteristic features of about two hundred and fifty feet of the Lower Coal Measures. Some of the seams of coal, including that of the "Beeston Bed Coal," which is nine feet thick, occur at or very near the surface. Under the coal measures is the "Millstone Grit," which crops out on the surface on the north and east of the town, and there is also a fine escarpment of it at Ilkley, visible from the railway. This formation is about three thousand feet thick, and is called by the miners "Farewell Rock," because no coal is obtainable at a greater depth in the same district. The next rocks in succession are the Yoredale series, which are well shown in section close to Bolton Abbey. Still lower occurs the Carboniferous or Mountain Limestone, a contorted section of which exists at the Hambleton Quarry, adjacent to Bolton Abbey Station.

Those members of the Conference who intend to visit Leeds and take part in the festivities, need hardly to be reminded that, in order to facilitate the making of the necessary arrangements, they should provide themselves as soon as possible, if they have not done so already, with the necessary books of tickets. Of these books there are two: No. 1 for the luncheons and teas, reception at the Yorkshire College, carriage drives and smoking concert on Tuesday and Wednesday, the price of which is five shillings ; and No. 2, for the railway journeys, coach drives, luncheon and afternoon tea on Thursday, the price of which is ten shillings and sixpence. Applications should be addressed to the Honorary Local Secretary, Mr. F. W. Branson, 14, Commercial Street, Leeds.

MEETING OF THE GERMAN PHARMACEUTICAL ASSOCIATION.

During the present week the nineteenth General meeting of the Deutscher Apotheker-Verein has been held in Rostock. The general business, which was preceded by a reception on Monday evening, was commenced on Tuesday morning at 9 o'clock and resumed on Wednesday at the same, the principal topics of discussion being the revision of the statutes and the tax on spirit. Dr. Brunnengraeber was re-elected for another term of office as President, and Messrs. Jaeter and Froelich will replace Messrs. Hais and Pusch on the Council. As is the custom at these gatherings, two lectures on pharmaceutical subjects were given: one by Professor Schmidt on the Occurrence of Atropine and another by Professor Iritsch, on Synthetic Medicines. The arrangements for the meeting were excellent, and were carried out by a Committee comprising all the Rostock pharmacists except one, supported by many leading citizens. Among the company present at the Dinner on Wednesday were several officials of the Medical Council, and the Burgermeister, Herr Lesenberg. Thursday afternoon was to be devoted to an excursion to Warnemünde and a trip on the lake. It has been decided that the meeting next year shall be held at Magdeburg.

THE CONTENTS OF A PHARMACOPŒIA.

The issue of the new edition of the German Pharmacopœia almost simultaneously with the gathering of the International Congress in Berlin naturally brought the subject of pharmacopœia compilation under the consideration of the Pharmacological Section. The discussion was introduced by the reading of two lengthy reports, one by Dr. Langgaard and the other by Dr. B. Hirsch, whose well-known work in comparing the existing pharmacopœias must have qualified him in a special manner to discuss the question. The reports touched upon too many subjects to be dealt with exhaustively in a single notice, and on the present occasion reference will be made only to some opinions expressed as to the conditions that affect the selection of certain articles for admission into a Pharmacopœia and the rejection of others.

Dr. Langgaard commenced by saying that the idea of an International Pharmacopœia that should be the authorized medicine book in every country has probably in the present day only a few adherents, and he expressed the opinion that to most persons it would appear as impossible to carry out as to make an international statute book. At the same time he thought the interchange of opinion in a meeting like the Congress upon certain points that were always of primary importance in the reconstruction of a pharmacopœia would not be useless. Among these points of primary importance were the questions as to what remedies should be contained in a pharmacopœia and what principles should guide the selection of the remedies that are included in it. With respect to the first question, at present two different principles seem to be adopted: according to the one even rare and seldom used remedies are included, as in the case of the French Codex, whilst according to the other, which has been increasingly followed in the more recent pharmacopœias, every effort is made to limit the items to remedies that are indispensable and valuable. Some statistics quoted by Dr. Hirsch illustrate this in a very interesting manner. In some twenty existing pharmacopœias, all of which are European, except those belonging to the United States and Japan, there are about 17,000 items, which after making a reduction for the entries that are identical or similar in the different works may be stated in round numbers at 4000. Of these the French Codex, heading the list, includes 2039. Then follow, giving round numbers, the pharmacopœias of Spain with 1600; Belgium with 1300; Russia with nearly 1200; Switzerland and the United States each with more than 1000; Greece with nearly 1000; whilst Great Britain, Sweden, Holland and Denmark diminish from 900 to 700, and the others fall still lower. The European pharmacopœia containing the smallest number of items is the Norwegian, which numbers 519, whilst the Japanese only contains 470.

But even when there is a consensus of opinion that only the more important remedies shall be included, divergencies are sure to occur in the different pharmacopœias, owing to the impossibility of securing unanimity as to what articles are to be considered entitled to rank as such. An instructive illustration of this may be found in a comparison of the list of articles newly introduced into the German Pharmacopœia with that which has been recently published as probably representing the forthcoming Addendum to the British Pharmacopœia. The proposed additions to the British volume are said to have "received the general approval of the medical profession," whilst it is claimed that in the German work no superfluous or apparently worthless substance has been admitted by the Commission. In the former case 37 articles have been selected out of 140 suggested, in the latter about 60 out of 1240. But of these selections only eight have been made for both works. Without taking upon himself to say whether the selection for the British Addendum corresponds to the requirements of British medical men, Dr. Langgaard believes he is able to say that it would not satisfy the physicians of Germany. However this may be, he is of opinion that wherever the selection of the remedies to be included in a pharmacopœia falls into the hands of a few members of a committee, there is a danger of valuable and much used substances being excluded on the authority of individuals who may not have had much opportunity of using them, and on the other hand an equal risk of little used remedies being selected.

BRITISH PHARMACEUTICAL CONFERENCE.

We are informed by the Honorary Secretaries that the following titles of papers to be read at the forthcoming meeting at Leeds have been received in addition to those published previously:—

18. Some Points in the Analysis of Oils. By T. Fairley, F.R.S.E., and B. A. Burrell, F.I.C., F.C.S.
19. On Cream of Tartar. By H. Broadbent, A.I.C., F.C.S.
20. Extract of Malt, Solid and Liquid. By J. C. Umney.
21. Chemical Notes on Mannas. By David Hooper, F.C.S.
22. Chloroform and Chloroform Water as Preservatives. By Harold Wyatt, Jun.

At the last meeting of the Georgia Pharmaceutical Association Dr. Attfield was unanimously elected an honorary member. Professor Attfield can now literally count such honours by the score, for this is the twentieth that has been sent to him from the pharmaceutical bodies of Europe, Canada and America.

* * *

The cultivation of the *Pyrethrum cinerariæfolium* for insect powder in California appears to have developed to a very considerable extent. According to the *Pharmaceutical Record* on one of the plantations upwards of one hundred persons were engaged at the beginning of the present month picking the closed flowers. These are placed at once in large square, but very shallow boxes, where they are exposed to the solar heat, with frequent turning, until they have lost all moisture, after which they are ground.

British Medical Association.

THE POLLUTION OF STREAMS BY PAPER WORKS.*

BY JOHN C. THRESH, D. SC., M.B.,

Medical Officer of Health.

In the list of subjects submitted to the members of this Association as suitable for discussion before the Public Health Section was the one now introduced. I was led to select it, because on several occasions I have had to examine the waste products from paper mills, and to ascertain their effect upon the streams into which they were cast, and have also had to advise how the pollution of comparatively pure streams could be prevented, and to devise processes whereby the filthy river waters of Lancashire could be rendered sufficiently pure for use in the manufacture of paper.

A paper on such a subject as this must necessarily be more or less technical in character, but County Medical Officers and those aspiring to hold such positions will require to make themselves acquainted with many trade processes if they wish to become efficient in the discharge of their duties. In the short time allotted for the reading of the paper I will endeavour to give as clear an account as possible of the origin of the matters with which paper makers pollute our streams, and also of the methods which have been proved practicable for preventing such defilement.

The amount of polluting material produced by a paper mill depends upon its size, and also upon the kind of fibre-yielding material used, and the special quality or kind of paper manufactured. The largest amount is produced by the mills using Esparto grass for newspaper making, and the smallest by the makers of millboard and of brown and other coarse kinds of paper.

In order to realize the relative importance of the various waste products it will be necessary to enumerate the materials used in paper-making, to classify the waste materials, and to briefly describe the processes by which they are produced.

The raw materials used in paper-making may be grouped in three classes:—

1. The fibre-yielding materials. Esparto grass, straw, wood pulp, rags, paper shavings, old sacks, ropes, cotton waste, etc.
2. The chemicals used in preparing the fibre. Caustic soda (usually manufactured at the paper works from soda-ash and lime), chloride of lime, antichlor (sodium thiosulphate), etc.
3. The substances used in glazing, colouring, and weighting the paper. China clay, ultramarine, ochre, alum, glue, resin, etc.

The first stage in the process of paper-making is the beating or "dusting" of the raw material to remove as much as possible of the dirt and dust. The fibre-yielding material is then packed in large iron cylinders and heated under pressure with strong caustic ley. The usual charge of a boiler is 50 cwts. of esparto or 20 cwts. of straw, with an amount of caustic ley corresponding to 17 or 18 lbs. of caustic soda per cwt. of material, and about 1400 gallons of water. For rags a much smaller quantity of alkali is required, probably on an average only 3 lbs. of caustic soda to the cwt. Where prepared wood pulp or paper shavings are used this boiling process is unnecessary, the material being already what is technically called "half stuff." After boiling, the liquor is drawn off, and, in the majority of cases, is allowed to flow directly into the river. This waste ley, technically called "boilings," varies in composition with the nature of the material treated. The esparto "boilings" are dark reddish brown in colour, almost black in bulk, and have a very characteristic balsamic odour. The reaction is strongly alkaline, and it froths very freely even when largely diluted with water. It is the cause of the abundant froth found near the weirs on streams into which it is cast. I find the average density is 1060, and each gallon contains about 8000 grains of solid matter in solution, of which about 5000 grains consist of organic matter derived from the Esparto. Grass "boilings" are not quite so dark in colour, have no balsamic odour, and contain about 3600 grains of matter in solution, of which a little over 2000 are organic. The density is about 1030. Both contain a little caustic soda, the former on an average 500 grains, and the latter 100 grains per gallon of the "boilings." Rag boilings vary considerably in colour, strength, etc., according to the quality of rag treated. Most paper makers regard rag boilings as much more objectionable polluting agents than esparto or grass boilings. When thrown into a stream with lime residues or waste bleach liquor a glutinous precipitate forms, adhering to the sides and bed of the river, and when exposed readily decomposing and becoming offensive.

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* Read before the Public Health Section of the British Medical Association at Birmingham.

To make 1 ton of paper about 2 tons of esparto or grass are required, the amount of organic matter therefore removed by the "boiling" and subsequent washing is simply enormous. On one small stream in Scotland I found there were six paper mills, casting into it every day 26 tons of solid matter, of which at least 12 tons was organic, and I know one large paper mill at Lancashire which alone throws daily into the adjoining stream fully this amount of polluting matter. At this mill no attempt was made to utilize any portion of these waste materials until I showed that one portion could be used for purifying the filthy river water in order to enable it to be used in the works. Unfortunately, the sludge so produced is periodically flushed into the river, so that its last state is if possible worse than its first.

Returning now to the process of paper making. After the strong ley or "boilings" has been drained away, cold water is run into the boiler, and this when drawn off constitutes the "first coolings," and consists of ley about one-third the strength of the original "boiling." The washing process is repeated several times, producing second, third "coolings," etc., which of course consists of still further diluted ley. After the process of cooling is completed, the fibre passes to the "beating engine," to be pulped and washed with a still larger quantity of water. It is next transferred to the bleaching tanks to be treated with a clear solution of bleaching powder, in the making of which another waste product arises—the calcium hydrate or insoluble portion of the bleaching powder. During the bleaching process the hypochlorite of calcium in solution becomes converted into the chloride, and this solution is also thrown into the streams. After bleaching, the fibre is again washed, and finally with or without the addition of China clay, size, colouring matter, etc., it passes on to the paper machine. The machine water, if containing the size, etc., is usually pumped back and used over and over again.

In making millboard and the coarser kinds of paper the bleaching and washing processes are considerably curtailed.

We are now in a position to classify and consider the various sources of river pollution from the paper-making industry. We may divide them into two groups —the solids and the liquids.

The solids comprise—

1. The dirt and dust collected during the "dusting" of the fibre-producing material.
2. The carbonate of lime resulting from the manufacture of the caustic soda.
3. The insoluble portion of the bleaching powder.

The liquids comprise—

1. The "boilings" and "coolings."
2. The washings from the pulping machine (breaking engine) and other waste wash waters.
3. The waste bleach.
4. The waste from paper machine containing size, colouring material, etc.

We may take most of these *seriatim*.

The "dustings" are most considerable where esparto is largely used. As it is rarely cast into the streams and usually finds a ready sale for manurial purposes, we need not further consider it.

The lime residues are in most cases thrown, either openly or surreptitiously, into the rivers. There can be no excuse for such pollution. The lime residue from the soda-making process should be allowed to drain in tanks made in duplicate. Whilst one is filling the other is draining, and when sufficiently dry should be carted away. In some districts the farmers would gladly avail themselves of it for agricultural purposes. The slacked lime forming the insoluble portion of the bleach should be utilized in causticizing the soda ash.

Of the fluid polluting materials, by far the most important are the alkaline boilings and coolings, and these we will consider last. In the washings from the "breaker" engine the suspended fibrous material is the most objectionable constituent. These washings vary in composition during various stages of the process. A sample of mixed washings when examined contained in each gallon—

Matters in solution	52 grains.
Matters in suspension	170 grains.
Total	222 grains.

The reaction was faintly alkaline.

By passing this liquid through fine wire cloth "savealls" a considerable portion of the fibre is recovered, but a portion passes through and remains in suspension. This strained fluid, especially if mixed with the waste from the paper machine containing size, etc., forms a turbid mixture which it is most difficult to treat. The solid particles settle very slowly, and rapidly choke up all kinds of filters. Where sewers are available, and provided the quantity is not too considerable, I see no objection to the strained solution being allowed to flow therein. As the washing processes are at present conducted an enormous amount of water is used, but it has been proved over and over again that if the fibre be more thoroughly washed by percolation before removal from the boilers the amount of water subsequently required for washing in the breaker engine is reduced very considerably. Such a change in the process of manufacture necessitates the use of a larger number of boilers in proportion to the paper made, and therefore the outlay of more capital, but on the other hand it is more economical because a much smaller amount of fibre is lost in the washing. Where no sewer is available or the amount of turbid fluid produced is considerable it may be passed through settling tanks and precipitation hastened by the addition of a little sulphate of alumina. The sludge would have to be drained and carted away, possibly it would be used as manure. In most cases the effluent would be sufficiently pure to pass into the stream. Where a still higher standard of purity is for any reason required, intermittent filtration through land as suggested by the Rivers Pollution Commissioners would have to be resorted to.

The waste bleach consists of a solution of calcium chloride with a little fibre in suspension. This might be mixed with the washings from the "breaker" engine and treated therewith, and the same may be said of the waste from the paper-making machine. Where the "boilings" are run into the river with the waste bleach it is said to cause a flocculent precipitate settling in the deep pools and quiet corners. I do not regard this objection as well founded, especially in works where esparto and straw are chiefly used, for I found on mixing fairly strong solutions the precipitate which formed settled very slowly and became again diffused by the slightest agitation, and it showed no signs of adhering to the sides of the containing vessel. Dilute solutions (1 in 200) produced only a turbidity, and after standing 12 hours there was no sediment deposited. These experiments were conducted to ascertain whether the mixed liquors, if allowed to flow into a sewer, would tend to form a deposit therein. The conclusion I arrived at was that the alkaline fluid had a cleansing rather than a fouling action.

We must now consider the "boilings" and "coolings," which constitute by far the most serious source of pollution, both as regards quality and quantity. The objectionable constituents are the free alkali, the soap formed by the action of the alkali on the resinous constituents of the fibre and the other organic matters also held in solution. In the first place the amount of these fluids should be reduced to a minimum by a more systematic and efficient method of removing the ley from the fibre. At the present time about ⅔rds of the polluting matter is removed at each drawing off, so that the boilings when withdrawn leave ⅓rd behind, the first coolings ⅑th and the third $\frac{1}{27}$th. By a little different manipulation ¾ths of the ley can be withdrawn each time, so that the "boilings" and "first coolings" together would contain $\frac{15}{16}$th, or nearly 94 per cent. of the polluting matter. The next cooling would contain 4 per cent., leaving only about 2 per cent. to be removed by further washing. The soda could then be recovered from the "boilings" and "first coolings," whilst the "second cooling" could be used for making fresh caustic ley. The further washings could be mingled with those from the breaker engine and treated therewith.

In a few mills the soda is recovered from the "boilings" only, the "coolings" passing into the river, and in a still smaller number of mills the "boilings" and first "coolings" are evaporated. The old method of soda recovery consists in evaporating the alkaline liquors in shallow open pans, to drive off the water, and partially burning the residue. The solid matter is then fired in caves, for it contains a considerable amount of combustible matter, whereby the mass smoulders, leaving behind an impure soda ash. This process gives rise to a serious nuisance from the disagreeable odour evolved, and a very large amount of soda is lost in the dense fumes given off. Less than 50 per cent. of soda is recovered by this primitive method.

The two more modern and most economical processes for soda recovery are the "Porion" and the "Yahyan." The "Porion" system is the invention of the late Emile Porion, a wealthy distiller of Wardrecques, Pas de Calais. In this apparatus behind the fireplaces in succession are the calcining hearths, the combustion chamber, the "Porion" chamber, and the chimney. Over the calcining hearth and combustion chamber are placed shallow pans for heating the alkaline liquid by the waste heat. When this liquid has reached the boiling point it is allowed to flow into the "Porion" chamber, where it is dashed into spray and evaporated by the passage through it of the intensely heated air from the furnace to a suitable strength for further treatment. It is then run into a tank placed over calciners to keep it hot and fluid. It flows from here to the calcining hearth, where by the action of the flame from the furnace, the organic matter is all consumed, and impure soda ash alone remains.

This process will recover 80 per cent. of the soda ash at a cost of about £1 8*s.* per ton (of 46 per cent. ash).

The "Yahyan" system of evaporation was worked out by the American engineer whose name it bears. Here the evaporation is quite distinct from the calcination, and is effected in a "multiple effect" vacuum apparatus. The liquid to be evaporated is passed through a series of tubes, each set of coils being enclosed in an iron cylinder containing superheated steam (25lb. pressure). By aid of a pumping engine and condensor, a high vacuum is maintained in the tubes in the last cylinder (four cylinders are employed in the most effective form of the apparatus). The fluid is passed continuously into the tube of the first cylinder, where it begins to boil vigorously, and is drawn rapidly forward, flowing out of the fourth cylinder in a condition suitable for introduction into any form of roaster or calciner. At the Esk Paper Mills, Messrs. Brown and Co. have adopted this process of evaporation, and calcine the residue in one of their patent duplex reversible roasters. They state the cost of recovering the soda ash does not exceed 15*s.* per ton.

In the United States, where more attention is paid to the utilization of bye-products, still better results have been obtained. The recovery of soda from weak waste liquor has been brought to such perfection that not more than 3 to 5 cwts. of coal are used per ton of 48 per cent. ash recovered, whilst the percentage of recovered ash compared with the total consumption is from 80 to 90 per cent. These results are obtained by using the "Warren Rotary Furnace" and Yahyan evaporator. The waste heat from the furnace is utilized for raising steam to work the vacuum pump, so that the only coal used for the recovery of ash is that burned in the fire box of the rotary furnace. A large plant of this kind is now being erected at an English paper mill.

It is unnecessary for us to discuss the relative advantages and disadvantages of the rival systems. It is enough that we are satisfied that by either the paper manufacturer can not only get rid of his alkaline liquors, but do so at an actual profit to himself. A knowledge of the fact that this can be done, that the prohibition of the pollution of rivers by the alkaline leys will not prejudice the industry, is one of great importance to county councils and all sanitary authorities having paper manufactories within their districts. There need be no anxiety about enforcing the law, and we may reasonably hope that before long some systematic attempt will be made in some county or district to compel all the paper makers to use the "best practicable and available means" of treating their waste products, instead of casting them all into the rivers and streams, as is almost the universal practice now.

In conclusion, I append a table of analyses of the

Source of Sample.	P.c. of sewage.	P. c. of mill discharge.	Appearance.	Reaction.	Total solids. Grs. p. gall.	Loss on ignition. Grs. p. gall.	Chlorides. Grs. p. gall.	Nitrites. Grs. p. gall.	Oxygen used. Pts. p. mill.	Free ammonia. Pts. p mill.	Organic ammonia. Pts. p. mill.
1. Water from stream above all the mills.	—	—	Brown, peaty, turbid.	Neutral.	7·	3·	·5	None.	1.8	·12	·50
2. Below two large paper mills.	·2	5·6	Brown with numerous floccula.	do.	13·	5·5	1·0	do.	5·2	·10	1·10
3. Below all (6) the paper mills.	·7	7·9	do.	Faintly alkaline.	15·	6·0	2·4	do.	7·6	·11	1·80
4. Still lower, beyond a sewer outfall.	1·2*	7·6	do.	do.	31·	14·5	2·0	Large trace.	9·5	·85	2·6

* Probably understated. Flow very variable.

water taken from various points along the course of a river receiving the discharges of a number of paper mills, and the sewage from villages, etc., on its banks. The calculated percentages of sewage and fluid mill discharges are also given. Considering the large proportion of mill discharge, it will be noticed that the impurity is not so large as would be expected, but it must be remembered that these waste products are not passed in uniformly and continuously, but only at intervals, often during the night. In some cases also the lime residues are stored until the river is in flood, when they are boldly flushed in and rapidly carried away.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Council of the above Association was held at the Mason College, Birmingham, on Monday afternoon, August 25, at 3.30, when the following officers were elected for the ensuing session:—President, A. C. Southall, F.C.S., Birmingham; Vice-Presidents, W. H. Pullin, Leamington; Charles Thompson, Birmingham; Council: Councillor T. Barclay, Birmingham; J. T. Barrett, Leamington; F. Barlow, Birmingham; T. W. Chapman, Birmingham; C. G. Crooke, Birmingham; S. Dewson, Birmingham; E. Ferriday, Birmingham; R. D. Gibbs, Wednesbury; F. J. Gibson, Wolverhampton; J. Hinds, Coventry; H. Hinds, Birmingham; H. Howes, Birmingham; M. Magor, Birmingham; J. O. Morris, Walsall; G. E. Perry, F.C.S., Birmingham; A. E. Robinson, F.C.S., Birmingham; W. H. Richardson, F.C.S., Dudley; W. R. Sellick, Stourbridge; G. Thonger, Harborne; S. Taylor, Birmingham; Hon. Treasurer, C. J. Arblaster; Hon. Librarian, George E. Perry; Auditors, F. H. Prosser and W. Jones; Hon. Secretary, F. H. Alcock, Broad Street Corner.

The inaugural meeting will be held in October.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

A meeting of the Council of the above Association was held in the Durham College of Science, on the 21st inst., when the reports of the lecturers in connection with the pharmaceutical classes were presented.

A letter was read from Mr. C. E. Stuart, B.Sc., resigning his position as lecturer in botany, which was accepted, and a hearty vote of thanks accorded to him for having given the lectures for the past five years.

On the motion of Mr. N. H. Martin, seconded by Mr. John Harrison, Mr. M. C. Potter, M.A., F.L.S., lecturer on botany and biology in the Durham College of Science, was appointed lecturer to the pharmaceutical classes.

A draft syllabus of the lectures on botany, chemistry, materia medica and pharmacy to be delivered next session was submitted and approved.

Delegates from the Association to the British Pharmaceutical Conference were appointed.

Proceedings of Societies in London.

ROYAL INSTITUTION.

FOAM.*

BY THE RIGHT HON. LORD RAYLEIGH, M.A., D.C.L.,

When I was turning over in my mind the subject for this evening, it occurred to me to take as the title of the lecture, "Froth." But I was told that a much more poetical title would be "Foam," as it would so easily lend itself to appropriate quotations. I am afraid, however, that I shall not be able to keep up the poetical aspect of the subject very long; for one of the things that I shall have most to insist upon is that foaming liquids are essentially impure, contaminated—in fact, dirty. Pure liquids will not foam. If I take a bottle of water and shake it up, I shall get no appreciable foam. If, again, I take pure alcohol, I get no foam. But if I take a mixture of water with 5 per cent. of alcohol there is a much greater tendency. Some of the liquids we are most familiar with as foaming, such as beer or ginger-beer, owe the conspicuousness of the property to the development of gas in the interior, enabling the foaming property to manifest itself; but of course the two things are quite distinct. Dr. Gladstone proved this many years ago by showing that beer from which all the carbonic acid had been extracted in vacuo still foamed on shaking up. I now take another not quite pure but strong liquid, acetic acid, and from it we shall get no more foam than we did from the alcohol or the water. The bubbles, as you see, break up simultaneously. But if I take a weaker acid, the ordinary acid of commerce, there is more, though still not much, tendency to foam. But with a liquid which for many purposes may be said to contain practically no acetic acid at all, seeing that it consists of water with but 1-1000th part of acid, the tendency is far stronger; and we get a very perceptible amount of foam. These tests with the alcohol and acetic acid are sufficient to illustrate the principle that the property of foaming depends on contamination. In pure ether we have a liquid from which the bubbles break even more quickly than from alcohol or water. They are gone in a moment. In some experiments I made at home I found that water containing a small proportion of ether foamed freely; but on attempting two or three days ago to repeat the experiment, I was surprised to find a result very different. I have here some water containing a very small fraction of ether, about 1-240th part. If I shake it up, it scarcely foams at all; but another mixture made in the same proportion from another sample shows more tendency to foam. This is rather curious, because both ethers were supposed to be of the same quality; but one had been in the laboratory longer than the other, and perhaps contained more greasy matter in solution.

Another liquid which foams freely is water impregnated with camphor. Camphor dissolves sparingly; but a minute quantity of it quite alters the characteristics of water in this respect. Another substance, very minute quantities of which communicate the foaming property to water, is glue or gelatine. This liquid contains only 3 parts in 100,000 of gelatine, but it gives a froth entirely different from that of pure water. Not only are there more bubbles, but the duration of the larger bubbles is quite out of proportion to that of water-bubbles. This sample contains 5 parts in 100,000, nearly double as much; but even with but 1 part in 100,000, the foaming property is so evident as to suggest that it might in certain cases prove valuable for indicating the presence of minute quantities of impurities. I have been speaking hitherto of those things which foam slightly. They are not to be compared with, say, a solution of soap in water, which, as is well known to everybody, froths very vigorously. Another thing comparable to soap, but not so well known, is saponin. It may be prepared from horse chestnuts by simply cutting them in small slices and making an infusion with water. A small quantity of this infusion added to water makes it foam strongly. The quantity required to do this is even less than in the case of soap; so the test is more delicate. It is well known that rivers often foam freely. That is no doubt due to the effect of saponin or some analogous substance. Sea-water foams, but not, I believe, on account of the saline matter it contains; for I have found that even a strong solution of pure salt does not foam much. I believe it has been shown that the foaming of sea-water, often so conspicuous, is due to something extracted from seaweeds during the concussion which takes place under the action of breakers.

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* Discourse delivered Friday evening, March 28.

Now let us consider for a moment what is the meaning of foaming. A liquid foams when its films have a certain durability. Even in the case of pure water, alcohol, and ether, these films exist. If a bubble rises, it is covered for a moment by a thin film of the liquid. This leads us to consider the properties of liquid films in general. One of their most important and striking properties is their tendency to contract. Such surfaces may be regarded as being in the condition of a stretched membrane, as of india-rubber, only with this difference, that the tendency to contract never ceases. We may show that by blowing a small soap bubble, and then removing the mouth. The air is forced back again by the pressure exerted on the bubble by the tension of the liquid. This ancient experiment suffices to prove conclusively that liquid films exercise tension.

A prettier form of the same experiment is due to Van der Mensbrugghe, who illustrated liquid tension by means of a film in which he allowed to float a loop of fine silk, tied in a knot. As long as the interior of the loop, as well as the exterior, is occupied by the liquid film, it shows no tendency to take any particular shape: but if, by insertion of, say, a bit of blotting paper, the film within the loop be ruptured, then the tension of the exterior film is free to act, and the thread flies instantaneously into the form of a circle, in consequence of the tendency of the exterior surface to become as small as possible. The exterior part is now occupied by the soap film, and the interior is empty. Many other illustrations of this property of liquids might be given, but time does not permit.

In the soap film, as in the films which constitute ordinary foam, each thin layer of liquid has two surfaces, each tends to contract; but in many cases we have only one such surface to consider, as when a drop of rain falls through the air. Again, suppose that we have three materials in contact with one another,—water, oil and air. There are three kinds of surfaces separating the three materials, one separating water and oil, another oil and air, and a third surface separating the water from the air. These three surfaces all exert a tension, and the shape of the mass of oil depends upon the relative magnitudes of the tensions. As I have drawn it here, it is implied that the tension of the water-air surface is less than the sum of the other two tensions—those of the water-oil surface and the air-oil surface; because the two latter acting obliquely balance the former. It is only under such conditions that the equilibrium of the three materials as there drawn in contact with one another is possible. If the tension of the surface separating water and air exceeded the sum of the other two, then the equilibrium as depicted would be impossible. The water air tension, being greater, would assert its superiority by drawing out the edge of the lens, and the oil would tend to spread itself more and more over the surface.

And that is what really happens. Accurate measurements made by Quincke and others, show that the surface tension separating water and air, is really greater than the sum of the two others. So oil does tend to spread upon a surface of water and air. That this is the fact we can prove by a simple experiment. At the feet of our chairman, our Honorary Secretary, is a large dish, containing water which at present is tolerably clean. In order to see what may happen to the surface of the water, it is dusted over with fine sulphur powder, and illuminated with the electric light. If I place on the surface a drop of water, no effect ensues; but if I take a little oil, or better still a drop of saponin or of soap water, and allow that to be deposited upon the middle of the surface, we shall see a great difference. The surface suddenly becomes dark, the whole of the dust being swept away to the boundary. That is the result of the spread of the film, due to the presence of the oil.

How then is it possible that we should get a lens-shaped mass of oil, as we often do, floating upon the surface of water? Seeing that the general tendency of oil is to spread over the surface of water, why does it not do so in this case? The answer is that it has already spread, and that this surface is not really a pure water surface at all, but one contaminated with oil. It is in fact only after such contamination that an equilibrium of this kind is possible. The volume of oil necessary to contaminate the surface of the water is very small, as we shall see presently; but I want to emphasize the point that, so far as we know, the equilibrium of the three surfaces in contact with one another is not possible under any other conditions. That is a fact not generally recognized. In many books you will find descriptions of three bodies in contact, and a statement of the law of the angles at which they meet; that the sides of a triangle, drawn parallel to the three intersecting surfaces must be in proportion to the three tensions. No such equilibrium, and no such triangle, is possible if the materials are pure; when it occurs, it can only be due to the contamination of one of the surfaces. These very thin films, which spread on water, and, with less freedom, on solids also, are of extreme tenuity; and their existence alongside of the lens, proves that the water prefers the thin film of oil to one of greater thickness. If the oil were spread out thickly, it would tend to gather itself back into drops, leaving over the surface of the water a film of less thickness than the molecular range.

One experiment by which we may illustrate some of these effects, I owe to my colleague, Professor Dewar. It shows the variation in the surface tension of water, due to the presence on it of small quantities of ether. I hold in my hand masses of charcoal, which can be impregnated with ether. The greater part of the surface of the charcoal is covered with paraffin wax, and, in consequence, the ether which has already penetrated the charcoal can only escape from it again on one side. The result is that the water in the rear of this boat of charcoal will be more impregnated with ether than the part in front, so the mass of charcoal will enter into motion, and the motion will extend over a considerable interval of time. As long as the ether remains in sufficient quantity to contaminate the water in the rear, so long is there a tendency to movement of the mass. The water covered with the film of ether has less tension than the pure water in front, and the balance of tension being upset, the mass is put in motion. If the nature of the case is such that the whole surface surrounding the solid body is contaminated, then there is no tendency to movement, the same balance in fact obtaining as if the water were pure.

Another body which we may use for this purpose is camphor. If we spread some camphor scrapings on the surface of pure water, they will, if the surface is quite clean, enter into vigorous movement, as you now see. This is because the dissolved camphor diminishes the surface tension of the water. But if I now contaminate the water with the least possible quantity of grease the movements of the camphor will be stopped. I merely put my finger in, and you observe the effect. There is not much poetry about that! A very slight film, perfectly invisible by ordinary means, is sufficient so to contaminate the water that the effect of the dissolved camphor is no longer visible.

I was very desirous to ascertain, if possible, the actual thickness of oil necessary to produce this effect, because all data relating to molecules are, in the present state of science, of great interest. From what I have already said, you may imagine that the quantity of oil required is very small, and its determination may be difficult. In my experiments,* I used the surface of water contained in a large sponge bath 3 feet in diameter. By this extension of the surface, I was able to bring the quantity of oil required within the range of a sensitive balance. In the table I have given a number of results obtained at various dates, showing the quantity of oil required to produce the effects recorded in the fourth column. Knowing the weight of the oil deposit, and the area of the water surface upon which it was uniformly spread, it was easy to calculate the thickness of the film. It is seen that a film of oil about 1½ millionth of a millimetre thick is able to produce this change. I know that large numbers are not readily appreciated, and I will therefore put the matter differently. The thickness of the oil film thus determined as sufficient to stop the motions of the camphor is one 400th of the wave length of yellow light. Another way of saying the same thing is that this thickness of oil bears to one inch the same ratio that one second of time bears to half a year.

Results obtained with a Sample of Oil somewhat Decolorized by Exposure.

Date.	Weight of oil.	Calculated thickness of film in micro-millimetres.	Effect upon camphor fragments.
Dec. 17. . .	0·40	0·81	No distinct effect.
Jan. 11. . .	0·52	1·06	Barely perceptible.
Jan. 14. . .	0·65	1·32	Not quite enough.
Dec. 20. . .	0·78	1·58	Nearly enough.
Jan. 11. . .	0·78	1·58	Just enough.
Dec. 17. . .	0·81	1·63	Just about enough.
Dec. 18. . .	0·83	1·68	Nearly enough.
Jan. 22. . .	0·84	1·70	About enough.
Dec. 18. . .	0·95	1·92	Just enough.
Dec. 17. . .	0·99	2·00	All movements very nearly stopped.
Dec. 20. . .	1·31	2·65	Fully enough.
A Fresh Sample.			
Jan. 28. . .	0·63	1·28	Barely perceptible.
Jan 28. . .	1·06	2·14	Just enough.

When the movement of the camphor has been stopped by the addition of a minute quantity of oil, it is possible, by extending the water surface enclosed within the boundary, without increasing the quantity of oil, to revive the movements of the camphor; or, again, by contraction, to stop them. I can do this with the aid of a flexible boundary of thin sheet brass, and you see that the camphor recovers its activity, though a moment ago it was quite dead. It would be an interesting subject for investigation to determine what is the actual tension of an oily surface contaminated to an extent just sufficient to stop the camphor movements; but it is not an easy problem. Usually we determine surface tensions by the height to which the liquids will rise in very fine tubes. Here, however, that method is not available, because if we introduce a tube into such a surface, there is no proof that the contamination of the inner surface in the tube is the same as that prevailing outside. Another method, however, may be employed which is less open to the above objection, and that is to substitute for the very fine or capillary tube, a combination of two parallel plates open at their edges. We have here two such plates of glass, kept from absolutely closing by four pieces of thin metal inserted at the corners, the plates being held close against these distance pieces by suitable clamps. If such a combination be inserted in water, the liquid will rise above the external level, and the amount of the rise is a measure of the surface tension of the water. You see now the image on the screen. A is the external water surface; B is the height of the liquid contained between the glass plates, so that the tension may be said to be measured by the distance AB. If a little oil be now deposited upon the surface, it will find its way between the plates. The fall which you now see shows that the surface tension has been diminished by the oil which has found its way in. A very minute quantity will give a great effect. When the height of the pure water was measured by 62, a small quantity of oil changed the 62 into 48, and subsequent large additions of oil could only lower it to 38. But after oil has done its worst, a further effect may be produced by the addition of soap. If Mr. Gordon now adds some soap, we shall find that there is a still further fall in the level, showing that the whole tension now in operation is not much more than one-third of what it was at first. This is an important point, because it is sometimes supposed that the effect of soap in diminishing the tension of water is due to merely the formation upon the surface of a layer of oil formed by decomposition of the soap. This experiment proves the contrary, because we find that soap can do so much more than oil. There is, indeed, something more or less corresponding to the decomposition of the soap and the formation of a superficial layer of oil. But the decomposition takes place in a very peculiar manner, and under such conditions that there is a gradual transition from the soapy liquid in the interior to the oily layer at the top, and not, as when we float a layer of oil on water, two sudden transitions, first from water to oil and secondly from oil to air. The difference is important, because, as I showed some years ago, capillary tension depends on the suddenness of change. If we suppose that the change from one liquid to another takes place by slow stages, though the final change may be as before, the capillary tension would absolutely disappear.

There is another very interesting class of phenomena due to oil films, which I hope to illustrate, though I am conscious of the difficulty of the task,—namely, the action of oil in preventing the formation of waves. From the earliest times we have records of the effect of oil in stilling waves, and all through the middle ages the effect was recognized, though connected with magic and fanciful explanations. Franklin, than whom, I suppose, no soberer inquirer ever existed, made the thing almost a hobby. His attention was called to it accidentally on board ship from noticing the effect on the waves caused by the greasy débris of a dinner. The captain assured him that it was due to the oil spread on the water, and for some time afterwards Franklin used to carry oil about with him, so as never to miss a chance of trying an experiment. A pond is necessary to illustrate the phenomena properly, but we shall get an idea of it by means of this trough six feet long, containing water.* Along the surface of the water we shall make an artificial wind by means of a fan, driven by an electro motor. In my first experiments I used wind from an organ bellows, which is not here available. Presently we shall get up a ripple, and then we will try the effect of a drop of oil put in to windward. I have now put on the drop and you see a smooth place advancing along. As soon as the waves come up again I will repeat the experiment. While the wind is driving the oil away, I may mention that this matter has been tested at Peterhead. Experiments were there made on a large scale to show the effect of oil in facilitating the entrance of ships into harbour in rough weather. Much advantage was gained. But here a distinction must be observed. It is not that the large swell of the ocean is damped down. That would be impossible. The action in the first instance is upon the comparatively small ripples. The large waves are not directly affected by the oil; but it seems as if the power of the wind to excite and maintain them is due to the small ripples which form on their backs, and give the wind, as it were, a better hold of them. It is only in that way that large waves can be affected. The immediate effect is on the small waves which conduce to that breaking of the large waves which from the sailor's point of view is the worst danger. It is the breaking waters which do the mischief, and these are quieted by the action of the oil.

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* 'Proc. Roy. Soc.,' March, 1890.

* The width is 8 inches, and the depth 4 inches. The sides are of glass; the bottom and ends of wood, painted white.

I want to show also, though it can only be seen by those near, the return of the oil when the wind is stopped. The oil is at present driven to one end of the trough;[*] when the wind stops it will come back, because the oil film tends to spread itself uniformly over the surface. As it comes back there will be an advancing wave of oil; and as we light the surface very obliquely by the electric lamp, there is visible on the bottom of the trough a white line, showing its progress.

Now, as to the explanation. The first attempt on the right lines was made by the Italian physicist, Marangoni. He drew attention to the importance of contamination upon the surface of the water, and to its tendency to spread itself uniformly, but for some reason which I cannot understand he applied the explanation wrongly. More recently Reynolds and Aitken have applied the same considerations with better success. The state of the case seems to be this:—Let us consider small waves as propagated over the surface of clean water; as the waves advance, the surface of the water has to submit to periodic extensions and contractions. At the crest of a wave the surface is compressed, while at the trough it is extended. As long as the water is pure there is no force to oppose that, and the wave can be propagated without difficulty; but if the surface be contaminated, the contamination strongly resists the alternate stretching and contraction. It tends always, on the contrary, to spread itself uniformly; and the result is that the water refuses to lend itself to the motion which is required of it. The film of oil may be compared to an inextensible membrane floating on the surface of the water, and hampering its motion; and under these conditions it is not possible for the waves to be generated, unless the forces are very much greater than usual. That is the explanation of the effect of oil in preventing the formation of waves.

The all-important fact is that the surface has its properties changed, so that it refuses to submit to the necessary extensions and contractions. We may illustrate this very simply by dusting the surface of water with sulphur powder, only instead of dispersing the sulphur, as before, by the addition of a drop of oil, we will operate upon it by a gentle stream of wind projected downwards on the surface, and of course spreading out radially from the point of impact. If Mr. Gordon will blow gently on the surface in the middle of the dusty region, a space is cleared;[†] if he stops blowing the dust comes back again. The first result is not surprising, but why does the dusty surface come back? Such return is opposed to what we should expect from any kind of viscosity, and proves that there must be some force directly tending to produce that particular motion. It is the superior tension of the clean surface. No oil has been added here, but then no water surface is ever wholly free from contamination; there may be differences of degree, but contamination is always present to some extent. I now make the surface more dirty and greasy by contact of the finger, and the experiment no longer succeeds, because the jet of wind is not powerful enough to cleanse the place on which it impinges; the dirty surface refuses to go away, or if it goes in one direction it comes back in another.

I want now to bring to your notice certain properties of soap solutions, which, however, are not quite so novel as I thought when I first came upon them in my own inquiries.[*] If we measure by statical or slow methods the surface tension of soapy water, we find that it is very much less than that of clean water. We can prove this in a very direct manner by means of capillary tubes. Here, shown upon the screen, are two tubes of the same diameter, in which, therefore, if the liquids were the same, there would be the same elevation; one tube dips into clean water, and the other into soapy water, and the clean water rises much (nearly three times) higher than the soapy water.

Although the tension of the soapy water is so much less than that of pure water when measured in this way, I had some reason to suspect that the case might be quite different if we measured the tensions immediately after the formation of the surfaces. I was led to think so by pondering on Marangoni's view that the behaviour of foaming liquids was due to the formation of a pellicle upon their surfaces; for if the change of property is due to the formation of a pellicle, it is reasonable to suppose that it will take time, so that if we can make an observation before the surface is more than say $\frac{1}{100}$ of a second old, we may expect to get a different result. That may seem an impossible feat, but there is really no difficulty about it; all that is necessary is to observe a jet of the substance in question issuing from a fine orifice. If such a jet issues from a circular orifice it will be cylindrical at first, and afterwards resolve itself into drops. If, however, the orifice is not circular, but elongated or elliptical, the jet undergoes a remarkable transformation before losing its integrity. As it issues from the elliptical orifice, it is in vibration, and trying to recover the circular form; it does so, but afterwards the inertia tends to carry it over to the other side of equilibrium. The section oscillates between the ellipse in one direction and the ellipse in the perpendicular direction. The jet thus acquires a sort of chain-like appearance, and the period of the movement represented by the distance between corresponding points is a measure of the capillary tension to which these vibrations of the elliptical section about the circular form are due. A measure, then, of the wave-length of the recurrent pattern formed by the liquid gives us information as to the tension immediately after escape; and if we wish to compare the tensions of various liquids, all we have to do is to fill a vessel alternately with one liquid and another, and compare the wave-lengths in the various cases. The jet issues from a flask, to which is attached below a tubular prolongation; the aperture is made small in order that we may be able to deal with small quantities of liquid. The jet issues from the orifice; it oscillates, and we can get a comparative measure of the tension by observing the distance between corresponding points.

If we were now to take out the water, and substitute for it a moderately strong solution of soap or saponine we should find but little difference, showing that in the first moments the tension of soapy water is not very different from that of pure water. It will be more interesting to exhibit a case in which a change occurs. I therefore introduce another liquid, water containing 10 per cent. of alcohol, and you see that the wave-length is different from before. So this method gives us a means of investigating the tensions of surfaces immediately after their formation. If we calculate by known methods how long the surface has been formed before it gets to the point B, at which the measurement is concluded, we shall find that it does not exceed $\frac{1}{100}$ of a second.

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[*] May, 1890. Any moderate quantity of oil may be driven off to leeward; but if oleate of soda be applied, the quieting effect is permanent.

[†] This experiment is due to Mr. Aitken.

[*] I here allude to the experiments of Dupré, and to the masterly theoretical discussion of liquid films by Professor Willard Gibbs.

Another important property of contaminated surfaces is what Plateau and others have described as superficial viscosity. There are cases in which the surfaces of liquids—of distilled water, for example—seem to exhibit a special viscosity, quite distinct from the ordinary interior viscosity, which is the predominant factor in determining the rate of flow through long narrow tubes. Plateau's experiment was to immerse a magnetized compass needle in water; the needle turns, as usual, upon a point, and the water is contained in a cylindrical vessel, not much larger than the free rotation of the needle requires. The observation relates to the time occupied by the needle in returning to its position of equilibrium in the meridian, after having been deflected into the east and west positions, and Plateau found that in the case of water more time was required when the needle was just afloat than when it was wholly immersed, whereas in the case of alcohol the time was greater in the interior. The longer time occupied when the needle is upon the surface of water is attributed by Plateau to an excessive superficial viscosity of that body.

Instead of a needle, I have here a ring of brass wire floating on the surface of the water. You see upon the screen the image of the ring, as well as the surface of the water, which has been made visible by sulphur. The ring is so hung from a silk fibre that it can turn upon itself, remaining all the while upon the surface of the water. Attached to it is a magnetic needle, for the purpose of giving it a definite set, and of rotating it as required by an external magnet. On this water, which is tolerably clean, when the ring is made to turn, it leaves the dust in the interior entirely behind. That shows that the water inside the ring offers no resistance to the shearing action brought into play. The part of the surface of water immediately in contact with the ring no doubt goes round; but the movement spreads to a very little distance. The same would be observed if we added soap. But if I add some saponin, we shall find a different result, and that the behaviour of the dust in the interior of the ring is materially altered. The saponin has stiffened the surface, so that the ring turns with more difficulty; and when it turns, it carries round the whole interior with it. The surface has now got a stiffness from which it was free before; but the point upon which I wish to fix your attention is that the surface of pure water does not behave in the same way. If, however, we substitute for the simple loop another provided with a material diameter lying also in the surface of the water, then we shall find, as was found by Plateau in his experiment, that the water is carried round. In this case, it is no longer possible for the surface to be left behind, as it was with the simple hoop, unless it is willing to undergo local expansions and contractions of area. The difference of behaviour proves that what a water surface resists is not shearing, but expansions and contractions; in fact, it behaves as a contaminated surface should do. On this supposition, it is easy to explain the effects observed by Plateau; but the question at once arises, can we believe that all water surfaces hitherto experimented upon are sensibly contaminated? and if yes, is there any means by which the contamination may be removed? I cannot in the time at my disposal discuss this question fully, but I may say that I have succeeded in purifying the surface of the water in Plateau's experiment, until it behaved like alcohol. It is therefore certain that Plateau's superficial viscosity is due to contamination, as was conjectured by Marangoni.

I must now return to the subject of foam, from which I may seem to have digressed, though I have not really done so. Why does surface contamination enable a film to exist with greater permanence than it otherwise could? Imagine a vertical soap film. Could the film continue to exist if the tension were equal at all its parts? It is evident that the film could not exist for more than a moment; for the interior part, like the others, is acted on by gravity, and, if no other forces are acting, it will fall 16 feet in a second. If the tension above be the same as below, nothing can prevent the fall. But observation proves that the central parts do not fall, and thus that the tension is not uniform, but greater in the upper parts than in the lower. A film composed of pure liquid can have but a very brief life. But if it is contaminated, there is then a possibility of a different tension at the top and at the bottom, because the tension depends on the degree of contamination. Supposing that at the first moment the film were uniformly contaminated, then the central parts would begin to drop. The first effect would be to concentrate the contamination on the parts underneath and diminish it above. The result of that would be an increase of tension on the upper parts. So the effect would be to call a force into play tending to check the motion, and it is only in virtue of such a force that a film can have durability. The main difference between a material that will foam and one that will not is in the liability of the surface to contamination from the interior.

Parliamentary and Law Proceedings.

Poisoning by a Narcotic Mixture.

At an inquest that has been held at Grantham, concerning the death of William Parker, aged 74, evidence was given showing that death had resulted from taking poison supplied by an unregistered person under cover of the medicine stamp. Thomas Wright, of Caythorpe, said he was a grocer and draper, and also sold patent medicines. The deceased came to his shop, and asked for a small bottle of laudanum, as he wanted to mix some oils. Witness told him that he had some "narcotic mixture," which would answer the same purpose. It was labelled poison. Deceased then purchased a bottle of the mixture, for which he paid 1*s.* 1½*d.* The bottle now produced was similar to the one witness sold to the deceased. Dr. George Barton deposed that he found the deceased apparently under the influence of a powerful narcotic poison. The son of deceased, when questioned, denied that he was aware that his father had taken any, but afterwards admitted that he had found in his father's pocket a bottle containing a dark liquid, which he had thrown away. When called in he noticed the breath of deceased had an odour of laudanum, and at the postmortem the stomach smelt faintly of laudanum. Witness was of opinion that death had resulted from an overdose of poison. Eventually the jury returned a verdict of *felo de se.*

Obituary.

THOMAS CARNELLY, D.SC.

On Wednesday, Dr. Thomas Carnelly died from an attack of influenza rather suddenly at Aberdeen, in the university of which city he had held the chair of Chemistry for the last two years. Dr. Carnelly, who was only 38 years of age, was educated at King's College, London, and afterwards at Owens College, Manchester. He then went for a time to Bonn, and upon his return was appointed demonstrator in the chemical laboratory of Owens College. In 1879 he was chosen as Professor of Chemistry in Firth College, Sheffield, but in 1882 accepted a similar post in University College, Dundee, from which he was called to Aberdeen two years since. Dr. Carnelly's investigations have chiefly had for their object to trace the connection that might exist between the chemical composition and the melting and boiling points of inorganic and organic compounds, and it was in connection with these researches that he compiled his standard work on the Physico-Chemical Constants.

Notice has also been received of the death of the following:—

On the 9th of April, Mr. William Bingham Henderson, Chemist and Druggist, Hornsea, Yorkshire. Aged 69 years.

On the 23rd of August, Mr. Alfred Chadwick, Chemist and Druggist, Morley, Yorkshire. Aged 52 years.

Correspondence.

PHARMACY ACT (IRELAND) AMENDMENT ACT.

Sir,—I wish to dispel at once the doubt which your observations would appear to cast upon the position of pharmaceutical chemists, in reference to the sale of poisons, as deduced from the wording of section 15 of the Amendment Bill.

Please note that section 23 provides that the principal Act and amending Act are to be read together as one Act. Clause 30 of the principal Act, which confers on pharmaceutical chemists the right to sell poisons, *has not been repealed*; so there is really no weight to be attached to the suggested difficulty. J. E. BRUNKER.

THE BENEVOLENT FUND.

Sir,—We are once again reminded by the words of our esteemed President at the last meeting of the Council, when speaking upon the report of the Benevolent Fund Committee, of the extreme uncertainty which surrounds us in the race of life. He spoke of a case which had come before the Committee the previous day of no ordinary interest to us all—"of one who had been in extremely good circumstances and was known to many members," but is to-day standing with "want staring him in the face at no distant period." Many of us well remember a similar case of one who had sat in the Presidential chair for some years, but through circumstances over which he had no control, was brought to abject poverty and with sickness upon him was unable to work, and to beg was ashamed. Doubtless many others are frequently occurring and well known to the Council.

My object in calling attention to these cases is to make a practical suggestion. We shall next year, I believe, be commemorating the jubilee of the Pharmaceutical Society. What better means of commemorating that event could be found than to make it the occasion of a special effort so to increase the capital of the Benevolent Fund that the present lamentably small annuity of £35 paid to pensioners over 65 should be increased to £50 to those who have themselves in more favourable days been subscribers to the Fund.

It may be said that the pharmaceutical jubilee can have interest only with members of the Society, and hence that they alone would be inclined to contribute (would that all chemists were members), but when we remember that the Benevolent Fund knows no distinction between members and non-members, but that the one claim upon that Fund is the existence of poverty and need, regardless altogether of membership, surely the sympathy of all should be drawn out, not in the light of subscribing to a benefit club, but with the desire of helping those who when in better circumstances did not withhold their sympathy from their poorer brethren.

I wish to commend this thought to the consideration of our friends and the Council. EDWIN B. VIZER.

THE SCHEDULE OF SUBJECTS FOR EXAMINATION.

Sir,—I was heartily glad to see in the issue of the Journal published on August 9, that the Council of the Pharmaceutical Society had adopted the schedule of subjects of examination recommended by the Boards of Examiners. In my opinion this is a much needed and long-delayed step in the right direction. As a former pharmaceutical teacher I can well remember how frequently I had occasion to deplore the absence of such a necessary guide to both the teacher and the student, and I can also remember how I took every available opportunity of urging the advisability of adopting such a schedule. In view of the recent decision of the Council it may not be uninteresting to your readers if I quote two passages from a letter of mine published in the *Pharmaceutical Journal* of December 2, 1882, a letter written *à propos* of the proposed pharmacy curriculum that was then undergoing discussion.

"Moreover special preparation for examination by tutors who to some extent know from experience the areas to be covered in connection with the different subjects is the necessary outcome of the want of a comprehensive syllabus defining the range of the examinations. Deploring, as I do, the absence of such a guide both to the teacher and the student, for the syllabus at present issued in connection with the Major and Minor examinations is all but useless, I should welcome some such a syllabus as that detailed in the report of the Special Committee appointed to consider the inter-relation of pharmaceutical education and examination, allied with, if necessary, a compulsory attendance at lectures and laboratory work, since it would greatly lighten the burden of the teacher, rendering his work much more satisfactory both to himself and to his pupils. . . . In my opinion nothing has contributed more to the fostering and development of preparation, and also of cramming in connection with the pharmaceutical examinations, than the absence of a comprehensive syllabus, indicating the range and limits of the various subjects. In the absence of such a guide a teacher is compelled, even against his inclination, to watch the examinations in order to gain an idea of the areas covered by the different subjects, the boundaries to which are to a great extent left to the will and fancy of the examiners. In making this statement—that the examiners possess the power of fixing or extending at their will the limits of the various subjects—a statement which I believe no one who gives serious thought to the matter will contravene, I wish to record that no disrespect nor impliance of want of faith is intended either towards the examiners as a body or to any of them personally; that they endeavour to perform their duties conscientiously I am confident, my feeling is only that of commiseration for them that their duties are rendered so onerous, so tormenting and so perplexing by the absence of a sufficiently comprehensive syllabus indicating the range of the different subjects in which they examine. The absence of such a syllabus not only puzzles the teacher as to the exact nature and area of the ground over which his teaching must be spread, but is the cause of the frequent cavilling heard amongst candidates as to the right of such and such a question being asked, remarks equally unpleasant for both examiners and teachers to hear. Why have the pharmaceutical examinations been rendered conspicuous by the absence of a syllabus fitted to guide examiners, teachers and students? In connection with other examinations to which no compulsory system of education is attached, a comprehensive syllabus is issued definitely indicating the range and limits of the subjects of the examination."

It is now eight years ago since I penned these extracts, and with the feeling of gladness with which I read of the adoption of the schedule by the Council at its last meeting, there arose in my mind the remembrance of these lines:

"Time means amelioration, tardily enough displayed.
Yet as mainly onward moving, never wholly retrograde."

Now that this much needed reform has been introduced, I trust that it will shortly be followed by another necessary reform in the conduction of the examinations, viz., a combination of a written examination with the present *vivâ voce* one. A. P. LUFF, M.D.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Vizer, Troke, Smith, Rainey, Investigator, Apprentice.

The Pharmaceutical Journal,

SATURDAY, SEPTEMBER 6, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

BRITISH PHARMACEUTICAL CONFERENCE.

Reception and Conversazione.

ON Monday evening last the proceedings of the British Pharmaceutical Conference at Leeds commenced with a very numerously attended reception, held by the President, supported by other officers of the Conference in the Philosophical Hall, Park Row. After a short interval, during which the greetings of friends and new introductions were interspersed by inspections of the many interesting objects in the Museum of the Institute, supplemented by special exhibits of microscopes and electric apparatus, most of the company adjourned to the Lecture Theatre. There an entertainment consisting of some capitally executed songs and recitations had been provided, and this was followed by a lantern display of some very artistic views of the Wharfedale and other districts. The gathering was a most successful one, and the arrangements made were fully appreciated by the company.

The next morning, a few minutes after ten, the chair was taken in the theatre of the Philosophical Hall by the President, Mr. CHARLES UMNEY, and Mr. RICHARD REYNOLDS, in a few well-chosen words, reported on another page, tendered the Conference a hearty Yorkshire welcome to Leeds. A list of the delegates deputed by various associations to represent them at the sittings of the Conference was read, and after reference had been made to letters of apology that had been received from Professor BENTLEY, Professor ATTFIELD and others, the ground was left clear for the regular business.

Annual Report.

The President then called upon the senior Honorary Secretary, Mr. W. A. H. NAYLOR, to read the report of the Executive Committee. This document commenced with an expression of satisfaction at the maintenance of the prestige of the Conference and its continued prosperity. It may be remarked, however, that neither on this occasion, nor on several previous ones, has the Committee presented any statistics to show the numerical relations of the membership to this prosperity, and these are hardly revealed by an examination of the Financial Statement. The first event referred to in the report was the resignation by Dr. J. C. THRESH, in November last, of the office of Honorary General Secretary, the Committee recording its sense of the valuable services rendered by him during the five years he had held the office. This was followed by the statement that Mr. F. RANSOM, F.C.S., had been selected to fill the vacancy. Allusion was also made to the death of Mr. SMEETON, a Vice-President, and the consequent changes. Another subject was the publication of an Addendum to the Unofficial Formulary in January, and the report also contained some words of congratulation upon the recent appointment of a committee of pharmacists to assist the Pharmacopœia Committee in preparing an addendum to the British Pharmacopœia. As this Committee has been appointed by the Council of the Pharmaceutical Society at the instance of the Medical Council, it is regarded as a distinct advance towards a recognition of the claims of pharmacy to be represented in the settlement of questions relating to the Pharmacopœia Among other items mentioned were the efforts that have been made to increase the membership and the grant of money in connection with research.

Financial Statement.

The Honorary Treasurer, Mr. W. MARTINDALE, then read the Financial Statement for the year ending 30th June. From this it appeared that the money received during the year had amounted to £672 3*s*. 9*d*., the principal items being £527 1*s*. 1*d*, on account of members' subscriptions, and £135 on account of the Year-Book. The income from subscriptions therefore shows a slight decrease as compared with the previous year. As, however, the expenditure has also been somewhat less, the net result this year is a slightly increased balance in favour of the Association.

President's Address.

Without asking the meeting to adopt the Report or Financial Statement, which was done on the following morning, the President then proceeded to deliver his address, choosing for a subject fashion in medicine. In a few words of preliminary justification he said it could not be contended that medicine, striving year by year to become a less inexact science, knows no fashion, though it might be urged that it possessed a licence for adopting fashions without parallel in any other profession, due to the rapid strides of science. The first fashion referred to was the modern disposition to replace in prescribing the remedies familiar to a former generation by new medicaments. A legion of new crystalline and resinoid principles have been adopted to the almost entire exclusion of the crude substances from which they are prepared, whilst even alkaloids have in many instances given place to synthetically prepared compounds. Certain drugs, as, for instance, opium and cinchona, are as much relied on as they were half a century ago, but they are standardized now to contain a definite amount of chemical constituent, so that the physician is enabled to use them with precision. On the other hand, some drugs, such as jalap, scammony, aloes and gamboge, are not prescribed so frequently as formerly, and this, to some extent, has been consequent upon a want of uniformity in their quality. Another change of fashion has been in the medicaments used as external applications. Lard as a basis for ointments has been displaced by hydrocarbons or the more easily absorbed wool fat, whilst plasters are now relatively seldom ordered and the oleates of zinc, mercury and bismuth have become familiar. Concentrated percolates of the more potent drugs are also now used for external application, elegant examples of which are seen in the official liniments of aconite and belladonna and the chloroformum belladonnæ of the Unofficial Formulary. Other preparations, such as grey powder, antimonial powder, and green iodide of mercury are in less esteem than formerly, because of their want of uniformity. But although the legitimacy of most of the changes was acknowledged the speaker could not overlook the prevailing fashion of discarding antiquated, though well-tried remedies, in favour of newly-introduced drugs, and mentioned that at the recent meeting of the British Medical Association an eminent therapeutist had denounced this rage as fatal to accuracy of observation and precision of treatment. The next fashion referred to was that of prescribing medicine in the most concentrated form, regardless of potency, and it was described as a practice not without danger to the public. But it was suggested that this has been largely brought about by the pharmacist, and it was pointed out how, ignoring the official standards which embody the best skill and knowledge in dealing with drugs and menstrua, concentrations two or three times over and above those that can with safety be practised are now an everyday requirement. Then came the fashion of prescribing ready-made physic, which was said to be increasing to such an extent as to be positively alarming and was denounced as a delusion and a snare to those who desire to retain the art of orthodox prescribing. The last fashion in medicine particularized, was the injudicious selection by the public of medicine to be used as household remedies and the preference displayed for those covered by a medicine stamp. By this practice, the speaker said, the medical art is deprived of much opportunity, pharmacy undermined, and the public not benefited, but on the contrary greatly damaged. Some of these preparations, it was admitted, are simple in their nature, safe in the hands of the public, and not inappropriate as household remedies; but others, it was contended, are unsuited as remedies except in the hands of a medical practitioner, while many of them are of such composition that they should not be sold except under the restrictions that accompany the sale of substances included in the poisons schedule and the Pharmacy Act. In 1860 the revenue from medicine stamp duty was £43,000, whilst for the present year it has been computed at £220,000; in the same time, however, the vendors have only increased from 10,000 to 23,000, indicating that the average sales by each vendor have practically doubled. The amount paid by the public annually for stamped medicines was estimated at not far short of £1,500,000, only a portion of which, if diverted into the channels of legitimate medicine would involve great advantages to the medical profession and pharmacy. After referring to the demoralizing effect of the medicine stamp law through the facilities it affords for obtaining from a grocer or stationer supplies of opiates that would be refused by the pharmacist, the President expressed the opinion that the time has come when the medicine stamp should be abolished and when the question might be raised whether, in the interest of the public, the compounding of proprietary medicines might not be placed under restrictions similar to those which obtain on the continent. A congratulatory reference was then made to the recent appointment of a committee of pharmacists to advise the Pharmacopœia Committee of the Medical Council, and the address concluded by an appeal to pharmacists to assist in counteracting the depressing influence of the cloud that hangs over pharmacy by individually and collectively seeking to maintain and advance all matters having a scientific bearing upon this art.

At the conclusion of the address, which was listened to with close attention, and evoked repeated demonstrations of approval, Dr. Thresh proposed a vote of thanks to the President, which was seconded by Mr. Branson, and having been put to the meeting by Mr. Schacht, as Senior Vice-President, was carried by acclamation.

Report of Formulary Committee.

The reading of papers was then commenced with the report of the Unofficial Formulary Committee, presented by Mr. W. Martindale as its Chairman. The report simply recorded the publication at the end of last year of an Addendum to the Unofficial Formulary, and stated that the work of the Committee was at present in abeyance, pending the issue of the expected Addendum to the British Pharmacopœia.

Gerrard on Henbanes.

In a very interesting paper Mr. Gerrard then gave the results of a number of experiments extending over a period of four years and having for their object to determine the grounds, if any, for the prevalent belief in the superiority of biennial henbane over annual. The investigation was made with specimens of both kinds of henbane grown in Middlesex, Sussex, and Lincolnshire, and the parts of the plants used were the leaves and tops of the annual variety, and the first year's leaves and roots and the second year's tops of the biennial kind. From a table showing the yield of alkaloids from 1000 parts it appeared (1) that annual henbane leaf, biennial henbane first year's leaf, and biennial second year's tops have practically the same alkaloidal value; (2) that biennial henbane first year's root contains two and a half times as much alkaloid as the leaves or tops of either variety; and (3) that the locality of growth does not influence the amount of alkaloid formed. It would seem, therefore, that the preference shown for biennial over annual henbane leaves is not well founded. Mr. Gerrard added that the biennial root yields with rectified spirit an excellent extract, comparatively free from objectionable taste and odour, which could be standardized with ease of a strength that the dose would be one-third of that of the present official extract.

Bothamley on Commercial Alkaline Sulphites.

The third paper recorded the results obtained by Mr. C. H. Bothamley in the examination of a number of samples of commercial alkaline sulphites. The author commenced by pointing out that besides the normal sulphite, represented by the normal formula M_2SO_3, and the hydrogen sulphites or bisulphites represented by the formula $MHSO_3$, a third class has recently been brought prominently forward under the name "meta-sulphites" and "meta-bisulphites." These are not, however, new products, as erroneously supposed, but were described many years ago by Muspratt, who termed them properly "anhydro-sulphites." They have the general formula $M_2S_2O_5$, and may be regarded as derived from two molecules of hydrogen sulphite with elimination of a molecule of water. Potassium bisulphite does not appear to be an article of commerce, whilst four samples supplied as sodium bisulphite contained respectively only 8·1, 34·14, 22·3, and 39 per cent. of sulphurous anhydride, the theoretical quantity in the anhydrous salt being 61·54 per cent. The difficulty in preparing these salts arises from the fact that even in solution the bisulphites pass quickly into the anhydrosulphites. The anhydrosulphites are met with in commerce in large, well-formed crystals, which at first are transparent, but soon lose some sulphurous anhydride and become coated with a white film, after which the salt undergoes little alteration. Three samples examined gave 52·54, 56·02 and 57·42 per cent. of sulphurous anhydride, the theoretical quantity being 57·63 per cent.

Holmes on Strophanthus hispidus.

The next paper, by Mr. E. M. Holmes, on *Strophanthus hispidus*, had for its special object to emphasize the fact that the variety of strophanthus seeds originally used by Professor Frazer, and therefore the kind from which the medicinal action described by him might be expected, came from East Africa, and differs from that yielded by the typical *S. hispidus* of West Africa. He thinks, therefore, that the commercial seeds imported from West Africa should not be employed pharmaceutically until it has been ascertained that they possess the same physiological properties as those upon which the reputation of the drug was founded. The seeds corresponding to those used by Professor Fraser were described as having a hairy surface, with the hairs pointing in one direction and appearing fawn-coloured or greenish as the apex or the base of the seed is presented to the light. Mr. Holmes further mentioned that ouabain, which is said to differ only slightly in chemical composition and therapeutic action from strophanthin is now manufactured from a smooth variety of strophanthus seeds, instead of the wood from which it was first prepared. At the conclusion of the reading of this paper a short note by Mr. T. Christy was read, accompanying two leaves of a plant grown at Sydenham from seed similar to that from which M. Arnaud has separated ouabain. In the discussion that followed Mr. Martin bore testimony that the results upon which the reputation of the drug was founded were obtained with preparations of greenish-fawn seeds and that other kinds have not produced such satisfactory effects.

Thresh on Estimation of Nitrites in Water.

The subject of the estimation of nitrites in potable waters was then introduced by Dr. J. C. Thresh, who remarked that although a quantitative estimation of the nitrites did not seem to be of much assistance in determining the quality of a water in the present state of knowledge, probably no analyst felt he had made a complete examination of a water unless he had made at least a qualitative test for them, and if he found indications of them he justly regarded the water with suspicion. But a series of experiments Dr. Thresh has been making on the changes in composition of certain waters kept under varied conditions have led him to believe that before long the study of these changes would be of great aid in forming a judgment of the quality of a water, and especially of such as the analyst now only reports to be suspicious. One of these changes is the variation in the amount of nitrous nitrogen. In working out the subject the want of a simple and reliable quantitative test for nitrites has been much felt and eventually Dr. Thresh succeeded in making the old potassium iodide and starch test for nitrites a reliable colorimetric quantitative one for water analysis. The preparation of the reagents and the method of working were then described and Dr. Thresh concluded by giving a practical demonstration of the great delicacy of the test. In reference to Dr. Thresh's remark as to the changes that take place sometimes in a water, Mr. F. M. Rimmington said that the character of the Bradford water had undergone a great change since the last dry summer. Mr. Siebold also thought the time would come when it would be the practice to watch a water for some time before pronouncing upon its quality, and stated that on one occasion he obtained indications of the probable presence of a ptomaine in a water.

The Conference then adjourned for luncheon. Upon resuming, Mr. Naylor, in the absence of the authors, gave a *résumé* of the next two papers.

Burnett and Wyatt on Chloroform as a Preservative.

In these two papers Mr. J. F. Burnett and Mr. H. Wyatt confirmed previous observations as to the value of chloroform as a preservative. Mr. Burnett gave a list of solutions made with chloroform water which he keeps for dispensing purposes, and testified to the value of chloroform in preserving infusions. Two other instances mentioned were mixtures of powdered rhubarb and aromatic powder of chalk, which he keeps rubbed down with chloroform water (1 in 8). Mr. Wyatt, among other instances, recorded the preservative action of chloroform when added to an extract of ergot mixture containing strychnine, as well as to essence of rennet and cucumber juice. The discussion that followed the reading of the papers showed a general consensus of opinion among those present as to the value of chloroform as a preservative agent, and the opinion was expressed that under medical authority it might often be advantageously used and sometimes take the place of alcohol.

Siebold and Lewkowitsch on Glycerine.

In a short note Mr. Siebold then referred to the opinion expressed at the last meeting of the Conference that glycerine might be freed from arsenical contamination by distillation, and stated that he had now found this not to be the case. But he had found that by treating glycerine, previously diluted, with recently precipitated ferric hydrate the arsenic can be completely removed, and at the same time the glycerine is freed from all sulphur compounds. The same object can be obtained by suitable treatment with potassium permanganate, but in that case redistillation of the glycerine is necessary. Mr. Lewkowitsch also referred to the same statement as to the removal of arsenic from glycerine by distillation and said it was impracticable, as the arsenious ether of glycerine is decomposed by heating to 250° C., arseniuretted hydrogen and other volatile arsenious compounds distilling over. So far as he is aware there is no process for completely freeing glycerine from arsenic on a practical scale after it has once been introduced by the use of arsenical materials in the manufacture. He pointed out that glycerine free from arsenic is obtained in those processes where the hydrolysis of fats is effected by means of water or by lime saponification, and also when sulphuric acid is used free from arsenic, as it may be prepared from the sulphur obtained by Chance's process. Out of ten samples of glycerine coming from as many different works examined for arsenic three would have had to be rejected, four contained small traces that might be disregarded, and only three were free. Concerning soap-ley glycerine a very unnecessary caution, Mr. Lewkowitsch said, had been given, because up to the present no chemically pure glycerine had been prepared from soap leys in consequence of the difficulties incident to the purification of it. But a sample specially prepared by himself from this material compared well with samples from other sources. In the discussion that followed the reading of the paper the question was raised as to the source of the minute quantities of iron that are sometimes observed in glycerine, and whether they might be due to a treatment like that suggested by Mr. Siebold.

Siebold on Antidotes to Strychnine.

Mr. Siebold next read a short note on some experiences in reference to strychnine antidotes. The conclusions arrived at were that tannic acid is without effect, that animal charcoal might be of some use if administered very soon after the ingestion of poison, but that physiological remedies are most likely to be of service.

Davies on Caffeine and Mercuric Chloride.

Mr. R. H. Davies then read a note on a compound of caffeine and mercuric chloride which is formed as a crystalline precipitate when a solution of corrosive sublimate is added to a solution of caffeine in water. The reaction is a very delicate one and the compound formed has a composition corresponding to that of a chloromercurate of caffeine.

Campbell and Stark on Tests for Methylated Spirit.

In the next paper Messrs. Campbell and Stark reported the results of a comparative examination of the tests for methylated spirit undertaken with a view to deciding their relative reliability and suitability for pharmaceutical testing. Emerson Reynolds's test, depending upon the presence of acetone and the formation with it of aceto-mercuric compounds, was found not to be effective when less than 2 per cent. of wood spirit was added to a distillate consisting of the first 50 c.c. passing over from 200 c.c. of spirit. With Cazeneuve's test, depending on the reducing action of acetone and other bodies on potassium permanganate, the limits of the test were reached with the presence of 0·5 per cent. of proof spirit. The test proposed by Riche and Bardet, depending upon the formation of methyl violet, gave results that were delicate and satisfying, the presence of 0·5 per cent. of wood spirit being satisfactorily proved, but the time and attention required are considered to render it far from being suited for the ordinary pharmacist. Miller's test, depending upon the oxidation of methyl alcohol to formic acid, was satisfactory only in mixtures containing not less than 2 per cent. of wood spirit. On the whole Cazeneuve's test was found to be the most delicate and convenient for the pharmacist, but not quite satisfactory.

This was the last paper read on Tuesday, and most of the members then made their way to the Yorkshire College, where they were received by Professor Bodington and other officials, who had made excellent arrangements to facilitate the inspection of the establishment.

Holmes, Naylor and Chaplin on Oroxylum Indicum.

On Wednesday morning the Conference re-assembled at ten o'clock. *Oroxylum Indicum* bark, which was the subject of the first two papers, is considered in India to be an astringent and tonic and to be useful in diarrhœa and dysentery. It has in addition been employed by Dr. Evers in cases of acute rheumatism, and is credited by him with being, when combined with opium, a much more powerful sudorific than compound powder of ipecacuanha. The plant from which the bark is derived belongs to the Bignoniaceæ, an order of which the chemical and physiological properties are little known. The drug had been received, with others that need investigation, from Dr. Dymock, of Bombay, and had been placed in the hands of Messrs. Naylor and Chaplin for chemical investigation by Mr. Holmes, who in the first of the two papers contributed a description and some particulars as to the history of the bark. From this bark Messrs. Naylor and Chaplin reported that they have separated what appears to be a characteristic principle that they have named "oroxylin." It forms lemon-yellow crystals, melting at 228·5°-229° C., readily soluble in alcohol, ether, glacial acetic acid and hot benzol, but practially insoluble in either hot or cold water. A minute quantity brought into contact with a drop of weak solution of sodium, potassium or ammonium hydrate gives immediately a cherry-red colour, that passes quickly into brick-red and olive green. In alcoholic solution it reduces silver nitrate immediately, does not reduce Fehling's solution, and gives a white precipitate with mercuric chloride and a golden-yellow one with subacetate of lead. In addition, there have been separated an acrid principle, an astringent substance not precipitable by solution of gelatin, a compound reducing Fehling's solution, fat, wax, pectin and chlorophyll.

Martindale and Salter on Hydrargyri Iodidum Viride.

Green iodide of mercury was one of the substances omitted from the last edition of the British Pharmacopœia, presumably on account of its instability. As there is still a considerable demand for such a compound for medicinal use Messrs. Martindale and Salter have applied themselves to remedying, as far as possible, the defects that led to its exclusion from the official work. This they propose to do by using in its preparation one-fourth more of mercury than the quantity required theoretically, and modifying the directions of the B.P., 1867. A drachm of rectified spirit is poured upon an ounce and a quarter of mercury in a porcelain mortar, and iodine is added gradually up to 278 grains, triturating constantly and adding more spirit occasionally to prevent over-heating and formation of red iodide. The trituration should be continued until all metallic globules have disappeared and the mass assumes a uniform green colour, when it should be dried by exposure to the air on filter paper in a dark room and preserved in an opaque bottle. The product will contain about 12·6 per cent. of free mercury, a quantity that has been found by a specialist to be no detriment and which was exceeded in a commercial sample examined. The authors state that pills of green iodide of mercury are best massed with sugar of milk, syrup and gum and their sap-green colour may be taken as evidence of quality. The pills may be coated with sandarach solution and should be sent out in amber coloured bottles. The paper evoked considerable discussion, and there was a decided divergence of opinion as to whether the instability of a preparation justified its exclusion from the Pharmacopœia or really made it more desirable that there should be an official standard and an authorized method of preparation.

Broadbent on Cream of Tartar.

In the next paper Mr. H. Broadbent gave the average results of the examination of a large number of samples of cream of tartar, of French, Italian, Spanish and German origin, from which it appeared that the article comes into this country from all these sources of tolerably uniform quality, answering fairly well to the requirements of the British Pharmacopœia.

At this moment Sir Frederick Abel, the President of the British Association, entered the theatre, together with Professor Thorpe.

Hodgkin on Synthetic Remedies.

The next communication partook of the nature of a blackboard demonstration by Mr. John Hodgkin, having for its object to explain from a chemical point of view the constitution of the principal new synthetic remedies and to show their relationship one to another. Commencing with the fatty group, the methane derivatives were first illustrated by graphic formulæ, including methyl chloride, methylene chloride, chloroform, methylal, amylene hydrate, sulphonal, trional and tetronal. Next came the compounds of the formic acid type, such as hypnone, urethane, paraldehyd, chloral, ural, somnal, chloralamide and butyl-chloral. The aromatic series of synthetic remedies was also for convenience divided into two groups, the benzene group, including the aniline, benzoic acid and phenol derivatives, and the naphthalene group, including the naphthylamine, naphthoic acid, naphthol and quinoline derivatives. Of the first group there were illustrated acetanilide, benzanilide, exalgine, pyrodin, antithermin, antipyrin, antisepsin, phenacetin, methacetin, methylphenacetin, benzoic acid, salicylic acid, salol, dithiosalicylic acid, phenol, trichlorphenol, aseptol, sozoiodol, cresalol, and aristol. The second group included thermine, α- and β-naphthol, betol, quinoline, kairolin, kairin, thallin, orexin, and iodol.

At the close of the paper Sir **Frederick Abel** expressed the pleasure it had given him to be able to visit the Conference during its sitting, and assured the members of his sympathy in their efforts to advance the chemical side of pharmacy.

Fairley and Burrell on Estimation of Mineral Oil.

It is frequently found that the "recovered oils" supplied for use in the woollen and leather industries contain large quantities of mineral oil or unsaponifiable or resinous matter, which is difficult to estimate. A method for effecting this was described by Messrs. **Fairley** and **Burrell** in the next communication.

Fairley and Cooke on Cotton Seed Oil in Lard.

In the next paper Messrs. **Fairley** and **Cooke** suggested a method for detecting the presence of cotton seed oil in lard based upon a slight difference in the specific gravity.

Mr. **Fairley** also read a note giving the results of an analysis of bile.

Kirkby on Adulterated Saffron.

Mr. **William Kirkby**, who has recently been appointed teacher of materia medica and pharmacy at Owen's College, brought under the notice of the Conference a sample of adulterated saffron. The sophistication consisted of fibres apparently derived from a species of sedge, which were present to the extent of 41 per cent. The paper was accompanied by drawings showing the figure of the fibre and its histological structure.

Wright on Menstrua for Tinctures.

In a paper, illustrated by several tables, Mr. R. **Wright** reported upon the solvent action of alcohol of different degrees of strength on some of the drugs used in making pharmacopœial tinctures. The menstrua experimented with in the case of the tinctures for which rectified spirit is officially ordered were of four degrees of strength, namely, rectified spirit, rectified spirit four volumes and water one volume, rectified spirit three volumes and water one, and proof spirit. For the proof spirit tinctures were used proof spirit, rectified spirit, rectified spirit three volumes and water one volume, and rectified spirit and water equal volumes. The process adopted was maceration of the powdered drug for ten days, at the end of which the clear liquor was poured off, the marc strained and pressed and the united liquors filtered. Altogether forty-eight of the official tinctures were made and the results were given in two tables, one showing the amount of extract yielded by a fluid ounce of the tincture, and the other showing the amount of alkaloid yielded by a fluid ounce of the alkaloidal tincture. It is considered that the general results show that some at least of the menstrua for the official tinctures might be modified with advantage and that several of them might be made with menstrua of slightly less alcoholic strength.

Farr on Alkaloidal Tinctures.

Mr. E. H. **Farr**, also, in some practical notes on certain alkaloidal tinctures described some experiments undertaken with a view to discover whether the official alcoholic menstrua, or some others, are those best suited to extract the medicinal properties from the drugs operated upon. In making the tinctures menstrua containing a known number of volumes of absolute alcohol in ten volumes of the liquid were employed, and the drugs in powder were macerated and percolated, the last portions being displaced by more menstruum until the desired volume was obtained. The tinctures were examined as to their contents in alkaloid and in extractive, their miscibility with water and with alcohol, and their appearance after having been kept a few months. The best results were obtained by using for each of the following tinctures a menstruum containing the specified number of volumes of absolute alcohol in ten volumes: aconite, 7; belladonna, 9; henbane, 7; stramonium, 7; colchicum, 5; gelsemium, 7 and 9 equal; jaborandi, 3; veratrum, 5; cinchona, 7; conium, probably 5; and digitalis, 7. For opium, proof spirit and menstrua containing 4, 3 and 2 volumes of absolute alcohol in 10 were used, but in no case was the opium thoroughly exhausted, but the tinctures made with the lower strength menstrua were on the whole richer in morphine.

Umney and Dott on Extract of Malt.

Extract of malt was the subject of the next two papers. In the first, Mr. J. C. **Umney** commenced by commenting upon the want of uniformity in malt extracts, especially in respect to consistence and diastasic power. The latter point was shown by the fact that the time taken by ten grams each of six samples of English make and two of German to convert an equal weight of starch at a temperature of 100° F. ranged from four minutes to upwards of two hours. Mr. **Umney** then described a process for liquid extract of malt yielding a product said to give an average indication of diastasic strength equal to a semi-solid extract, being capable of converting its own weight of starch in six minutes. This liquid extract was further affirmed to be elegant in appearance, exceedingly palatable, and not prone to fermentation, solidification or any of the changes to which the semi-solid extract is liable. In the second paper, Mr. D. B. **Dott** discussed the merits of methods followed in the estimation of the diastasic value of malt extract, and expressed preference for a modification of that suggested by **Duggan**. This consists in digesting 5 c.c. of a 5 per cent. solution of the extract for half an hour with 400 c.c. of a liquid containing 2 per cent. of arrowroot at a temperature of 55° C., adding 10 c.c. of a 10 per cent. solution of soda to stop the action, and diluting the mixture to measure 500 c.c. This is then tested as to its reducing power on Fehling's solution and the result corrected by deducting the equivalent of the malt extract itself. Mr. Dott considers that under these conditions a good extract of malt may be expected to produce from starch not less than three times its weight of sugar, calculated on the basis that each 10 c.c. of Fehling's solution is equal to 0·0807 gram of maltose.

Thompson on Official Buchus.

The next paper, by Mr. C. J. S. Thompson, dealt with the comparative medicinal values of the three kinds of buchu leaves that are official in the British Pharmacopœia. The investigation was undertaken in consequence of an observation that an infusion prepared from leaves of *Barosma serratifolia* was not so active or effectual as others prepared from leaves of *B. betulina* and *B. crenulata*. This appears to have been confirmed by a comparative examination of leaves of the three species. The therapeutic properties of the leaves are said by Spica to reside in the volatile oil and a bitter resin. The microscope showed that the oil-cells in the underpart of the leaf were closer together and much larger in the *B. crenulata* and *B. betulina* leaves than in those from *B. serratifolia*. Upon distillation *B. betulina* leaves yielded an average of 1·45 per cent. of volatile oil, which developed after a time a strong peppermint odour; *B. crenulata* leaves also yielded 1·6 per cent. of the oil, while *B. serratifolia* leaves gave barely 1 per cent. As to the resin, upon being exhausted with ether, the *B. betulina* leaves gave up 4·25 of dark olive-green resinous matter, slightly soluble in water, more so in alcohol and freely in chloroform, aromatic, but bitter to the taste, and having the characteristic odour of buchu. *B. crenulata* leaves treated in a like manner gave 3·75 per cent. of resinous matter, similar in colour and taste. *B. serratifolia* leaves gave 3·45 per cent. of resin, but different from the other products in colour and taste. The mucilage precipitated from a fresh infusion of *B. serratifolia* leaves was also less in quantity than that from an infusion from either of the other species, and from the general inferiority of this kind, Mr. Thompson suggests that it should no longer be employed in making the officinal preparations.

Macintyre on Syrup of Hypophosphite of Iron.

The subject of the next paper, by Mr. John Macintyre, was the instability of syrup of hypophosphite of iron made according to the B.P.C. formulary, samples having been returned to the author with the complaint that they had become milky. Mr. Macintyre states that the difficulty may be overcome by the addition of citric acid in the proportion of one-quarter of a grain to one ounce of syrup.

Hooper on Mannas.

In the next paper, which was taken as read, Mr. D. Hooper has brought together some published information upon eastern mannas, which he has supplemented with other results obtained by himself. The solubility of the different mannas appears to vary greatly, ranging from one in one-half to one in twelve of water. All of them are said to contain a substance reducing Fehling's solution, and out of eleven compared in a table ten are represented as dextro-rotatory. Incidentally Mr. Hooper mentions a report that the manufacture of sugar from cotton-seed cake is about to be instituted, the product being alleged to be fifteen times sweeter than that from the sugar-cane and twenty times sweeter than sugar from the beet.

Mootooswamy on Curry Leaves.

The last paper, by Dr. Mootooswamy, which was also taken as read, had for its subject an Indian drug, consisting of the leaves of the "curry leaf tree" (*Murraya Kœnigii*, Spreng.). The tree, which belongs to the Rutaceæ, is well known in Southern India, and the highly fragrant leaves are used by the natives for seasoning curries. The leaves are also employed in native medicines, being credited with aromatic, stomachic, stimulant, astringent and tonic properties. Mr. Prebble has obtained from them a small quantity of essential oil resembling that yielded by the leaves of *Ægle Marmelos*, as well as two resins and a glucosidal bitter principle that he has named "kœnigin."

Presentation from Bell and Hills Fund.

Mr. Naylor then called attention to nine volumes lying on the table, which had been selected by the executive of the Leeds Chemists' Association, for purchase out of the annual grant made from the Bell and Hills Fund to the library of the local association in the town that the Conference happens to be visiting. In addition there was a copy of Flückiger and Hanbury's 'Pharmacographia,' and one of Hanbury's 'Science Papers,' presented by Mr. Thomas Hanbury. The President then made the formal presentation of the volumes, and the gift was acknowledged by Mr. Ward.

Formulary Committee.

The President now moved the reappointment of the Unofficial Formulary Committee for the ensuing year, the members being Messrs. Martindale, Naylor, Abraham, Greenish, Groves, Maben, Martin, Reynolds, Symes, Wright and Ransom. The motion was seconded by Mr. W. D. Savage, and carried unanimously.

Place of Meeting, 1891.

Mr. Alderman Yorath, speaking in the name of a deputation sent by the chemists and druggists of Cardiff and the surrounding district, then gave a cordial invitation to the Conference to meet next year in the metropolis of South Wales. Mr. Alfred Coleman, having briefly supported the invitation, upon the motion of Mr. S. Taylor, of Leeds, seconded by Mr. Riddle, of Hexham, it was unanimously accepted. Subsequently the President mentioned that a telegram had been received from Mr. W. Gilmour, inviting the Conference to meet in Edinburgh in 1892, and said that there was a feeling among some of the members that the time had arrived when it should be considered whether the Conference might not meet in a different town from that visited by the British Association.

Election of Officers.

Mr. Naylor then read the list of names of gentlemen proposed by the Executive Committee to hold office in the coming year, and no others being suggested the following were elected:—

President: Mr. William Martindale.

Vice-Presidents: Messrs. Carteighe, Kinninmont, Thresh and Munday.

Treasurer: Mr. R. H. Davies.

Hon. Gen. Secretaries: Messrs. Naylor and Ransom.

Other Members of Executive Committee: Professor Green, Messrs. Gerrard, Kirkby, Dott, Martin, Holmes, Branson, Ward, and Alderman Yorath.

Hon. Local Secretary: Mr. Alfred Coleman.

Auditors: Mr. David Anthony and Mr. Yewdall.

Votes of Thanks.

Mr. **Schacht**, in an appreciative speech now moved a vote of thanks to the Local Committee and especially to Messrs. **Branson**, **Ward**, S. **Taylor**, and **Bowman**, for the very successful manner in which the arrangements in connection with the reception of the Conference had been carried out. The motion was seconded by Mr. **Kinninmont** and having been adopted unanimously, was acknowledged by Mr. **Ward**, Mr. **Branson** and **Taylor**, whose reception upon rising must have convinced them that the vote was no empty compliment. Votes of thanks were also accorded to the authorities of the Yorkshire College, for the reception on Tuesday, and to the Leeds Literary and Philosophical Society and the Leeds Mechanics Institution Literary Society for the use of their halls, and acknowledged on behalf of the two former by Mr. **Richard Reynolds** and for the last-mentioned by Mr. **Yewdall**. A hearty vote of thanks to the President for his conduct in the chair brought this part of the proceedings to a close. Most of the members then went for a carriage-drive to Roundhay Park, where tea was provided.

Excursion.

Thursday morning opened very drearily with a heavy fall of rain, but although this had hardly ceased at half-past nine, some hundred and twenty ladies and gentlemen met at the station at the appointed time. A quick and pleasant run of thirty-five minutes brought the company to Embsay, where carriages were in waiting, and notwithstanding the start was made in an unpromising drizzle of rain, the ride across the moor afforded glimpses of beauties sufficient to enable even the unimaginative to realize that a bright sun would have revealed much more. Barden Tower having been reached and inspected, some of the company made their way to the bank of the Wharfe and followed its windings on foot whilst others rode, eventually reuniting at the Devonshire Arms, Bolton Abbey, where they sat down to an excellent luncheon. From thence, making their way to the Abbey, and gathering in the portion still used as a parish church, the company, after listening to an organ recital, were favoured by the Vicar, the Rev. A. P. **Howes**, with a very lucid and interesting historical account of the venerable structure, after which some strolled about the grounds, whilst others gathered for the inevitable photograph, which just escaped a shower. A short ride to the railway station, and in about twenty minutes Ilkley Wells was reached, where tea was served in the Winter Gardens of the Wells House Hydropathic Establishment. Upon re-assembling at the Ilkley Wells station it was rather amusing to learn upon the authority of a leading Leeds paper that the Conference had already returned in safety to that town, but this was only a little premature, and of the nature of a prophecy that was quickly fulfilled.

One word, in conclusion, requires to be said, congratulating Messrs. **Ward**, **Branson**, **Taylor**, **Stubbins** and their colleagues upon the success which followed all their arrangements. The number of those who attended, about one hundred and sixty, did not, perhaps, equal that which has been reached in some other large towns, and the weather was not very favourable, but the Conference at Leeds has been one of those meetings which testify to the business capabilities of their managers by the smooth and frictionless character of their course.

British Pharmaceutical Conference.

MEETING AT LEEDS.

The Conference assembled for its twenty-seventh annual meeting in the Lecture Theatre of the Philosophical Hall, Leeds, on Tuesday morning, September 2. Charles Umney, Esq., F.I.C., F.C.S., President, in the chair.

Mr. R. **Reynolds**, Leeds, opened the proceedings by offering, on behalf of the Local Committee, a hearty Yorkshire welcome to the Conference. He referred to his own connection with the Conference from its birth, if not before, but said he would refrain from indulging in the garrulous utterances for which nurses were celebrated, and would not therefore comment as he might on many incidents of the Society's childhood. He would only say that it had been planted on a solid foundation, and if they in the present could hand down to the future what they had received from the past they would be only fulfilling their duty. There was no doubt that the visits which had been paid to various parts of the country had assisted to broaden the minds of the members, and he hoped the same result would attend the present meeting.

Reception of Delegates.

Mr. F. **Ransom** (Sec.) then read the following list of delegates who had been appointed by different Societies to attend the Conference:—

Pharmaceutical Society of Great Britain.—The President, Vice-President, Treasurer, Messrs. Abraham, Allen, Atkins, Cross, Leigh, Martin, Martindale, Newsholme and Schacht.

Pharmaceutical Society of Great Britain (North British Branch).—Messrs. D. Frazer, A. Kinninmont, and J. Paterson.

Pharmaceutical Society of Ireland.—Messrs. G. D. Beggs and F. W. Wells, jun.

Aberdeen and North of Scotland Society of Chemists and Druggists.—Messrs. J. Johnson and J. S. Kay.

Brighton Association of Pharmacy.—Messrs. Marshall Leigh and W. D. Savage.

Dover Chemists' Association.—Messrs. Alex. Bottle and W. Wyles.

Hawick Pharmaceutical Association.—Mr. T. Maben.

Hull Chemists' Association.—Messrs. C. B. Bell, J. S. Linford and B. M. Stoakes.

Leeds Chemists' Association.—Messrs. F. W. Branson, J. Jefferson, R. Reynolds, S. Taylor, Geo. Ward and E. Yewdall.

Leicester and Leicestershire Chemists' Association.—Messrs. J. W. Clark and J. G. F. Richardson.

Liverpool Chemists' Association.—Messrs. John Bain, M. Conroy, R. Parkinson, C. Symes and W. Wellings.

London Chemists' Assistants' Association.—Messrs. T. A. Ellwood, C. W. Seccombe, A. C. Stark, C. J. Strother and W. Lloyd Williams.

Newcastle-on-Tyne North of England Pharmaceutical Association.—Messrs. T. Maltby Clague, P. Hall, J. Harrison, N. H. Martin and E. C. Stuart.

Sheffield Pharmaceutical and Chemical Society.—Messrs. J. H. Eardley, A. Russell Fox, C. O. Morrison, G. T. W. Newsholme, W. Ward and R. Watts.

Bristol Pharmaceutical Association.—Messrs. Schacht and Towerzey.

West London Chemical Association.—Messrs. Long and Matthews.

Manchester Pharmaceutical Association.—Messrs. Benger, Siebold and Kirkby.

Midland Counties Chemists' Association.—Messrs. J. Barclay and R. A. Cripps.

Letters of Apology.

The **President** said letters of apology for their absence had been received from Professor Bentley, Professor Attfield, Mr. Holmes, Mr. Wiley, Coventry, Mr. Brady, Newcastle, and Mr. Clayton, Birmingham.

REPORT OF THE EXECUTIVE COMMITTEE.

Mr. NAYLOR then read the following:—

Report of the Executive Committee.

Your Committee in presenting its annual report for the year is glad to be able to announce that the Conference maintains its prestige, and is in a satisfactory and prosperous condition.

At a meeting held in November last, your Committee received with deep regret the resignation by J. C. Thresh, M.B., D.Sc., of the office of Honorary General Secretary of the Conference, consequent upon his appointment as Medical Officer of Health for the Chelmsford and Maldon rural sanitary district. On behalf of the Conference your committee placed on record its sense of the efficient services rendered by Dr. Thresh during the five years that he held office. The assistance rendered by him not only in his official capacity, but as the author of a number of valuable papers which he has read at its meetings, has materially contributed to the success of past annual gatherings, and it is hoped that his professional duties will not prevent him from making communications in the future. At the following meeting Mr. F. Ransom, F.C.S., was appointed to fill the vacancy caused by the resignation of Dr. Thresh.

Early in the present year, on the recommendation of the Formulary Committee, sanctioned by the Executive of the Conference, an addendum to the 1888 Formulary was issued. This included preparations, the increasing demand for which appeared to justify the publication of directions for their manufacture, so as to secure efficient and uniform products.

At a meeting held in April, your Committee received with painful surprise the sad intelligence of the death of Mr. Wm. Smeeton, of Leeds, a Vice-President of the Conference. Mr. Smeeton had for many years taken a deep interest in all that concerned pharmacy, and his election to office at the last annual meeting of the Conference indicated the esteem in which he was held by this Association. Mr. G. Ward, F.I.C., F.C.S., one of the auditors, was elected to fill the vacancy, and his name has been added to the list of Vice-Presidents. At the same time Mr. Yewdall, of Leeds, generously accepted an invitation to succeed to the office previously held by Mr. Ward.

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 30, 1890.

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

July 1, 1889. *Dr.*	£	s.	d.	£	s.	d.
To Assets forward from last year—						
„ Balance in hand at Bank				64	17	3
„ Cash in Secretary's hands				3	11	7
„ Messrs. Churchill's Account				117	8	9
June 30, 1890.						
To Sale of Year-Book by Publishers				18	0	0
„ Advertisements, 1889 volume	109	11	8			
„ „ 1888 „	7	17	0			
				117	8	8
„ Members' Subscriptions, Amount received for year ending July 1, 1889, to June 30, 1890				527	1	1
„ Index to Year-Book, sale by Secretary				0	5	0
„ Unofficial Formulary, sale by Publishers				9	9	0
„ Outstanding Liabilities, Messrs. McCorquodale and Co.				0	8	6
				£858	9	10

June 30, 1890. *Cr.*	£	s.	d.	£	s.	d.
By Expenses connected with Year-Book:—						
Printing, Binding, Publishing, etc.	296	12	6			
Postages and Distribution	39	11	7			
Advertising and Publisher's charges	32	14	2			
Editor's Salary	150	0	0			
Foreign Journals for Editor	5	16	6			
				524	14	9
„ Unofficial Formulary:—						
Advertising and Postage	4	1	6			
Publisher's Commission	0	19	0			
				5	0	6
„ Sundry Expenses:—						
Grant to Formulary Committee	5	0	0			
Expenses of Assist. Sec. at Newcastle	10	0	0			
				15	0	0
„ Assist. Sec.'s Salary from July 1, 1889, to June 30, 1890	47	10	0			
„ Rent of Office	10	0	0			
				57	10	0
„ Grant (for Research)				5	0	0
„ Blue Lists, Printing	3	10	0			
Postages of	3	1	3			
Revising and Editing	5	5	0			
				11	16	3
„ Postages				13	1	6
„ Printing and Stationery, from July 1, 1889, to June 30, 1890				19	15	6
„ Bank Charges, as per Bank Book				0	1	1
„ Petty Cash				5	11	0
„ Liabilities of last year, since paid—Messrs. McCorquodale and Co.				6	17	9
„ Outstanding Assets—Messrs. Churchill's Account				107	8	0
„ Balance at Bank	83	0	8			
„ Balance in Secretary's hands	*3	17	10			
				86	18	6
				£858	9	10

* For Postages, 2s. 1d.; Petty Cash, £3 15s. 9d.

THE BELL AND HILLS FUND.

		£	s.	d.	£	s.	d.
1889.							
July 1.	Balance in hand	17	9	2			
„ 19.	Dividend on Consols, due July 6, 1889	2	8	4			
Dec. 17.	„ „ „ October 6, 1889	2	8	4			
1890.							
Jan. 10.	„ „ „ Jan. 6, 1890	2	8	4			
May 14.	„ „ „ April 6, 1890	2	8	4			
					27	2	6
1889.							
Sept. 20.	By Purchase of Books from Kimpton for Newcastle				9	18	0
	Balance				£17	4	6
	Assets—						
	Cash—Balance at Bank				17	4	6
	Consols				360	0	0

Audited and found correct. Security (Consols, £360) viewed.

T. RHEEDER, Newcastle-on-Tyne.
EDWIN YEWDALL, Leeds. } *Auditors.*

In accordance with a resolution mentioned in the report of last year, a revised circular drawing attention to the objects of the Conference and inviting to membership has been freely distributed through the secretaries of local associations to which the 'Year-Book' is annually sent. Sufficient time has not yet elapsed to judge of the effect of this distribution, but it is hoped that it will result in a large accession of numerical strength.

It has been resolved to send a special invitation to membership to all chemists and druggists, as they shall be placed on the Register of the Pharmaceutical Society of Great Britain. Practical effect is given to this resolution as necessity arises. It is believed, however, that more may be done in obtaining new adhesions by the personal efforts of individual members than by formal appeals made through your secretaries. Copies of circulars will be gladly supplied to any members who are willing to distribute them among their pharmaceutical friends. It is gratifying to your Committee to be able to announce the application of a money grant to defray expenses in connection with a research. The amount of five pounds was handed over in December to Mr. R. A. Cripps to assist him in continuing his investigations on ipecacuanha. Mr. Cripps regrets that his work is not in a sufficiently advanced stage to justify a presentation to this meeting of the results he has obtained.

It is a subject of special interest to note the appointment by the Pharmaceutical Society at the instance of the Medical Council of a Committee of pharmacists, for the purpose of assisting the Pharmacopœia Committee of the Medical Council in the preparation of an Addendum to the British Pharmacopœia. The fact that pharmacists are now represented on the Committee of Compilation may justly be regarded as a matter for congratulation. There still remain, however, and doubtless will continue to be, many preparations in frequent demand which although not of sufficient importance for official recognition will require the careful attention of your Formulary Committee.

The reception held last night by the President and Officers of the Conference and the Conversazione which followed were largely attended and proved a signal success.

In December last Mr. Louis Siebold, F.I.C., F.C.S., was re-appointed Editor of the 'Year-Book.' The MS. of the forthcoming volume, so far as it can be completed, is now in the hands of the printers.

Financial Statement.

Mr. Martindale (Treasurer), read the statement of accounts, which is printed on the preceding page. He added that he thought the account was a very satisfactory one, the balance of assets in hand being about £15 more than on the last year's account. Only one grant had been made for experimental research, and he hoped that in future the funds would be more largely utilized by members in this direction.

Mr. Yewdall (Leeds), one of the auditors, said he had examined the vouchers and securities and found everything in order.

The President then delivered the following address:—

Presidential Address.

When at the last meeting at Newcastle you decided to place me for a second time in the presidential chair I appreciated the compliment, and looked forward with much pleasure to the opportunity of presiding at this annual meeting amongst so many well-known and staunch supporters of the British Pharmaceutical Conference as are to be found in Leeds and the West Riding of Yorkshire.

As this Association becomes older it is less easy to find a suitable theme for the "President's Address," inasmuch as restrictions multiply, and notwithstanding there is much in which we are necessarily interested arising out of pharmaceutical politics, still there is an unwritten, and in my opinion, a wise understanding that such subjects shall be eschewed in the annual address from this chair.

Some of your past presidents framed their addresses upon the scientific progress of the preceding year, and the material was ample, and the retrospect both agreeable and instructive; but the enlarged area one would now have to traverse to produce a complete summary, seems to be a sufficient reason for treating such a review in the preface of the "Year Book of Pharmacy."

The time apportioned by your Executive for reading the communications that you and others are pleased year by year to bring before the Conference is much too short, consequently discussion is curtailed, and your secretaries are frequently compelled to abstract communications, which had time permitted might have been more fully read and discussed.

My intention is to give you a short address, so that our time may be profitably utilized, and I beg, therefore, you will, during this Conference, punctually attend each and every sitting, so that you may by your presence, encourage those who have communications to make, and show your appreciation of pharmacological research.

We hear it remarked that there is a fashion in everything, and those who do not so express themselves are at times conscious of the difficulty in finding nowadays anything uninfluenced by fashion.

It cannot be contended that medicine, striving year by year to become a less inexact science, knows no fashion, although it might be urged that there was in medicine a licence for adopting fashions without parallel in any other profession or calling, solely due to the rapid strides of science.

The advance in medicine and surgery of late years is a matter of common knowledge and observation, and a glance at a list of modern medicaments shows that there is a material change in the substances prescribed in the present as compared with the past generation.

During the past thirty years our materia medica has multiplied to no inconsiderable extent; old remedies have been discarded, a legion of new drugs introduced, crystalline and resinoid principles adopted to the almost entire exclusion of the crude substances from which they are prepared, and synthetical substances often take the place of alkaloids which were novelties but a generation ago.

You would expect, if I traversed the long list of crude substances that found their place even in the last editions of the London, Edinburgh and Dublin Pharmacopœias, with the object of showing the position they now hold, to learn that very many have fallen into disuse, that others are now unofficial, and many but seldom prescribed.

Certain drugs, notwithstanding, are as much relied upon to-day as they were half a century ago, and this is not to be wondered at when we remember that the medicinal value of such crude drugs as opium, cinchona, etc., depends upon the presence of certain well-defined chemical principles which we are accustomed to isolate, and upon the proportion present in the crude substance it is customary now to assess both medicinal and commercial value.

It is our practice also, as you are aware, to standardize these and similar drugs to contain a definite proportion of chemical constituent, so that the physician may use these remedies with greater precision.

Other drugs—the use of which still continues—such as jalap, scammony, aloes, gamboge, etc., are not prescribed as frequently as formerly; and to some extent this has arisen from absence of uniformity in the substances themselves.

A class of drug—not a large one, it is true—of which sarsaparilla is a type, is only occasionally prescribed, but largely used by the public, notwithstanding therapeutists have written upon its medicinal worthlessness.

Medicaments used as external applications have changed immensely; and we find lard, as a vehicular substance or as a basis for ointments, has been displaced by solid and semi-solid hydrocarbons, or the more easily absorbed lanoline.

Plasters, again, which were formerly prepared both in great quantity and variety, are now but little prescribed, and we have become familiar with other oleates of powerful inorganic bases such as oleates of zinc, mercury, bismuth, etc.

Concentrated percolates produced from some of the most potent drugs by alcohol, ether and chloroform menstrua, either used separately or so blended that the entire active constituent of the drug may be removed, are now largely used, elegant examples of which are seen in the official liniments of aconite and belladonna, and the chloroform belladonna of the non-official formulary.

Such preparations as grey powder, antimonial powder, green iodide of mercury, notwithstanding they may be used for some specific purposes, still are in less use and esteem than formerly.

This is due to the want of uniformity even when freshly prepared, or to change and decomposition on the substances being stored.

Although the legitimacy of most of the changes must be acknowledged, still we cannot shut our eyes to the fashion that prevails in discarding antiquated, although well-tried remedies in favour of newly introduced drugs.

This practice is not wholly approved by the medical profession, for at the recent meeting of the British Medical Association at Birmingham, a leading London therapeutist protested against the rage for new drugs, and condemned the practice as fatal to the accuracy of observation and precision of treatment.

It is fashionable with some to prescribe medicines in the most concentrated form in which the ingredients are compatible, regardless of potency. While none can reasonably expect to go back to those days when each dose of medicine was consigned to the patient in a separate vial, still many can prove that the practice of prescribing concentrated medicines is not without danger to the public, arising out of an inability to measure an exact small medicinal dose.

In this fashion of undue concentration the pharmacist is most deeply plunged, indeed it is difficult to be persuaded that he himself has not largely contributed in bringing it about.

Everything nowadays must be concentrated—not to such an extent that experience and knowledge of chemical substances, drugs and menstrua would indicate might be resorted to, so that in the process of manufacture, subsequent storing, or use, no variation from an official standard, when the preparation is diluted, would result. No, this will not do; but a concentration of two or three times over and above that which may with safety be practised is now an every day requirement.

"Elegant pharmacy" has something to answer for, its products having been appreciated by the eye and palate of the public, without corresponding advantage to the physician in continuing his art of prescribing.

Then again, the fashion of prescribing ready-made physic, which is increasing to such an extent as to be positively alarming, is a delusion and a snare to those who desire to retain their art of orthodox prescribing. This practice, which is increasing with leaps and bounds, has been condemned by a leading London physician of half a century's experience, who writes: "There has grown up a habit of prescribing ready-made physic, of using compounds which contain a variety of drugs, each having different properties—a practice in which there is mental proclivity to regard the disease as suitable to the physic rather than to take the trouble to find a remedy that is suitable for the disease. This system is unpractical, unscientific, and least calculated to promote a knowledge of the medicinal legitimate use of medicine. In fact the art of writing a rational prescription is in danger of being lost."

One might continue to contrast remedies and comment upon styles and fashions almost indefinitely, but the examples given will suffice to show the changes that have been made in our time in reference to the substances comprising our materia medica.

Reflection must convince us that medical art is deprived of much opportunity, pharmacy undermined, the public not benefited, but on the contrary, seriously damaged by a fashion that has of late years both prevailed and greatly increased, and which may be described as the injudicious selection by the public of medicines to be used as household remedies.

The public has always been in the habit of treating itself for minor ailments, and until late years its choice of medicines was fairly judicious and generally amenable to the influence of the medical profession acting through the usual channels.

An unfortunate fashion is now in the ascendancy, and there is a disregard by the public for the simple, well-tried and safe medicaments of the past generation, and a preference for medicines which are – tained under cover of a patent medicine stamp.

To condemn indiscriminately, as either useless or dangerous all medicines that reach the public through the medium of the press, quite apart from the question of the medicine stamp, would be unjust, because many substances, simple in their nature and safe in the hands of the public, are by such means brought into greater prominence and are not inappropriate as household medicines.

While one could particularize many such, however, it is equally certain that a number could be named which are unsuited as remedies except in the hands of the medical practitioner; further, many are of such composition that they should not be sold without being placed under the restrictions which accompany the sale of substances similar in composition included in the schedule of poisons in the Pharmacy Act.

You are aware of the increased traffic in so-called "patent medicines" during the present generation, but perhaps have not realized the extent to which it has developed, and the great strides it is making annually without let or hindrance. In the year 1860 the revenue from medicine stamp duty was £43,000; in the year 1889, £203,000; and during the current year it is computed that £220,000 and upwards will be realized.

Now although there has been this marked increase in the sale of patent medicines during the past thirty years the number of vendors has not increased in like proportion, for whereas in 1860 there were under 10,000 vendors, there are at the present time but 23,000, indicating notwithstanding the total sales are five times as large as they were a generation ago, that the registration of vendors has only increased to half that extent, and the sale, consequently, by each licensed vendor has practically doubled.

You possibly have not reckoned how large a sum the public parts with in satisfying its craving for stamped medicines, and will be surprised to learn that the amount is not far short of one and a half millions sterling annually.

It is obvious that considerable advantages would accrue to the medical profession and pharmacy even if a proportion only of such sum were directed into the channels of legitimate medicine.

Those in contact with this evil have an opportunity of watching the results from a social standpoint, and cannot be expected to be oblivious to its medical aspect. Each year I have but little doubt finds you with stronger convictions that the unrestricted sale to the public of many substances and compounds which are now commonly sold as patent medicines, and which are easily obtainable on account of the facilities offered by the medicine stamp traffic, is a subject of deep concern, and a prolific source of both mental and physical degradation to the public.

The medical profession is aware that a section of the public become habituated to the use of hydrate of chloral, opiates and other narcotics solely from the cloak that is adroitly spread around this matter by the medicine stamp regulation.

Within the past month and since my address has been in manuscript, the *British Medical Journal* has in a very able article, entitled "Poisons on Sale," directed the attention of the medical profession to this important subject. I endorse the views of that Journal when it says:—"The whole question of the sale of proprietary medicines demands serious consideration. The apparent official sanction of the Government stamp, which has actually no more intrinsic signification than that affixed to a promissory note, indicates some sort of official approval or guarantee of the virtues of the medicine itself. It is simply absurd that the sale of poisons — narcotics for example—should be hedged about with legislative restrictions when their nature and strength are fully known, and that the very same poisons should be freely sold when their nature is a matter of conjecture and the proportion in which they are present is unknown and probably variable."

A refusal to supply poisonous patent medicines, except under a medical prescription, is resented by the public, and the patent medicine vendor, who may be a grocer, stationer or any individual, without the faintest knowledge of drugs, may for a small fee to be paid for a licence, sow poisons broadcast.

The importance of this subject should be urged upon the medical department of the Privy Council by medical officers of health, coroners, and medical practitioners generally; and members of the Legislature should be asked to put pressure on the Chancellor of the Exchequer, so that notwithstanding his greed for revenue a continuance of the tax would be impossible.

As legislation for regulating the practice and sale of medicine is now all professedly for the safety of the public, it becomes a question as to whether the compounding of all proprietary medicines should not be subjected to similar restrictions to those imposed in Germany and elsewhere on the continent of Europe, where the composition of each so-called patent medicine has not only to be stated to a recognized authority, but permission obtained for its sale.

In my opinion the time has come when the medicine stamp should altogether be dispensed with. Such a course would recommend itself to those free-traders who, although liberal in their views concerning the sale of harmless medicinal substances, are not advocates for the unrestricted sale of poisons to the public.

I have spoken lengthily on this unfortunate fashion in which the public now indulges to its own detriment, and to the great damage of the practice of medicine, and I feel confident that my suggestion will have your careful thought.

Any action you decide upon should have as its mainspring the better protection of the public, and the support and co-operation of the medical profession, not only in this matter, but in any desirable movement connected with the advancement of the art and science of medicine, may be confidently relied upon.

The time has at last come when those who practice legitimate pharmacy may, without arrogance, view their relation with the medical profession, and with the General Medical Council in particular, with the greatest satisfaction and pleasure.

For the past thirty years discontent has been rife, that pharmacists were not officially invited to co-operate with the body legally entrusted with the production of the British Pharmacopœia.

The Pharmaceutical Society's Executive had oftentimes to listen to bitter sayings which we have no wish to recall, and desire only to refer to the advice that the forbearing President invariably gave, viz., that "everything would come to those who would wait."

No little advantage has been derived from the fact that the editor of the Pharmacopœia, in his annual report to the General Medical Council, has never lost sight of the value of pharmacists' co-operation, nor an opportunity of showing of what practical value the pharmacists' information is in the production of the Pharmacopœia, which he, as editor, aims to make, not only an exponent of medicine as practised in Great Britain and Ireland, but a book of reference for the medical profession and pharmacists throughout the civilized world.

The British Pharmaceutical Conference has in some degree contributed to bringing about a better appreciation of pharmacists by the medical profession, for many of the more important communications that have appeared in the 'Year-Book of Pharmacy' have from time to time been the subject of favourable comment in the Medical Press, and have not been without their influence upon medicine and surgery.

The Association has been popular—and deservedly so—for in its infancy it was fondled by the best pharmacists England has produced, and now in its maturer years we find it healthy and capable of doing good work.

Each member of this Association should strive for the maintenance and enlargement of the influence alluded to upon the medical profession, and no firmer step can be taken in this direction than by a strict adhesion to the admirable principles laid down at Newcastle in 1866 by the fathers of our Association, some of whom I am delighted to see amongst us to-day.

Men should never enter the ranks of pharmacy without a recognition of the absolute necessity for patient and persevering study and continuous observation and thought, and students must be disabused of the idea that the object of their education and work is solely for examinations. Those who always continue students, and learn that increased knowledge brings a wider field of thought and observation are the backbone of this Association; those whose acquirements are completed with examination are millstones round its neck.

As a member of this Association for upwards of twenty-five years, I may be permitted to refer to the opportunity this annual meeting gives for knowing, cultivating and enjoying the friendship of one's *confrères*.

There is necessity at the present time to counteract the depressing influence of the cloud that will persist in hovering over us as a trade, by our seeking individually and collectively not only to maintain, but also to advance by research and every possible means, all matters having a scientific bearing upon pharmacy.

Dr. THRESH, in moving a vote of thanks to the President for his address said it was of a most interesting and practical character, and was of itself sufficient to repay any one the time and trouble of attending the Conference. Among the many points which had been touched upon that of fashion in medicine was one of the most important, and it was a thing which all intelligent people must deprecate. When he was first connected with pharmacy, the public used to rely mainly in their domestic treatment on rhubarb, senna, sulphur, salts, sweet spirit of nitre and such remedies; but now they went in for all kinds of patent and proprietary pills, effervescing antipyrin, and other new remedies, and he must admit that the fashion was set them to some extent by the medical profession. He had also been surprised to find even amongst educated persons an idea that a patent medicine was something superior to what could be obtained from an ordinary chemist, even on a doctor's prescription, and that this was guaranteed by the Government stamp. The sooner the public were disabused of this superstition the better it would be for every one, including both the chemist and the medical man. He had recently had many opportunities of coming in contact with members of the sister profession of medicine, and was pleased to find that there was a growing change in the spirit in which pharmacy was regarded. There were, it was true, some men who seemed to envy pharmacists their superior knowledge of pharmacy, but in the opinion of the more liberal members of the profession the scientific work done by the Pharmaceutical Society and by the Conference had undoubtedly been raising the status of the whole profession. He would move that the best thanks of this meeting be given to the President for his very able and interesting address.

Mr. F. BRANSON (Leeds) having seconded the motion—

Mr. G. F. SCHACHT, as senior Vice-President, put the motion. He did so with much pleasure, all the more from having himself occupied the position of President for two successive years, and found the difficulty of preparing a second address which should prove at all interesting. He had recently had the courage to re-read those two addresses and found that whatever merit there might have been in the first was lacking in the second, which was a good example of an anti-climax. He could all the more therefore congratulate Mr. Umney on the success with which he had kept the good wine until the last.

The motion was carried unanimously and was briefly acknowledged by the President.

The reading of papers was then proceeded with, the first being the following Report of the Unofficial Formulary Committee, which was presented by Mr. MARTINDALE, as Chairman:—

REPORT OF THE FORMULARY COMMITTEE.

To the British Pharmaceutical Conference in Session.

As Chairman of the Formulary Committee I have to report that at the end of last year, with the sanction of the Executive, our Committee published an Addendum containing nine formulæ, which was included in the Year Book and issued bound with the then existing copies of the Formulary. Our work for the present remains in abeyance pending the issue of an official Addendum to the British Pharmacopœia, but we hope to renew our labours after this is published. I may add that our labours have been remunerative to the Conference.

The PRESIDENT remarked on the great practical assistance which the Unofficial Formulary had been to chemists in making up prescriptions containing ingredients for which there was no official formula. It had greatly conduced to uniformity in such preparations.

(*To be continued.*)

The British Association for the Advancement of Science.

FIFTY-NINTH ANNUAL MEETING.

The fifty-ninth annual meeting of the above Association commenced on Wednesday, September 3, at Leeds, under the presidency of Sir Frederick Augustus Abel, C.B., D.C.L. (Oxon.), D.Sc. (Cant.), F.R.S., P.P.C.S., Hon. M. Inst. C.E.

THE PRESIDENT'S ADDRESS.

Many who had the pleasure of listening last year, at Newcastle, to the interesting and instructive address of the President to whom I am a most unworthy successor, could not fail, both by the chief subject of his discourse and by the circumstance of the official position which he occupies with so much benefit to science and the public, to have their thoughts directed to the illustrious naturalist whose philosophical address delighted the members of the Association and the people of Leeds thirty-two years ago.

More than one-half the period of existence of this Association has passed since Richard Owen presided over its meeting in this town. Alas! what gaps have been created in the ranks of those who then were prominent for activity in advancing its work. The then General Secretary, Sir Edward Sabine; the all-popular Assistant-general Secretary, John Phillips; the Treasurer, John Taylor, now live with us only through their works and the enduring esteem which they inspired. But very few of those who held other prominent positions at that meeting have survived to see the Association reassemble in this town. Whewell, Herschel, Hopkins, the elder Brodie, Murchison, William Fairbairn, all Presidents of Sections in 1858, have long since been removed from among us; and the then President of Section F, Edward Baines, a much honoured and highly talented son of the "Franklin of Leeds," whom we had hoped to count among those Vice-Presidents representing the City on this occasion, has recently passed away, in his ninetieth year, after a most honourable and useful career, during which he especially distinguished himself by his successful exertions in the advancement of the great educational movements of his time.

The illustrious President of our last meeting here, concerning whose health the gravest apprehensions were not long since entertained, is happily still preserved to us; still intellectually bright at the ripe age of eighty-six, and still, with the keen pleasure of his early life, following the progress of those branches of scientific research which have constituted the favourite occupations and the arena of many intellectual triumphs of a long career of ardent and successful devotion to the advancement of science.

To not a few of those who have flocked to Leeds to attend the annual gathering of this Association, our present meeting-place is doubtless known chiefly by its proud position as one of the most thriving manufacturing towns of the United Kingdom; of ancient renown, especially in connection with one of the chief industries identified with Great Britain in years past. But this good town of Leeds, whose cloth market was described by Daniel Defoe, one hundred and sixty odd years ago, as "a prodigy of its kind, and not to be equalled in the world," and whose present position in connection with divers of our great industries would have equally excited the enthusiasm of that graphic writer, is famous for other things than its prominent association with manufactures and commerce.

Not many of our great industrial centres can boast of so goodly an array, upon the scroll of their past history, of names of men eminent in the sciences, the arts and manufactures, in divinity and letters, and in heroic achievements, such as are identified with Leeds and its immediate vicinity; Thomas, Lord Fairfax, one of the most prominent heroes of the Commonwealth; Smeaton, an intellectual giant among engineers; William Hirst and John Marshall, illustrious examples of the men who by their genius, energy and perseverance placed Great Britain upon the pinnacle of industrial and commercial greatness which she so long occupied unassailed; Richard Bentley, the eminent classic and divine; John Nicholson, the Airedale poet; John Fowler and Peter Fairbairn, worthy followers in the footsteps of Smeaton; Isaac Milner, weaver and mathematician, afterwards Senior Wrangler, Smith's prizeman, Jacksonian Professor, President of Queen's College, Vice-Chanceller of Cambridge University, Dean of Carlisle, and a most illustrious Fellow of the Royal Society; Thoresby, antiquarian and topographer; Benjamin Wilson, painter and industrious contributor to the development of electrical science; William Hey, the eminent surgeon and friend and counsellor of Priestley; Sadler, political economist and philanthropist; the brothers Sheepshanks—Richard, the astronomer, and John, the accomplished patron of the arts, and munificent contributor to our national art treasures; Edward Baines, whose conspicuous talents and energy developed a small provincial journal into one of the most powerful public organs of the country; his talented sons, of whom not the least conspicuous and highly respected was the late Sir Edward Baines. I might swell this voluminous list by reference to illustrious members of such families as that of Denison, of Beckett, of Lowther, but the men I have referred to fitly illustrate the remarkable array of worthies whose careers have shed lustre upon the town in or near which they were born. Yet that illustration would be altogether incomplete if I failed to speak of one whose career and works alone would suffice to place Leeds in the foremost rank of those English towns which can claim as their own men whose course of life and whose achievements have secured their pre-eminence among our illustrious countrymen. Needless to say that I refer to Joseph Priestley, born within six miles of Leeds, whose name holds rank among the foremost of successful workers in science; who, by brilliant powers of experimental investigation, rapidly achieved a series of discoveries which helped largely to dispel the shroud of mystery surrounding the art of alchemy, and to lay the foundation of true chemical science. An ardent student of the classics, of Eastern languages, and of divinity, a zealous exponent of theological doctrines which marred his career as divine and instructor, he early displayed conspicuous talents for the cultivation of experimental science, which he pursued with ardour under formidable difficulties. His acquaintance with Franklin probably developed the taste for the study of electric science which led him to labour successfully in this direction; and the publication, in 1767, of his valuable work on "The History and Present State of Electricity, with Original Experiments," secured him a prominent position among the working Fellows of the Royal Society. His connection with Mill Hill Chapel, in 1768, appears to have given rise accidentally to his first embracing the experimental pursuit of what formerly was termed pneumatic chemistry, the foundation to which had been laid by Cavendish's memorable contribution, in 1766, to the 'Philosophical Transactions,' on carbonic acid and hydrogen. Priestley's first publication in pneumatic chemistry, on "Impregnating Water with Fixed Air" (carbonic acid), attracted great attention; it was at once translated into French, and the College of Physicians addressed the Lords of the Treasury thereon, pointing out the advantages which might result from the employment, by men at sea, of water impregnated with carbonic acid gas, as a protective against, or cure for, scurvy.

Six years later Priestley investigated the chemical effects produced on the air by the burning of candles and the respiration of animals, and, having demonstrated that it was thereby diminished in volume and deteriorated, he showed that living plants possessed the power of rendering air, which had been thus deteriorated, once more capable of supporting the combustion of a candle. At about this time Priestley received very advantageous proposals to accompany Captain Cook upon his second expedition to the South Seas; but when about to prepare for his departure he learned from Sir Joseph Banks that objections against his appointment, on account of the great latitude of his religious principles, had been successfully urged by some ecclesiastic member of the Board of Longitude. In 1773 the Royal Society awarded Priestley the Copley Medal for a remarkable paper entitled "Observations on Different Kinds of Air," and in that year he became librarian and literary companion to the Earl of Shelbourne (afterwards Marquis of Lansdowne), and thereby secured special advantages in the pursuit of his scientific researches.

With respect to his departure from Leeds, he expressed himself as having been very happy there "with a liberal, friendly, and harmonious congregation, to whom my services (of which I was not sparing) were very acceptable. Here I had no unreasonable prejudices to contend with, so that I had full scope for every kind of exertion; and I can truly say that I always considered the office of a Christian minister as the most honourable of any upon earth, and in the studies proper to it I always took the greatest pleasure." During the next five years he published as many volumes describing the results of important experiments on air. After investigating the properties of nitric oxide, and applying it to the analysis of air, Priestley, in 1774, discovered and carefully studied oxygen, which he obtained by the action of heat upon the red oxide of mercury. He was the first to prepare and study sulphurous acid, carbonic oxide, nitrous oxide, hydrochloric acid (*marine acid air*), and the fluoride of silicon, and carried out important researches on the properties of hydrogen, and of other gases previously but little known. His great quickness of perception and power of experiment led him to the achievement of many novel and important results; but one cannot help contrasting his somewhat random search after new discoveries with the close logical reasoning and philosophic spirit which guided and pervaded the remarkable researches of him whose departure from amongst us since the last gathering of this Association is so universally deplored—of the great discoverer of the universal law of the conversion of energy, James Prescott Joule. I could not add to the judicious and graceful reference to his work which Sir Henry Roscoe was privileged to make, in the last year of that philosopher's valuable life, when presiding over the recent meeting of the Association in the town which gloried in numbering Joule among its citizens; but I may, perhaps, be permitted to express the sanguine hope that the desire of the scientific world to secure the establishment of an international memorial fitly commemorative of his great life-work may be realized in the most ample manner.

The wide scope of the admirable discourse delivered by Owen in this town thirty-two years ago affords an interesting illustration of the delight which men whose best energies are devoted to the cultivation of one particular branch of science take in the results of the labours of their fellow-workers in other departments, and in their achievements in contributing to the general advancement of our knowledge of Nature's laws and of their operations. It is to this bond of intimate union between all workers in pure science that we owe the instructive reviews of the progress made in different departments of science, with which we have often been presented at our annual gatherings. On the other hand, those men, from time to time selected to fill the distinguished office of President, whose lives have been mainly devoted to the practical utilization of the results of scientific research and to the extension in particular directions of the consequent resources of civilization, seize with keen pleasure the opportunity afforded them of directing attention to the triumphs achieved in the application, to the purposes of daily life, of the great scientific truths established by such illustrious labourers in the fields of pure science as Newton, Dalton, Faraday, and Joule. The wide and constantly extending domain of applied science presents, even to the superficial observer, a continually varied scene; not a year passes but some great prize falls to the lot of one or other of its explorers, and some apparently insignificant vein of treasure, struck upon but a few years back, is rapidly opened out by cunning explorers, until it leads to a mine of vast wealth from which branch out in many directions new sources of power and might.

Among the branches of science in the practical applications of which the greatest strides have been made since the Association met at Leeds in 1858, is electricity. That year witnessed the accomplishment of the first great step towards the establishment of electrical communication between Europe and America by the laying of a telegraph-cable connecting Newfoundland with Valencia. Through this cable a message of thirty-one words was shortly afterwards transmitted in thirty-five minutes; an achievement which, though exciting great enthusiasm at the time, scarcely afforded promise of the succession of triumphs of ocean telegraphy which have since surpassed the wildest dreams of the pioneers in the realms of applied electricity.

The development of the electric telegraph constitutes a never-failing subject of the liveliest interest. The experiments made by Stephen Gray, in 1727, of transmitting electrical impulses through a wire 700 feet long; by Watson, twenty years afterwards, of transmitting frictional electricity through many thousand feet of wire, supported by a line of poles, on Shooter's Hill, in Kent; and by Franklin, who carried out a similar experiment at Philadelphia,—although they were followed by many other interesting and philosophical applications of frictional electricity to the transmission of signals—were not productive of really practical results. The work of Galvani and of Volta was more fruitful of an approach to practical telegraphy in the hands of Sömmering and of Coxe, while the researches of Oersted, of Ampère, of Sturgeon, and of Ohm, and especially the discoveries of volta-electric induction and magneto-electricity by Faraday, paved the way for the development of the electric telegraph as a practical reality by Cooke and Wheatstone in 1837. How remarkable the strides have been in the resources and powers of the telegraphist since that time is demonstrated by a few such facts as these: the first needle-instrument of Cooke and Wheatstone transmitted messages at the rate of four words per minute, requiring five wires for that purpose; six messages are now conveyed by one single wire, at ten times that speed, and news is dispatched at the rate of 600 words per minute. Duplex working, which more than doubled the transmitting power of a submarine cable, was soon eclipsed by the application of Edison's quadruplex working, which has in its turn been surpassed by the multiplex system, whereby six messages may be sent independently, in either direction, on one wire. When last the British Association met in Leeds submarine telegraphy had but just started into existence; thirty years later, the accomplished President of the Mechanical Section informed us, at our meeting at Bath, that 110,000 miles of cable had been laid by British ships, and that a fleet of nearly forty ships was occupied in various oceans in maintaining existing cables and laying new ones.

The important practical achievements by which most formidable difficulties have been surmounted, step by step, in the successive attainment of the marvellous results of our day, have exerted an influence upon the advancement, not merely of electrical science, but also of science generally and of its applications, fully equal to that which they have exercised upon the development of commerce and of the intercourse between the nations of the earth.

Thus, the laying of the earliest submarine cables, between 1851 and 1855, led Sir W. Thomson, in conference with Sir George Stokes, to work out the theory of signalling in such cables, by utilizing the mathematical results arrived at by Fourier in his investigation of the propagation of heat-waves. The failure of the first Atlantic cable led to the survey of the bottom of the Atlantic, which was the forerunner of deep-sea explorations, culminating in the work of the 'Challenger' Expedition, and opening up new treasures of knowledge scarcely dreamt of when last the British Association met at Leeds. To the difficulties connected with the early attempts at submarine telegraphy, and the determination with which Thomson drove home the lessons learned, we owe the systematic investigations into the causes of the variations in resistance of copper-conductors, and the consequent improvements in the metallurgy of copper, which led to the realization of the high standard of purity of metal essential for the efficient working of telegraphic systems, and also to the extensive utilization of electricity in the production of pure copper. The rare combination of originality in powers of research and perspicuity in mathematical reasoning, with inventive and constructive genius, for which Thomson has so long been pre-eminent, has placed at the disposal of the investigator of electric science, and of the practical electrician, instruments of measurement and record which have been of incalculable value, and which owe their origin to the theoretical conclusions arrived at by him in his researches into the conditions to be fulfilled for the attainment of practical success in the construction and employment of submarine cables. The mirror galvanometer, the quadrant electrometer, the syphon-recorder, and the divided-ring electrometer, are illustrations of the valuable outcome of Thomson's labours; the combination of the last-named instrument with sliding resistance coils has rendered possible the accurate sub-division of a potential difference into 10,000 equal parts. The general use of condensers in connection with cable signalling, due to Varley's application of them for signalling through submerged cables with induced short waves, was instrumental in establishing the fact that all electrostatic phenomena are simply the result of starting an electric current of known short duration round a closed circuit. The practical application of the Wheatstone Bridge led to numerous important mathematical investigations, and induced Clerk Maxwell to devise a new mode of applying determinants to the solution of the complicated electrical problems connected with networks of conductors. The necessity for the universal recognition of an electrical unit of resistance led to the establishment, in 1860, of the Electrical Standards Committee of the British Association, whose long succession of important annual reports was instrumental in most important developments of theoretical electricity, and, indeed, served to open up the whole science of electrical measurement. Matthiessen's important investigations of the electrical behaviour of metals and their alloys, and the preparation and properties of pure iron, were the outcome of the commercial demand for a practically useful standard of electrical resistance, while Latimer Clark's practical standard of electro-motive force, the mercurous sulphate cell, became invaluable to the worker in pure electrical research. The unit of resistance established by the British Association Committee received, in 1866, most important scientific application at the hands of Joule, who, by measuring the rate of development of heat in a wire of known resistance by the passage of a known current, obtained a new value of the mechanical equivalent of heat. This value differed by about 1·3 per cent. from the most accurate results arrived at by his experiments on mechanical friction, a difference which eventually proved to be exactly the error in the British Association unit of resistance; so that the true value of the unit of resistance, or Ohm, was determined by Joule fifteen years before this result was achieved by electricians. Clerk Maxwell's remarkable electro-magnetic theory of light was put to the test, through the aid of the British Association unit of resistance, by Thomson, in determining the ratio of electro-magnetic unit to the electro-static unit of quantity. Many other most interesting illustrations might be given of the invaluable aid afforded to purely scientific research by the practical results of the development of electrical science, and of the constant co-operation between the science student and the practical worker. No one could, more fitly than the late Sir William Siemens, have maintained, as he did in his admirable address at our meeting in Southampton, in 1882, that we owe most of the rapid progress of recent times to the man of science who partly devotes his energies to the solution of practical problems, and to the practitioner who finds relaxation in the prosecution of purely scientific inquiries. Most assuredly, both these classes of the world's benefactors may with equal right lay claim to rank the name of Siemens among those whom they count most illustrious!

In that highly interesting and valuable address, delivered little more than a year before his sudden untimely removal from among us, the numerous important subjects discussed by him included not a few which he had made peculiarly his own in the wide range embraced by his enviable power of combining scientific research with practical work. Prominent among these were the applications of electric energy to lighting and heating purposes, and to the transmission of power, to the future development of which his personal labours very greatly contributed.

Siemens referred to the passing of the first Electric Lighting Bill, in the year of his Presidency, as being designed to facilitate the establishment of electric installations in towns; but the anxiety of the Government of that day to protect the interests of the public through local authorities, led to the assignment of such power to these over the property of lighting companies, that the utilization of electric lighting was actually delayed for a time by those legislative measures. There can now be no doubt, however, that this delay has really been in the interests of intending suppliers and of users of the electric light, as having afforded time for the further development of practical details, connected with generation and distribution, which was vital to the attainment of a fair measure of initial success. The subsequent important modification of legislation on the subject of electric lighting, together with the practical realization of comparitively economical methods of distribution, the establishment of fairly equitable arrangements between the public and the lighting companies, and the apportionment, so far as the metropolis is concerned, of distinct areas of operation to different competing companies, have combined to place electric lighting in this country at length upon some approach to a really sound footing, and to give the required impetus to its extensive development. Nine companies either are now, or will very shortly be, actually at work supplying, from central stations, districts of London comprising almost the entire western and north-western portions of the metropolis. As regards other parts of England, there are already twenty-seven lighting stations actually at work in different towns, besides others in course of establishment, and many more projected. The town of Leeds has not failed to give serious attention to the subject of utilizing the electric light, and, although no general scheme has yet been adopted, the electricians who now visit this town will rejoice to see many of its public buildings provided with efficient electric illumination.

While the prediction made by Siemens, eight years ago, that electric lighting must take its place with us as a public illuminant, has thus been already, in a measure, fulfilled, important progress is being continuously made by the practical electrician in developing and perfecting the arrangements for the generation of the supply, its efficient distribution from centres, and its delivery to the consumer in a form in which it can be safely and conveniently dealt with and applied at an outlay which, even now, does not preclude a considerable section of the public from enjoying the decided advantages presented by electric lighting over illumination by coal-gas. Yet our recent progress in this direction, encouraging though it has been, is insignificant as compared with the strides made in the application of electric lighting in the United States, as may be gauged by the fact that, while in America the number of arc lamps in use, in April of this year, was 235,000, and of glow-lamps about three millions, there are at present about one-tenth the number of the latter, and one hundredth the number of arc lamps, in operation in England.

In some important directions we may, however, lay claim to rank foremost in the application of the electric light; thus, our large passenger-ships and our warships are provided with efficient electrical illumination; to the active operations of our Navy the electric light has become an indispensable adjunct; and our system of coast defence, by artillery and submarine mines, is equally dependent, for its thorough efficiency, upon the applications of electricity in connection with range-finding, with the arrangement and explosion of mines, and with the important auxiliary in attack and defence, the electric light, which, while so arranged, at the operating stations, as to be protected against destruction by artillery-fire and difficult of detection by the enemy, is available at any moment for affording invaluable information and important assistance and protection.

Other important applications of the electric light, such as its use as a lighthouse-illuminant, for the lighting of main roads in coal-mines, where its value is being increasingly appreciated, and even for signalling purposes in mid-air, through the agency of captive balloons, are continually affording fresh demonstrations of the value of this particular branch of applied electric science.

At the Electrical Exhibition at Vienna in 1883, where, not long before the lamented death of Siemens, I had the honour of serving as one of his colleagues in the representation of British interests, the progress which had been made in the construction of electrical measuring instruments since the French Exhibition and the Electrical Congress, two years before, was very considerable. The advance in this direction has been enormous since that time; but although the practical result of Thomson's and of Carlew's important work has been to supply us with trustworthy electrical balances and voltmeters, while efficient instruments have also been made by other well-known practical electricians, we have still to attain results in all respects satisfactory in these indispensable adjuncts to the commercial supply and utilization of electric energy.

In connection with this important subject the recent completion of the Board of Trade standardizing laboratory, established for the purposes of arriving at and maintaining the true values of electrical units, and of securing accuracy and uniformity in the manufacture of instruments supplied by the trade for electrical measurements, may be referred to with much satisfaction as a practical illustration of official recognition of the firm root which the domestic and industrial utilization of electric energy has taken in this country.

The achievements of the telephone were referred to by Siemens in glowing terms eight years ago; but the results then attained were but indications of the direction in which telephonic inter-communication was destined speedily to become one of the most indispensable of present applications of electricity to the purposes of daily life. Preece, in speaking at Bath, two years ago, of the advances made in applied electricity, showed that the impediments to telephonic communication between great distances had been entirely overcome; and now, although considerably behind America and France in the use of the telephone, we are rapidly placing ourselves upon speaking terms with our friends throughout the United Kingdom. The operations of the National Telephone Company well illustrate our progress in telephonic intercommunication: that company has now 22,743 exchange lines, besides nearly 5000 private lines, its exchanges number 272, and its call-offices 526. The number of instruments under rental in England has now reached 99,000: but, important as this figure is compared to our use of the telephone a very few years ago, it sinks into insignificance by the side of the number of instruments under rental in America, which at the beginning of the present year had reached 222,430, being an increase of 16,675 over the number in 1889. Only thirteen years have elapsed since the telephone was first exhibited as a practically workable apparatus to members of the British Association at the Plymouth meeting, and the number of instruments now at work throughout the world may be estimated as considerably exceeding a million.

The successful transmission of the electric current, and the power of control now exercised over the character which electrically-transmitted energy is made to assume, are not alone illustrated by the efficiency of the arrangements already developed for the supply of the electric light from central stations. Siemens dwelt upon this subject at Southampton with the ardent interest of one who has made its development one of the objects of his energetic labours in later years, and also with a prophet's prognostications of its future importance. In speaking of the electric current as having entered the lists in competition with compressed air, the hydraulic accumulator, and the quick-running rope driven by water-power, Siemens pointed out that no further loss of power was involved in the transformation of electrical into mechanical energy than is due to friction, and to the heating of the conducting wires by the resistance they oppose, and showed that this loss, calculated upon data arrived at by Dr. John Hopkinson and by himself, amounted at the outside to 38 per cent. of the total energy. Subsequent careful researches by the Brothers Hopkinson have demonstrated that the actual loss is now much less than it was computed at in 1885; as much as 87 per cent. of the total energy transmitted being realizable at a distance, provided there be no loss in the connecting leads used.

The Paris Electric Exhibition of 1881 already afforded interesting illustrations of the performance of a variety of work by power electrically transmitted, including a short line of railway constructed by the firm of Siemens, which was a further development of the successful result already attained in Berlin by Werner Siemens in the same direction, and was, in its turn, surpassed by the considerably longer line worked by Messrs. Siemens at the Vienna Exhibition two years later. Various short lines which have since then been established by the firm of Siemens are well known, and one of the latest public acts in the valuable life of Siemens was to assist at the opening of the electric tramway at Portrush, in the installation of which he took an active part, and where the idea, so firmly rooted in his mind, from the date of his visit to the Falls of Niagara, in 1876, of utilizing water power for electrical transmission—a result first achieved on a small scale by Lord Armstrong—was more practically realized than had yet been the case. Since that time Ireland has witnessed a further application of electricity to traction purposes, and of water-power to the provision of the required energy, in the working of the Bessbrook and Newry tramway, while London at length possesses an electric railway, three miles in length, to be very shortly opened, which will connect the City with one of the southern suburbs through a tram subway, and although including many sharp curves and steep gradients, will be capable of conveying one hundred passengers at a time, at speeds varying from thirteen to twenty-four miles per hour. During the past year a regular service of tramcars has been successfully worked, through the agency of secondary batteries, upon part of one of the large tramways of North London, with results which bid fair to lead to an extensive development of this system of working. The application of electricity to traction purposes has, however, received far more development in the United States. At the commencement of this year there were in operation in different States 200 electrical tramroads, chiefly worked upon the Thomson-Houston and the Sprague systems, and having a collective length of 1641 miles, with 2346 motor-cars travelling thereon. Further extensions are being rapidly made; thus, one company alone has 39 additional roads, of a collective length of 385 miles, under construction, to be worked through the agency of storage batteries.

The idea cherished by Siemens, and enlarged upon by him in more than one interesting address, of utilizing the power of Niagara, appears about to be realized, at any rate in part; as a large tract of land has been recently acquired, by a powerful American Association, about a mile distant from the Falls, with a view to the erection of mills for utilizing the power, which it is also proposed to transmit to distant towns; and an International Commission, with Sir William Thomson at its head, and with Mascart, Turrettini, Coleman Sellers and Unwin as members, will carefully consider the problems involved in the execution of this grand scheme.

The application of electric traction to water traffic, first successfully demonstrated in 1883, is receiving gradual development, as illustrated by the considerable number of pleasure-boats which may now be seen on the Upper Thames during the boating season, and in connection with which Professor George Forbes proposed, at our meeting last year, that stations for charging the requisite cells, through the agency of water-power, should be established at the many weirs along the river, so as to provide convenient electric coaling-stations for the river pleasure-fleet.

Electrically-transmitted energy was first applied in Germany to haulage work in mines by the firm of Siemens some years ago, and great progress has since been achieved herein on the Continent and in America. Comparatively little has been accomplished in this direction in England; but it is very interesting to note, on the present occasion, that the first successful practical application of electricity in this country to pumping and underground haulage-work was made in 1887, in this neighbourhood, at the St. John's Colliery, at Normanton, where an extensive installation, carried out by Mr. Immisch, so well-known in connection with electric launches, is furnishing very satisfactory results in point of economy and efficiency. The gigantic installations existing for the same purposes in Nevada and California afford remarkable illustrations of the work to be accomplished in the future by electrically transmitted energy.

Among the many subjects of importance studied by Joule with the originality and thoroughness characteristic of his work, was the application of voltaic electricity to the welding and fusion of metals. Thirty-four years ago he published a most suggestive paper on the subject, in which, after dealing with the difficulties attending the operation of welding, and of the interference of films of oxide, formed upon the highly heated iron surfaces, with the production of perfect welds either under the hammer or by the methods of pressure (of which he then predicted the application to large masses of forged iron), he refers to the possibility of applying the calorific agency of the electric current to the welding of metals, and describes an operation witnessed by him in the laboratory of his fellow-labourer, Thomson, of fusing together a bundle of iron wires by transmitting through them when imbedded in charcoal, a powerful voltaic current. Joule afterwards succeeded in fusing together a number of iron wires with the current of a Daniell battery, and of welding together wires of brass and steel, platinum and iron, etc. In discussing the question of the amount of zinc consumed in a battery for raising a given amount of iron to the temperature of fusion, he points out that the same object would probably be more economically attained by the use of a magneto-electric machine, which would allow the heat to be provided by the expenditure of mechanical force, developed in the first instance by the expenditure of heat; and he indicates the possibility of arranging machinery to produce electric currents which shall evolve one-tenth of the total heat due to the combustion of the coal used, so that 5,000 grains of coal applied through that agency would suffice for the fusion of one pound of iron. The successful practical realization of Joule's predictions in regard to the application of electric currents, thus developed, to the welding of iron and steel, and to analogous operations, through the agency of the efficient machines devised by Professor Elihu Thomson, was demonstrated to the members of the Association by Professot Ayrton at Bath two years ago, and was shown upon a larger scale to visitors at the Paris Exhibition last year, and recently to highly interested audiences in London by our late President, Sir Frederick Bramwell. The latter demonstrated that the production of iron-welds by means of the Thomson machines was accomplished nearly twice as rapidly as by expert craftsmen; the perfection of the welds being proved by the fact that the strength of bars broken by tensile strains at the welds themselves was about 92 per cent. of the strength of the solid metal. At the Crewe Works Mr. Webb is successfully applying one of these machines to a variety of welding-work. The rapidity with which masses of metal of various dimensions are raised in those machines to welding heat is quite under control; the heat is applied without the advent of any impurities, as from fuel, and the speed of execution of the welding operation reduces to a minimum the time during which the heated surfaces are liable to oxidize. With such practical advantages as these, this system of electric welding bids fair to receive many useful applications.

Another very simple system of electric welding, especially applicable to thin iron- and steel-sheets, hoops, etc., has been contemporaneously elaborated in Russia by Dr. Bernados, and is already being extensively used. The required heat at the surfaces to be welded is developed by connecting the metal with the negative pole of the dynamo-machine, or of a battery of accumulators, the circuit being completed by applying a carbon electrode to the parts to be heated; the reducing power of the carbon is said to preserve the heated metal surfaces from oxidation during the very brief period of heating. This mode of operation appears to have been practised upon a small scale, some years ago, by Sir William Siemens, to whom we also owe the first attempt to practically apply electric energy to the smelting of metals.

In his Address in 1882 he referred to some results attained with his small electrical furnace, and pointed out that, although electric energy could, obviously, not compete economically with the direct combustion of fuel for the production of ordinary degrees of heat, the electric furnace would probably receive advantageous application for the attainment of temperatures exceeding the limits (about 1800° C.) beyond which combustion was known to proceed very sluggishly. This prediction appears to have been already realized through the important labours of Messrs. Cowles, who some years ago attacked the subject of the application of electricity to the achievement of metallurgic operations with the characteristic vigour and fertility of resource of our Transatlantic brethren. After very promising preliminary experiments they succeeded, in 1885, at Cleveland, Ohio, in maturing a method of operation for the production of aluminium-bronze, ferro-aluminium and silicium bronze, with results so satisfactory as to lead to the erection of extensive works at Lockport, N.Y., where three dynamo-machines, each supplying a current of about 3,000 Ampères, are worked by water-power, through the agency of turbines, each of 500 h.-p., eighteen electric furnaces being now in operation for the production of aluminium alloys. These achievements have led to the establishment of similar works in North Staffordshire, where a gigantic dynamo-machine has been erected, furnishing a current of 5,000 Ampères, with an E. M. F. of 50 to 60 volts. The arrangement of the electrodes in the furnaces, the preparation of the furnace-charges (consisting of mixtures of aluminium-ore with charcoal and with the particular granulated metal with which the aluminium is to become alloyed at the moment of its elimination from the ore); the appliances for securing safety in dealing with the current from the huge dynamo-machine, and many other details connected with this new system of metallurgic work, possess great interest. Various valuable copper and aluminium alloys are now produced by alloying copper itself with definite proportions of the copper-alloy, very rich in aluminium, which is the product of the electric furnace. The rapid production in large quantities of ferro-aluminium—which presents the aluminium in a form suitable for addition in definite proportions to fluid cast iron and steel—is another useful outcome of the practical development of the electric furnace by Messrs. Cowles.

The electric process of producing aluminium-alloys has, however, to compete commercially with their manufacture by adding to metals, or alloys, pure aluminium produced by processes based upon the method originally indicated by Oersted in 1824, successfully carried out by Wöhler three years later, and developed into a practical process by H. St. Claire Deville in 1854—namely, by eliminating aluminium from the double chloride of sodium and aluminium in the presence of a fluoride, through the agency of sodium. An analogous process, indicated in the first instance by H. Rose—namely, the corresponding action of sodium upon the mineral cryolite, a double fluoride of aluminium and sodium—has also been recently developed at Newcastle, where the first of these methods was applied, upon a somewhat considerable scale, in 1860, by Sir Lowthian Bell, but did not then become a commercial success, mainly owing to the costliness of the requisite sodium. As the cost of this metal chiefly determines the price of the aluminium, technical chemists have devoted their best energies to the perfection and simplification of methods for its production, and the success which has culminated in the admirable Castner process constitutes one of the most interesting of recent illustrations of the progress made in technical chemistry, consequent upon the happy blending of chemical with mechanical science, through the labours of the chemical engineer.

Those who, like myself, remember how, between forty and fifty years ago, a few grains of sodium and potassium were treasured up by the chemist, and used with parsimonious care in an occasional lecture-experiment, cannot tire of feasting their eyes on the stores of sodium-ingots to be seen at Oldbury as the results of a rapidly and dexterously executed series of chemical and mechanical operations. The reduction which has been effected in the cost of production of aluminium through this and other processes, and which has certainly not yet reached its limit, can scarcely fail to lead to applications of the valuable chemical and physical properties of this metal so widespread as to render it as indispensable in industries and the purposes of daily life as those well-known metals which may be termed domestic, even although, and, indeed, for the very reason that, its association with many of these, in small proportion only, may suffice to enhance their valuable properties or to impart to them novel characteristics.

The Swedish metallurgist, Wittenström, appears to have been the first to observe that the addition of small quantities of aluminium to fused steel and malleable iron had the effect of rendering them more fluid, and, by thus facilitating the escape of entangled gases, of ensuring the production of sound castings without any prejudicial effect upon the quality of the metal. The excellence of the so-called Mitis castings, produced in this way, appears thoroughly established, and the results of recent important experiments seem to be opening up a field for the extensive employment of aluminium in this direction, provided its cost becomes sufficiently reduced. The valuable scientific and practical experiments of W. J. Keep, James Riley, R. Hadfield, Stead, and other talented workers in this country and the United States are rapidly extending our knowledge in regard to the real effects of aluminium upon steel, and their causes. Thus it appears to be already established that the modifications in some of the physical properties of steel resulting from the addition of that metal, are not merely ascribable to its actual entrance into the composition of the steel, but are due, in part, to the deoxidation by aluminium of some proportion of iron-oxide which exists distributed through the metal, and prejudicially affects its fluidity when melted. In the latter respect, therefore, the influence exerted by aluminium, when introduced in small proportions into malleable iron and steel, appears to be quite analogous to that of phosphorus, silicium, or lead when these are added in small proportions to copper and certain of its alloys, the deoxidation of which, through the agency of those substances, results in the production of sound castings of increased strength and uniformity. It is only when present in small proportion in the finished steel that aluminium increases the breaking strain and elastic limit of the product.

The influence of aluminium, when used in small proportion, upon the properties of grey and white cast iron, is also of considerable interest, especially its effect in promoting the production of sound castings, and of modifying the character of white iron in a similar manner to silicium, causing the carbon to be separated in the graphitic form; with this difference —that the carbon appears to be held in solution until the moment of setting of the liquid metal, when it is instantaneously liberated, with the result that the structure of the cast metal and distribution of the graphite are perfectly uniform throughout.

The probable beneficial connection of aluminium with the industries of iron and steel naturally directs attention to the great practical importance in the same direction, which has already been acquired, and promises to be in increasing measure attained, by certain other metals which, for long periods succeeding their discovery, have either been only of purely scientific interest and importance, or have acquired practical value in regard to their positions in a few directions quite unconnected with metallurgy. Thus, great interest attaches to the influence of the metals manganese, chromium and tungsten upon the physical properties of steel and iron.

The name of Mushet is most prominently associated with the history of manganese in its relations to iron and steel. Half-a-century ago David Mushet carried out very instructive experiments on the influence exerted upon the properties of steel by the presence of manganese; and to Robert Mushet we owe the invaluable experiments leading to his suggestion to use manganese in the production of steel by the Bessemer process, which at once smoothed the path to the marvellously rapid and extensive development of the applications of steel produced by that classic method, and subsequently by the open hearth or Siemens-Martin process—a development which has recently received its crowning illustration in the completion of one of the grandest of existing triumphs of engineering science and constructive skill—the Forth Bridge.

Robert Hadfield has recently contributed importantly to our knowlege of the relations of manganese to iron. His systematic study of the subject has revealed some very remarkable variations in the physical properties of so-called manganese-steel, according to the proportions of manganese which it contains. Thus, while the existence in steel of proportions ranging from 0·1 up to about 2·75 per cent. improves its strength and malleability, it becomes brittle if that limit is exceeded, the extreme of brittleness being obtained with between 4 and 5 per cent. of manganese; if, however, the percentage is increased to not less than 7, and up to 20, alloys of remarkable strength and toughness are obtained. Castings of high manganese-steel, such as wheel-tyres, combine remarkable hardness with toughness. Even if the proportion of manganese is as high as 20 per cent. in a steel containing 2 per cent. of carbon, it can be forged; whereas it is very difficult to forge a steel of ordinary composition containing as much as 2·75 per cent. of carbon. Another remarkable peculiarity of the high manganese-steel is its behaviour when quenched in water. Instead of the heated metal being hardened and rendered brittle by the sudden cooling, like carbon-steel, its tensile strength and its toughness are increased; so that water-quenching is really a toughening process, as applied to the manganese-alloy; and an interesting feature connected with this is that, the colder the bath into which the highly-heated metal is plunged, the tougher is the product. The curious effect of manganese in reducing, and even destroying, the magnetic properties of iron was already noticed by Rinman nearly 120 years ago; one result of Hadfield's important labours has been to place in the hands of such eminent physicists as Thomson, John Hopkinson, and Reinold, materials for the attainment of most interesting information respecting the electrical and other physical characteristics of manganese-steel. Hopkinson, from experiments with a sample of steel containing 12 per cent. of manganese, estimated that not more than 9 out of the 86 per cent. of the iron composing the mass was magnetic, and he considered that the manganese enters into that which must, for magnetic purposes, be regarded as the molecule of iron, completely changing its properties, a fact which must have great significance in any theory regarding the nature of magnetization. The great hardness of manganese-steel, and the consequent difficulty of dealing with it by means of cutting-tools, constitute at present the chief impediments to its technical applications in many directions; but where great accuracy of dimensions is not required, and where great strength is an essential, it is already put to valuable uses.

The importance of manganese in connection with the metallurgy of iron and steel is in a fair way of finding its rival in that of the metal chromium, the employment of which, as an alloy with steel, was first made the subject of experiment in 1821, by Berthier, who was led by the important experiments of Faraday and Stoddart, then just published, to endeavour to alloy chromium with steel, and obtained good results by fusing steel together with a rich alloy of chromium and iron, so as to introduce about 15 per cent. of the former into the metal. Further small experiments were made the year following, by Faraday and Stoddart, in the same direction; but chrome-steel appears to have been first produced commercially at Brooklyn, N.Y., sixteen years ago. Ten years later its manufacture had become developed in France, and the varieties of chrome-steel produced in the Loire district now receive important and continually-extending applications, on account of their combining comparative hardness with high tenacity, and only little loss in ductility, and of their acquiring great closeness of structure when tempered.

The influence of chromium upon the character of steel differs in several marked respects from that exercised by manganese; thus, chrome-steels weld badly, or not at all, whereas manganese-steels weld very readily, and work under the hammer better than ordinary carbon-steel. Again, the remarkable influence of manganese upon the magnetic properties of steel and iron is not shared by chromium. Chrome-steel has for some time been a formidable rival of the very highest qualities of carbon-steel produced for cutting-tools, and of the valuable tungsten-steel which we owe to Robert Mushet. The great hardness, high tenacity and exceeding closeness of structure possessed by suitably-tempered steel containing not more than from 1 to 1·5 per cent. of chromium, and from 0·8 to 1 per cent. of carbon, renders this material invaluable for war purposes: cast projectiles, when suitably tempered, have penetrated compound steel and iron plates over 9 inches in thickness, such as are used upon armoured ships of war, without even sustaining any important change of form. The proper tempering of these projectiles necessitates their being produced hollow; their cavities or chambers are only of small capacity, but the charge of violent explosive which they can contain, and which can be set into action without the intervention of fuse or detonating appliance, suffices to tear these formidable punching-tools into fragments as they force their way irresistibly through the armoured side of a ship, and to violently project those fragments in all directions, with fearfully destructive effects. The employment of chromium as a constituent of steel plates used for the protection of ships of war is already being entered upon, and the influence exerted by the presence of that metal in small quantities in steel employed in the construction of guns is also at present a subject of investigation. At Crewe, Mr. F. Webb has for some time past used chromium, with considerable advantage, in the production of high-quality steels for railway requirements.

The practical results attained by the introduction of copper and of nickel as components of steel have also recently attracted much attention. At the celebrated French Steel Works of M. Schneider, at Creuzot, the addition of a small percentage of copper to steel used for armour-plates and projectiles is practised, with the object of imparting hardness to the metal without prejudice to its toughness. James Riley has found that the presence of aluminium in very small quantities facilitates the union of steel with a small proportion of copper, and that the latter increases the strength but does not improve the working qualities of steel. With nickel, Riley has obtained products analogous in many important respects to manganese steel; the remarkable differences in the physical properties of the manganese alloys, according to their richness in that metal, are also shared by the nickel alloys, some of these being possessed of very valuable properties. Thus it has been shown by Riley that a particular variety of nickel-steel presents to the engineer the means of nearly doubling boiling pressures, without increasing weight or dimensions. He has, moreover, found the co-existence of manganese in small quantity with nickel in the alloy to contribute importantly to the development of valuable physical properties.

The careful study of the alloys of aluminium, chromium, manganese, tungsten, copper, and nickel, with iron and with steel, so far as it has been carried, with especial reference to the influence which they respectively exercise upon the salient physical properties of those materials, even when present in them in only very small proportions, has demonstrated the importance of a more searching or complete application of chemical analysis, than hitherto practised, to the determination of the composition of the varieties of steel which practical experience has shown to be peculiarly adapted to particular uses. It appears, indeed, not improbable that certain properties of these, which have been ascribed to slight variations in the proportion or the condition of the constituent carbon, or in the amount of silicium, phosphorus, and manganese which they contain, may sometimes have been due to the presence in minute quantities of one or other of such metals as those named, and to the effects which they produce, either directly or indirectly by modifying or counteracting the effects of the normal constituents of steel. The important part now played by manganese in steel manufacture is an illustration of the comparatively recent results of research, and of practical work based on research, in these directions, and the effects of the presence in steel of only very small quantities of some of the other metals named are already, as I have pointed out, being similarly understood and utilized.

Such systematic researches as those upon which Osmond, Roberts-Austen and many other workers have been for some time past engaged, may make us acquainted with the laws which govern the modifications effected in the physical characteristics of metals by alloying these with small proportions of other metals. The suggestion of Roberts-Austen, that such modifications may have direct connection with the periodic law of Mendeleeff, which may furnish explanations of the causes of specific variations in the properties of iron and steel, has been followed up energetically by Osmond, who has experimentally investigated the thermal influence upon iron of the elements phosphorus, sulphur, arsenic, boron, silicium, nickel, manganese, chromium, copper and tungsten. He regards his results as being quite confirmatory of the soundness of Roberts-Austen's suggestion, as they demonstrate that foreign elements having atomic volumes lower than iron tend to make it assume or preserve the particular molecular form in which it has itself the lowest atomic volume, while the converse is the case for the foreign elements of high atomic volume. An analogous influence was found to be exerted by those two groups of elements upon the permanent magnetization of steel.

Captivating as such deductions are, those who have devoted much attention to the practical investigation of iron, steel, and other metals, cannot but feel that much caution has to be exercised in drawing broad conclusions from the results of such researches as these. Like the investigations recently made with the object of ascertaining the condition in which carbon exists in steel, and the part played by it in determining the modifications in the properties developed in that material by the influence of temperature and of work done upon it, they are surrounded by formidable difficulties, arising from the practical impossibility of altogether eliminating the disturbing influences of minute quantities of foreign elementary bodies, co-existing in the metal operated upon, with those whose effects we desire to study. Certain it is, however, that by acquiring an accurate acquaintance with the composition of varieties of iron and steel exhibiting characteristic properties; by persevering in the all-important work of systematic practical examination of the mechanical and physical peculiarities developed in iron and steel of known composition by their association with one or more of the rarer metals in varied proportions, and by the further prosecution of chemical and physical research in such directions as those which have already been fruitful of most instructive results, such talented labourers as Chernoff, Osmond, Roberts-Austen, Barus, and Stroudal, Hadfield, Keep, James Riley, Stead, Turner, and others, cannot fail to contribute continually to the development of improvements equalling in importance those already attained in the production, treatment, and methods of applying cast iron, malleable iron, and steel, or alloys equivalent to steel in their qualities.

The causes of the variations in the physical properties of steel produced by the so-called hardening, annealing, and tempering processes were for very many years a fruitful subject of experimental inquiry, as well as of theoretical speculation with regard to the condition in which the carbon is distributed in steel, according to whether the metal is hardened or annealed, or in an intermediate, tempered state. Recent researches have made our knowledge in the latter direction fairly precise; as yet, however, we are only on the track of definite information respecting the nature and extent of connection between the physical peculiarities of steel in those different conditions and the established differences in the form and manner in which the carbon is disseminated through it.

The careful systematic study of the modifications developed in certain physical properties of iron and steel by gradual changes of temperature between fusion of the metal and the normal temperature, has shown those modifications to be governed by a constant law, and that at certain critical temperatures special phenomena present themselves. This important subject, which was so clearly brought before the Association last year in the interesting lecture of Roberts-Austen, has been, and is still being pursued by accomplished workers, among whom the most prominent is F. Osmond. The phenomenon of recalescence, or the re-glowing of, or liberation of heat in, iron and steel at certain stages during the cooling process, first noticed by Gore, and examined into by Barrett, appears to be the result of actual chemical combination between the metal and its contained carbon at the particular temperature attained at the time; while the absorption of heat, demonstrated by the arrest in rise of temperature during its continuous application to the metal is ascribed to the elimination, within the mass, of carbon as an iron-carbide perfectly stable at low temperatures. The pursuit of a well-devised system of experimental inquiry into this subject has led Osmond to propound theories of the hardening and tempering of steel, which are at present receiving the careful study of physicists and chemists, and cannot fail to lead to further important advancement of our knowledge of the true nature of the influence of carbon upon the properties of iron.

Another important subject connected with the treatment of masses of steel, and with the influence exercised upon their physical characteristics by the processes of hardening and tempering, and by submitting them to oft-repeated concussions or vibrations, or frequent or long-continued strains, is the development and maintenance, or gradual disappearance, of internal stresses in the masses—one of the many important subjects to which attention was directed by Dr. Anderson, the Director-General of Ordnance Factories, in his very suggestive address to the Mechanical Section last year. This question is one of especial interest to the constructor of steel guns, as the powers of endurance of these do not simply depend upon the quality of the material composing them, but are very largely influenced by the treatment which it receives at the hands of the gun-maker. Indeed, the highest importance attaches to the processes which are applied to the preliminary preparation of the individual parts of which the gun is constructed, and to the putting together of these so as to ensure their being and remaining in the physical condition best calculated to assist each other in securing for the structure the power of so successfully resisting the heavy strains to which it has to be subjected, as to suffer little alteration other than that due to the superficial action of the highly heated products of explosion of the charges fired in the gun. The development of internal strains in objects of steel, especially by the hardening and tempering processes, or by their exposure to conditions favourable to unequal cooling of different parts of the mass, has long been a subject of much trouble and of experimental inquiry in connection with many applications of steel. Systematic experiments of the kind commenced, about eighteen years ago, by the late Russian general, Kalakoutsky, are now being pursued at Woolwich, with the objects of determining the nature and causes of internal stresses in steel gun-hoops and tubes, and in shells, and of thereby establishing the proper course to be adopted for avoiding, lessening, or counteracting injurious stresses, on the one hand, and for setting up stresses beneficial to the powers of endurance of guns, on the other. One method of experiment pursued, with parts of guns, is to cut narrow hoops off the forgings, after a particular treatment, which are then cut right across at one place, it being observed whether, and to what extent, the resulting gaps open or close. This important subject has also been similarly investigated by my talented old friend and fellow-worker, the President this year of the Mechanical Section, Captain Andrew Noble, whose name in connection with the science and practice of artillery is familiar to us as household words.

The Crimean War taught nations many lessons of gravest import, to some of which Sir Richard Owen took occasion to call attention most impressively in the address delivered here, before the miseries of that war had become past history. The development of sanitary science, to which he especially referred, and which sprang from the bitter experience of that sad epoch, has had its parallel in the development of the science of artillery; but it would indeed be difficult to establish any parallelism between the benefits which even the soldier and the sailor have reaped from the great strides made by both these sciences. The acquisition of knowledge of the causes of the then hopelessness of gallant struggles which medical skill and self-sacrificing devotion made against the sufferings of the victims of battles and of fell diseases, as deadly as the cruellest implements of war; the application of that knowledge to the provision of the blessings of antiseptic treatment of wounds and to the intelligent utilization of disinfectants and of other valuable preventive measures, to the supply of wholesome water, of wholesome food in campaigning, of sensible clothing, and of wholesome air in hospitals, barracks and ships—these are some few of the benefits which the soldier and the sailor have derived from the development of sanitary science, which was so powerfully stimulated by the terrible lessons learned during the long-drawn-out siege of Sebastopol; and it is indeed pleasant to reflect that there has been, for years past, most wholesome competition between nations in the enlargement of those benefits, and their dissemination among the men whose vocation it is to slay and be slain. The periodical International Congresses on Hygiene and Demography, of which we shall cordially welcome next year's assemblage in London, and whose members will deplore the absence from among them of the veteran Nestor in the science and practice of hygiene, Sir Edwin Chadwick, have afforded conclusive demonstration of the heartiness with which nations are now co-operating with a view to utilize the invaluable results attained by the successful labourers in sanitary science.

What, on the other hand, shall we say of the benefits which sailors and soldiers, in the pursuit of their calling, derive from the ceaseless costly competition amongst nations for supremacy in the possession of formidable artillery, violent explosives, quick-firing arms of deadly accuracy, and fearful engines which, unseen, can work wholesale destruction in a fleet? And what can we say of the benefits acquired by individual countries in return for their continuous, and sometimes ruinous, expenditure in endeavouring to maintain themselves upon an equality with their neighbours in man-killing power? The conditions under which engagements by sea or land will in the future be fought have certainly become greatly modified from those of thirty-five years ago, and the duration of warfare, even between nations in conflict who are on a fair equality of resources, must become reduced; but, as regards the results of a trial of strength between two contending forces, similarly equipped, as they now will be, with the latest of modern appliances, only varying in detail, these must, after all, depend, as of old, partly upon accident, favoured, perhaps, by a temporary superiority in equipment, partly upon the skill and military genius of individuals, and very much upon the characteristics of the men who fight the battles.

What really can be said in favour of the advances made in the appliances of war—and this is, perhaps, the view which in such a town as Leeds we should keep before our eyes to the exclusion of the dark side of the picture—is, that by continuous competition in the development of their magnitude, diversity, and perfection, the resources of the manufacturer, the chemist, the engineer, the electrician, are taxed to the uttermost, with the very important, although incidental, results, that industries are created or expanded and perfected, trades maintained and developed, and new achievements accomplished in applied science, which in time beneficially affect the advance of peaceful arts and manufactures. In these ways the expenditure of a large proportion of a country's resources upon material which is destroyed in creating destruction does substantially benefit communities, and tends to the accomplishment of such material progress by a country as goes far to compensate its people for the sacrifices which they are called upon to incur for the maintenance of their dignity among nations.

From this point of view, at any rate, it may interest members of the British Association for the Advancement of Science, and for the promotion of its applications to the welfare and happiness of mankind, to hear something of recent advances in one of the several branches of science in its applications to naval and military requirements with which, during a long and arduous official career, now approaching its close, I have become in some measure identified.

Since the meeting of the Association in this town in 1858, the progress which has been made in the regulation of the explosive force of gunpowder, so as to adapt it to the safe development of very high energy in guns presenting great differences in regard to size and to the work which they have to perform, has been most important. The different forms of gunpowder which were applied to war-purposes in this and other countries, until within the last few years, presented comparatively few differences in composition and methods of manufacture from each other and from the gunpowder of our ancestors. The replacement of smoothbore guns by rifled artillery, which followed the Crimean War, and the great increase in the size and power of guns, necessitated by the application of armour to ships and forts, soon called, however, for the pursuit of investigations, having for their object the attainment of means for variously modifying the action of fired gunpowder, so as to render it suitable for artillery of different calibres whose power could not be effectively, or, in some instances, safely, developed by the use of the only kind of gunpowder then employed in English artillery of all calibres.

The means resorted to in the earlier of these investigations, and adhered to for many years, for controlling the violence of explosion of gunpowder, consisted exclusively in modifying the size and form of the individual masses composing a charge, and of their density and hardness, with the object of varying the rate of burning of those masses in a gun; it being considered that, as the proportions of ingredients generally employed very nearly correspond to those required for the development of the greatest chemical energy by the thoroughly-incorporated materials, the attainment of the desired results should be, if possible, effected rather by modifications of the physical and mechanical characters of gunpowder, than by variations of the proportions and chemical characters of its ingredients.

The varieties of powder from time to time introduced into artillery-service, as the outcome of investigations in this direction, were of two distinct types: the first of these consisted of further developments of the old granulated or corned powder, being produced by breaking up more or less highly-pressed slabs of the material into grains, pebbles, or boulders of approximately uniform size and shape. Gunpowders of this class, ranging in size from about 1,000 pieces to the ounce to about 6 pieces to the pound, have performed efficient service, and certain of them are still employed. The character of the other type is based upon the theoretical view that uniformity in the action of a particular gunpowder, when employed under like conditions, demands not merely identity in regard to composition, but also identity in form, size, density, and structure of the individual masses of which a charge consists. To approach the practical realization of this view, equal quantities of one and the same mixture of ingredients, presented in the form of powder of uniform fineness and dryness, must be submitted to a particular pressure, for a fixed period, in moulds of uniform size, the surrounding conditions and subsequent manufacturing processes being as nearly as possible alike. Practical experience has shown that uniformity in the ballistic properties of black powder can be even more readily secured by the thorough blending or mixing together of different products of manufacture, presenting some variations in regard to size, density, hardness or other features, than by aiming at an approach to identity in the characters of the individual grains or masses.

When our attention was first actively directed to the modification of the ballistic properties of powder, the subject had already been to some extent dealt with, in the United States, by Rodman and Doremus, and the latter had proposed the employment, in heavy guns, of charges consisting of large pellets of prismatic form. While this prismatic powder, which was first used in Russia, was being perfected, and extensively applied there as well as in Germany and England, the production of powder masses more suitable, by the comparatively gradual nature of their explosion, for the very large charges required for the heavy artillery of the present day, was actively pursued in Italy, and by our own Government Committee on Explosives, the outcome of very exhaustive practical investigations being the very efficient Fossano powder, or *poudre progressif* of the Italians, and the boulder and large cylindrical powders produced at Waltham Abbey.

Researches carried out by Captain Noble and myself, some years ago, with a series of gunpowders, presenting considerable differences in composition, indicated that decided advantages might be secured, for heavy guns especially, by the employment of such a powder as would furnish a comparatively very large volume of gas, its explosion being at the same time attended by the development of much less heat than in the case of ordinary black powder. In the course of these researches much light was thrown upon the causes of the wearing or erosive action of powder-explosions upon the inner service of the gun, an action which, especially in the larger calibres of artillery, produces so serious a deterioration of the arm, that the velocity of projection and accuracy of shooting suffer considerably, the wear being especially great where the products of explosion, while under the maximum pressure, can escape between the projectile and the bore. The great velocity which which the very highly heated gaseous and liquid (fused solid) products of explosion sweep over the heated surface of the metal, gives rise to a displacement of the particles composing the surface of the bore, which increases in extent as the latter becomes roughened, and thus opposes greater resistance; at the same time, the high temperature to which the surface is raised reduces the rigidity of the metal, and its consequent power of resisting the force of the gaseous torrent; and lastly, some amount of chemical action upon the metal, by certain of the highly-heated, non-gaseous products of explosion, contributes towards an increase in the erosive effects. Experiments made upon a large scale by Captain Noble with powders of different composition, and with other explosives, have afforded decisive evidence that the explosive agent which furnishes the largest proportion of gaseous products, and the explosion of which is attended by the development of the smallest amount of heat, exerts least erosive action.

Some eminent German gunpowder-makers, who were at this time actively engaged upon the production of a suitable powder for heavy guns, directed their attention, not merely to an alteration of the proportions of the ingredients, but also to a modification in the character of charcoal employed; the eventual result was the production of a new prismatic powder, composed of saltpetre in somewhat higher proportion than in normal black powder, and of a very slightly-burned charcoal of reddish-brown colour, quite similar to the *charbon roux* which Violette produced about forty-years ago for use in sporting-powder, by the action of superheated steam upon wood or other vegetable matter. This brown prismatic powder (or "coca powder") differs from black powder not merely in colour: it burns very slowly in the open air, and in guns its action is comparatively gradual and long sustained. The products of its explosion are simple; as the powder contains saltpetre in large proportion relatively to the sulphur and charcoal, these become fully oxidized, and a relatively very large amount of water-vapour is produced, partly because of the comparatively high proportion of water in the finished powder, and partly from the large amount of hydrogen in the slightly charred wood or straw used. The smoke from a charge of brown powder differs but little in volume from that of black powder, but it disperses much more rapidly, owing to the speedy absorbtion of the finely-divided potassium salts, forming the smoke, by the large proportion of water vapour through which they are distributed.

This kind of powder has been substituted, with considerable advantage, for black powder in guns of comparatively large calibre, but it soon became desirable to attain even more gradual action in the case of the very large charges required for guns of the heaviest calibres, such as the 110-ton gun, from which shot of about 1,800 lbs. weight are propelled by a powder charge of 960 lbs. Brown powder has, therefore, been modified in composition to suit these conditions; while, on the other hand, a powder intermediate in rapidity of action between black powder and the brown prism powder has been found more suitable than the former for use in guns of moderately large calibre.

The importance which machine-guns and comparatively large, quick-firing guns have assumed in the armament of ships, has made it very desirable to provide a powder for them which will produce comparatively little or no smoke, as their efficient employment becomes greatly limited when, after a very few rounds rapidly fired, with black powder, the objects, against which it is desired to direct the fire, are more or less completely hidden by the interposed smoke. Hence much attention has of late been directed to the production of smokeless, or nearly smokeless, powders for naval use. At the same time the views of many military authorities regarding the importance of dispensing with smoke in engagements on land, have also created a demand for smokeless powders suitable for field artillery and for small-arms.

The properties of ammonium nitrate, of which the products of decomposition by water are, in addition to water-vapour, entirely gaseous, have rendered it a tempting material to those who have striven to produce a smokeless powder; but its deliquescent character has been a formidable obstacle to its application as a component of a useful explosive agent. By incorporating charcoal and saltpetre in particular proportions with ammonium nitrate, F. Gaus recently claimed to have produced an explosive material free from the hygroscopic character common to other ammonium nitrate mixtures, and furnishing only permanently gaseous and volatile, or smokeless, products of explosion. These anticipations were not realized, but they led the talented German powder-maker, Mr. Heidemann, to produce an ammonium nitrate powder possessing remarkable ballistic properties, and producing comparatively little smoke, which speedily disperses. It yields a very much larger volume of gas and water-vapour than either black or brown powder, and is considerably slower in action than the latter; the charge required to produce equal ballistic results is less; while the chamber-pressure developed is lower, and the pressures along the chase of the gun are higher, than with brown powder. No great tendency is exhibited by it to absorb moisture from an ordinarily dry, or even somewhat moist, atmosphere, but it rapidly absorbs water when the hygroscopic condition of the air approaches saturation, and this greatly restricts its use.

About five years ago reports began to reach us from France of the attainment of remarkable results with a smokeless powder employed with the repeating or magazine rifle then in course of adoption for military service, and of marvellous velocities obtained by the use of this powder, in specially constructed artillery of great length. As in the case of the explosive agent called *mélinite*, the fabulously destructive effects of which were much vaunted at about the same time, the secret of the nature of this smokeless powder was well preserved by the French authorities; it is now known, however, that more than one smokeless explosive has succeeded the original, and that the material at present in use with the Lebel repeating rifle belongs to a class of nitro-cellulose- or nitro-cotton preparations, of which several have been made the subject of patents in England, and of which varieties are also being used in Germany and other countries.

A comparison between the chemical changes attending the burning or explosion of gunpowder, and of the class of nitro-compounds represented by gun-cotton, at once explains the cause of the production of smoke by the former, and of the smokelessness of the latter. Whilst the products of explosion of the nitro-compounds consist exclusively of gases and of water-vapour, gunpowder, being composed of a large proportion of saltpetre, or other metallic nitrate, mixed with charred vegetable matter and variable quantities of sulphur, furnishes products of which over 50 per cent. are not gaseous, even at high temperatures, and which are in part deposited as a fused solid—which constitutes the fouling in a firearm—and in part distributed in an extremely fine state of division through the gases and vapours developed by the explosion, thus giving to these the appearance of smoke as they escape into the air.

So far as smokelessness is concerned, no material can surpass *gun-cotton* (or other varieties of nitro-cellulose); but, even if the rate of combustion of the fibrous explosive in a firearm could be controlled with certainty and uniformity, its application as a safe propulsive agent is attended by so many difficulties that the non-success of the numerous early attempts to apply it to that purpose is not surprising. Those attempts, commencing soon after the discovery of gun-cotton, in 1846, and continued many years later in Austria, consisted entirely in varying the density and mechanical condition of employment of the gun-cotton fibre. No difficulty was experienced in thus exercising complete control over the rapidity of burning in the open air; but when the material was strongly confined, as in the bore of a gun, such methods of regulating its explosive force were quite unreliable, as some slight unforeseen variation in its compactness or in the amount and disposition of the air-spaces in the mass, would develope very violent action. Much more promising results were subsequently obtained by me by reducing the fibre to a pulp, as in the ordinary process of making paper, and converting this into highly compressed, homogeneous masses of the desired form and size. Some favourable results were obtained at Woolwich, in 1867–8, in field-guns, with cartridges built up of compressed gun-cotton variously formed and arranged, with the object of regulating the rapidity of explosion of the charge. But although comparatively small charges often gave high velocities of projection, without any indications of injury to the gun, the uniform fulfilment of the conditions essential to safety proved to be beyond absolute control, even in guns of small calibre; and military authorities not being, in those days, alive to the advantages which might accrue from the employment of an entirely smokeless explosive in artillery, experiments in this direction were not persevered in. At the same time, considerable success attended the production of gun-cotton-cartridges for sporting purposes, the rapidity of its explosion being controlled by various methods; very promising results were also attained with the Martini-Henry rifle and a lightly-compressed pulped gun-cotton-charge, of pellet-form, the uniform action of which was secured by simple means.

(*To be continued.*)

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Reverdy, Transom, Indicatcr, Botanist, Inquirer.

RECENT DONATIONS TO THE MUSEUM.

CURACOA ALOES.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

During the last month there has been presented to the Society's Museum by D. F. van Eeden, of Haarlem, specimens of the leaves and flowers of the aloe from which Curacoa aloes is prepared.

In a previous note (*Pharm. Journ.*, [3], xx., p. 562) I pointed out the probability that this variety of aloes might perhaps owe its distinct appearance and peculiar odour to the presence in the island of some other species of aloes as well as the *A. vulgaris.* In subsequent letters, however, Professor van Eeden stated that so far as he could learn only one species of aloes is *cultivated* in the island at the present time, and he kindly promised to obtain flowering specimens of the plant for identification. These specimens arrived during the past month, the leaves being preserved in spirit and the inflorescence in vaseline, so that the colour and consistence of the flowers was well retained. These specimens have been examined by Mr. J. G. Baker, F.R.S., of the Kew Herbarium, who is so well known as an authority on the genus. He refers the plant without hesitation to *Aloe chinensis*, Baker.

This species is figured and described in the *Botanical Magazine*, p. 630. The occurrence of a Chinese (?) species as a cultivated plant in the Dutch colony of Curacoa seems so unexpected an occurrence that it seems desirable to quote from Mr. Baker's description of the plant in the *Botanical Magazine.*

> "Native country unknown. Trusting to a large extent to garden tradition we venture to identify the present plant with an aloe which was introduced from China by Mr. W. Anderson in 1817, and which was briefly described by Haworth from flowerless specimens in his 'Suppl. Plant. Succul.,' p. 45, in 1819, as a probable var. of *Aloe barbadensis*, and is mentioned by name only in Salm-Dyck's monograph or in Kunth's 'Enum.,' iv., 522. It is clearly quite specifically distinct from *A. barbadensis.* The leaves are never more than half the length of those in that species and are spotted more or less copiously on the back and face after the fashion of *Aloe abyssinica*; the raceme is very much laxer and the stamens are very much shorter. We have had it for a long time in the Kew collection, but never, so far as I know, with any definite information as to its native country. The flower has a strong and decidedly unpleasant scent. Its affinity is with *A. barbadensis*, *abyssinica*, and *consobrina.*"

A full description of the plant is given both in the *Botanical Magazine* and in Mr. Baker's paper on "Aloineæ" in the *Journal of the Linnean Society*, vol. xviii. (1881, p. 161). In this paper the name *Aloe barbadensis*, Mill., is sunk under that of *A. vera*, L.

From the above statements it would appear that the Curacoa aloe plant is nearly allied but yet specifically distinct from *A. vera*, L. (*A. barbadensis*, Mill.), so that if it can be shown that the plant cultivated in Barbadoes is the true *Aloe barbadensis*, Mill., the specific difference might go far towards explaining the characteristic odour and appearance of Curacoa aloes as compared with the Barbadoes aloes of commerce.

A. vera, L. (*Aloe barbadensis*, Mill.), is a native of the Mediterranean region, although now widely disseminated in the warmer regions of the globe, and there is a variety of it, *littoralis*, Kœnig, found on the southern shores of eastern India, which is stated in Baker's monograph (*Journ. Lin. Soc.*, xvliii., p. 176) to come near to *A. chinensis*, Baker.

In the absence of more definite information, therefore, it may be assumed that the *Aloe chinensis* cultivated in Curacoa was probably carried there from the Dutch East Indies; although Ligon, 'History of Barbadoes,' London, 1673, p. 98, speaks of the plant as if it were indigenous in A.D. 1647-1650, about twenty years only after the arrival of the first settlers.*

On the other hand no aloe is known as a native of America.

The two specimens received from Professor van Eeden differ slightly from the description given of *A. chinensis*, Baker, in the following particulars:—

The leaves have a purplish colour (due to the action of the spirit employed to preserve them?). The anthers (but not the filaments) are exserted. Each of the segments of the perianth have three purplish lines extending from base to apex. The three outer segments are somewhat acute, and the inner distinctly obtuse. The colour of the leaves and the apex of the perianth segments are not, however, alluded to in Mr. Baker's description.

The aloes of the Arabian coast imperfectly described by Forskäl in 1775 have apparently never been refound, and the distribution of those on the East Coast of Africa is not accurately known, so that if due allowance be made for the changes that are apt to take place in the position of labels in even the best regulated gardens, *A. chinensis* may quite possibly be found to be a native of the coast of Africa, Arabia or India.

Probably several species afford the aloes which find their way to Bombay and Aden,† and varieties of a species nearly allied to *A. vera* are probably used for this purpose. This opportunity may therefore be taken to express the hope that Indian botanists will endeavour to clear up the mystery which still surrounds the botanical source of the aloes produced on the shores of N.E. Africa, Arabia, and India. At the present time there is an aloe entering British commerce under the name of *Socotrine* aloes, and apparently imported from Zanzibar, which has an odour resembling that of Barbadoes aloes, and like it gives a crimson colour with nitric acid, but of the geographical and botanical source of which nothing is accurately known.

The species already described in Baker's monograph as occurring in the regions above mentioned are, *A. Schimperi*, Todaro, p. 159, *A. macrocarpa*, Todaro, *A. commutata*, Todaro, *A. Abyssinica*, Lam., all from Abyssinia; *A. crassipes*, Baker, between Suakin and Berber; *A. constricta*, Baker, S.E. Tropical Africa, and *A. tenuifolia*, Lam., near Zanzibar. But, with the exception of *A. Abyssinica*, I am not aware that any of these species have been stated to yield commercial aloes.

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* 'Pharmacographia,' 2nd ed., p. 681.

† *Pharm. Journ.*, [3], xi., p. 733, 'Jaferabad Aloes,' *Ibid.*, p. 121, 'Musambra Aloes.'

THE TOXIC ACTION OF URANIUM.

In view of the recent discovery of uranium deposits in Cornwall and the large reduction in price, and the consequent endeavour to find useful applications for the metal and its salts, it is well to be alive to the fact, of no great importance whilst the use of uranium salts was confined to the chemist and technologist, that the substance in question is one of the most powerful of the metallic poisons. Although this fact has been known for years it has been somewhat overlooked in much the same way as the extreme toxicity of barium salts has been little insisted on, and the researches of Woroschilsky, chronicled in the *Chemiker Zeitung*, are especially *apropos* at this time.

Our knowledge of uranium dates from its discovery in Bohemian pitch-blende by Klaproth, about a hundred years ago, but the first investigation of the physiological action of its salts appear to have been made in 1824 by Gmelin, who mentions its poisonous character. Leconte in 1851 confirmed this assertion, and added that one of the most characteristic symptoms of poisoning by uranium was the occurrence of large quantities of sugar in the urine, whereupon homœopathists jumped to the conclusion that it must be a specific for diabetes. Woroschilsky's experiments show that sugar certainly appears in the urine after the administration of uranium salts by the mouth, or by subcutaneous injection. As the net result of eight experiments with the nitrate he agrees with the conclusion of Leconte and Chittenden that it is intensely poisonous. But neither the nitrate nor the acetate is well suited for physiological investigations, as both salts coagulate albumen, even when diluted in the proportion of 1 : 10000. Further experiments were therefore instituted with the double tartrate of uranium and sodium, which is both readily soluble, and does not precipitate albumen. It may be prepared by neutralizing a solution of 10 grams of pure uranic oxide (UO_3) in 300 c.c. of a 4 per cent. solution of tartaric acid, with caustic soda, and diluting to 400 c.c. The resulting brown yellow clear liquid is stable if kept from light; it yields on evaporation a glassy amorphous mass, no crystalline double salt being formed. The double tartrate gives with potassium ferrocyanide a deep brown coloration instead of the usual precipitate yielded by ordinary uranium salts, and with ammonium sulphide, after standing a moment, an intensely yellow precipitate, which is soluble in ammonium carbonate.

The physiological action of this salt, exhibited in various ways, was studied in the case of worms, frogs, birds, and mammals. It was found that whether absorbed through the mucous membrane of the stomach, or introduced by subcutaneous injection, it is powerfully poisonous. Subcutaneous doses of 0·5–2·0 milligrams per kilo of body weight, cause death with all the symptoms of acute poisoning. It is noteworthy that very small doses administered subcutaneously are almost as quickly fatal as are considerably larger quantities, the only difference being that the action of the latter on the organs affected is more marked. It is remarkable that during the first day or two after the administration of the poison there is no outward evidence of its effects save the pathological character of the urine, although afterwards the toxic action is increasingly manifest, so that the whole nature of the poisoning may be said to be of a subcutaneous character.

The exact symptoms produced by poisonous doses of uranium are as follows:—severe gastro-enteritis follows its administration, while nephritis is induced by such small doses as 1-2 milligrams per kilo of body weight. It is distinguished from other metallic poisons by acting directly even in very small doses on the walls of the blood vessels. This tendency is doubtless closely connected with its specific action on the blood by causing the hæmoglobin to retain oxygen altogether abnormally, in which respect it resembles hydrocyanic acid. A knowledge of this fact throws considerable light on the phenomena attending poisoning by uranium. On its introduction into the circulation, the difficultly reducible oxyhæmoglobin, resulting from its action above mentioned, probably affects the walls of the blood vessels in the same manner as venous blood and causes their dilatation. The failure of the oxyhæmoglobin under the influence of uranium salts to part normally with its oxygen, accounts also for the profound disorganization of the nutritive functions which ensues, and for the derangement of the nervous system, liver and kidneys which accompanies it. It also explains the general waste of tissue resulting in the emaciation of the animal under experiment, which was a characteristic symptom, and further elucidates the first noted pathological phenomenon, viz., the appearance of sugar in the urine, which is merely a sign of imperfect oxidation in the circulatory system, disappearing with the removal of the ultimate cause. Professor Kobert has recommended, on account of their extreme toxicity, the insertion of the soluble salts of uranium in the list of poisons officially current in Russia, and it is certainly desirable that other countries should make a similar move.

ABSORPTION OF DRUGS FROM OINTMENTS.[*]

BY DR. A. P. LUFF.

The author describes some experiments he has made with the object of ascertaining to what extent drugs spread upon the skin in the form of ointments are absorbed into the general circulation. The several ointments containing soluble drugs were prepared, and each ointment was placed inside a sheep's bladder; the bladder was suspended in a beaker of distilled water, kept at a uniform temperature of 98° F. in a water bath. The ointments were prepared with three different substances as a basis, viz., vaseline, lard and lanolin. The results of these experiments are thus classified:—Vaseline and iodide of potassium, exosmosis commenced at end of *one hour*; lard and iodide of potassium, at end of *nine hours*; lanolin and iodide of potassium, *nil* at end of *twenty-four hours*; vaseline and carbolic acid, exosmosis commenced at end of *two and three-quarter hours*; lard and carbolic acid at end of *seven hours*; lanolin and carbolic acid, *nil* at end of *twenty-four hours*; vaseline and resorcin, exosmosis commenced at end of *ten hours*; lard and resorcin at end of *fifteen hours*; lanolin and resorcin, *nil* at end of *twenty-four hours*. These experiments have all been performed with sheep's bladders, but the author hopes to be able to publish the results of further experiments on the living subject. The practical lesson to be learnt from this paper is, that if an ointment is employed with the view of its active ingredients being absorbed, then vaseline is by far the best excipient to use; but if an ointment is employed for its local effect only, absorption of its active ingredient not being desired, then lanolin is the best excipient for such an ointment.

EFFECT OF TEMPERATURE ON THE NESSLER TEST.

BY A. HAZEN AND H. W. CLARK.

The authors find that the low results obtained by them and by Smart were due, not to imperfect condensation of the ammonia, but to the low temperature of the distillates, which had been condensed in a block tin condenser. It is found that the colour produced in the Nessler test varies with the temperature, and is deeper according as the solution is warmer; it is thus necessary to bring the distillate and the standard ammonia solution to the same temperature before comparing the tints which they give with the Nessler solution.—*Journ. Chem. Soc.*

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[*] *London Medical Recorder*, from the *British Journal of Dermatology* for June.

The Pharmaceutical Journal.

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SATURDAY, SEPTEMBER 13, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MYDRIATIC BASES OF THE SOLANACEÆ.

At the recent meeting of the Apotheker-Verein in Rostock, Professor Schmidt, of Marburg, made an important communication describing the results of an investigation carried out under his direction by his pupil Schütte, in reference to the alkaloids of *Atropa Belladonna* and some other plants of the family Solanaceæ. The point to be ascertained was whether the belladonna plant really contains atropine or whether the atropine that has been obtained from it hitherto has been only a product of the transformation of hyoscyamine. Until about three years ago it was believed that the mydriatic base of belladonna root consisted essentially of atropine mixed with small proportions of hyoscyamine and other bases, and much surprise was created by the announcement that good belladonna root contained no atropine, but only hyoscyamine. The fact that atropine had been obtained in large quantities from belladonna root was therefore only explicable by the circumstance that hyoscyamine readily undergoes transformation into atropine by a mere internal molecular change. Recent observations have shown that this change is brought about by heating hyoscyamine for several hours above its melting point or when an alcoholic solution is kept for some time in contact with a small quantity of caustic alkali. When it is considered that in the preparation of atropine, the liquor extracted from belladonna root is made alkaline for treatment with ether or similar solvents of the base, it will be seen that from the conditions of the process there is a possibility of the transformation of hyoscyamine into atropine. But even if such a change takes place it still remained an open question whether the whole of the atropine obtained is the result of this transformation of hyoscyamine, and whether there may not be good belladonna root which contains together with hyoscyamine a certain amount of atropine or even a preponderance of that base. The conversion of hyoscyamine into atropine may, for all that is known, be a process that takes place under normal conditions in the plant, and experience of plant bases has shown that not only the quantity but the nature of them is materially influenced by the conditions of growth and other circumstances. It was upon the strength of such considerations that, when this subject was discussed, two years ago, at the Naturforscher meeting in Cologne, Professor Schmidt expressed the opinion that the quality as well as the nature of the bases in belladonna root might be dependent upon the age of the plant, the conditions of its growth, and perhaps also upon the mode in which the roots were preserved.

It was for the purpose of clearing up these obscure points that the investigation of the subject was undertaken by Herr Schütte. It was therefore of the first importance to obtain well-authenticated material to operate upon, and to devise a method of treatment for the extraction of the bases which would exclude the possibility of a conversion of hyoscyamine into atropine. The details of this method have not yet been published, but Professor Schmidt stated that he had carefully tested its suitability for the purpose in view. Both wild and cultivated plants have been examined, but at present the work relating to the former only has been completed. Young roots of one or two years' growth, as well as old roots of eight years and upwards, were examined. Both were collected at different periods: in spring, when the leaves were about four inches long; in summer, during inflorescence; and in autumn, when the fruit was ripe. In regard to the amount of base, it was found, in accordance with previous observation, that in old roots it increased from spring to summer, and again decreased in the autumn, the average percentages at those three periods being 0·174, 0·358 and 0·280. The corresponding figures for the younger roots were 0·127, 0·452 and 0·458. The younger roots contained only hyoscyamine, but in the old roots that base was mixed with some atropine, that being the case whether the roots were collected in spring, summer or autumn. The leaves of the wild plant contained in spring and autumn hyoscyamine with some atropine, but the ripe fruit contained only atropine. Long keeping does not appear to have any influence upon the nature of the mydriatic base, for apparently young roots that had been kept for ten years were found to contain only hyoscyamine.

Of the other mydriatic bases examined by Herr Schütte that from stramonium seed was found to consist essentially of hyoscyamine, with small quantities of atropine and hyoscine or oxyatropine. Two samples of duboisia leaves, almost exactly alike in appearance, were found to contain in one instance only hyoscyamine and in the other only hyoscine. Mydriatic bases, having in their behaviour some resemblance to the bases of belladonna, were extracted from the herbaceous parts of the potatoe, *Solanum nigrum*, *Lycium barbarum* and *Nicotiana tabacum*, but the quantities obtained at present have been too small for chemical identification.

THE BRITISH ASSOCIATION MEETING.

The British Association during the meeting which commenced last week in Leeds and was brought to a close on Wednesday, has had under its consideration in its different sections many topics presenting points of special interest to readers of this Journal. The address of the President of the Association, although unusually lengthy, was an able *résumé* of recent progress in applied electricity, metallurgy and the chemistry of explosives. In section A., the address of the President, Mr. J. W. L. Glaisher, was devoted to a mathematical subject, but the physical aspect of the section was manifest in many of the papers read before it. In one of the most interesting Professor Rowland described the results of a research having for its primary object to find out what sort of things molecules are, and in what way they vibrate, which he thinks may be done by studying the relations that may exist between the wave-lengths of the spectra and the different elements. Indications have already been found that similar chemical substances have molecules vibrating in a similar manner. For example, for nearly every line in the zinc spectrum there is a corresponding one in that of cadmium; whilst the same remark holds good with the spectra of calcium, strontium and barium; and those of potassium, cæsium and rubidium. In the chemical section Professor Thorpe devoted his presidential address to a vindication of the claims of Priestley to be considered the discoverer of oxygen and of the composition of water against those put forward recently by M. Berthelot on behalf of Lavoisier. Subsequently Professor Dunstan read a third report of the Committee on the present method of teaching chemistry. Sir Henry Roscoe next introduced a discussion on recent legislation facilitating technical education, or, as he preferred to call it, "science instruction," expressing the opinion that the fact that the sum of £700,000 is now appropriated for the purpose is evidence that the Legislature is alive to the importance of the subject. In a paper on coal tar colours Dr. W. H. Perkin said that Germany is still holding the first place in this industry, though becoming somewhat more closely pressed by Switzerland, France and England. He regretted that so much advance has not been made as might be desired in the training in this country of chemists imbued with a spirit of investigation, but he attributed this partly to manufacturers not having as a body sufficiently realized the importance of employing such men in their works. Sir Frederick Abel also stated that in his knowledge there are works in Germany where chemical research is carried on as an elaborate business, and in one case forty well-trained chemists were thus employed. In another paper Professor Hummel dealt with the popular idea as to the fugitive nature of coal-tar colours, and pointed out that of about three hundred known thirty gave extremely fast colours, which can be said of only about ten natural dyestuffs. On Monday the Mathematical and Chemical sections held a joint meeting for a discussion on the nature of solutions, which was opened by Mr. S. U. Pickering, and in which Professors van t'Hoff and Ostwald took part. Among the other papers read in the Chemical section may be mentioned one on Veratrin, by Dr. Ohrens, of Breslau; one by Professor W. H. Perkins, jun., on Berberine, which he described as the most widely distributed alkaloid in nature; and a note by Mr. W. Morrison on the injurious effect of contact with copper salts on india rubber. Altogether the section seems to have been well supported, and the President stated, when closing the proceedings, that in respect to papers the meeting had been almost unprecedented. The President of the Biological section, Professor A. Milnes Marshall, delivered an address rivalling that of Sir Frederick Abel in length, the subject being embryology, especially in relation to the theory of "recapitulation." On the following day Professor Marshall Ward opened a discussion on the teaching of botany, which he said ought to be carried out in ordinary schools, on account of the interest it arouses in the mind and the stimulus it affords to the processes of accurate observation and comparison. Among the papers, Mr. Hankin submitted one on Indications for the Cure of Infectious Disease; Mr. Sharp described "some experiments with drugs as a question of science;" and Mr. Warington gave some most interesting information as to the power of certain bacteria to form organic compounds from inorganic materials.

All the sections were well attended, though the number of tickets sold, 1775, was not so large as usual in recent years, and only exceeded by 77 the number issued on the previous visit of the Association to Leeds, thirty-two years ago. Next year the Association is to meet in Cardiff, under the presidency of Dr. Huggins, the meeting commencing on the 19th of August.

We are informed that it has been decided to recommence, on Monday, October 6, the classes for pharmaceutical students in connection with the Midland Counties Chemists' Association, provided that not less than twelve students enter for the Minor course, a condition that ought to be easy of fulfilment in a town like Birmingham. The course will include lectures on Chemistry and Chemical Physics delivered on Tuesday evenings, from 8.30 till 9.30 o'clock, by Mr. Stokes Dewson; on Botany and Materia Medica, delivered on Friday evening, from 8 till 9 o'clock, by Mr. F. H. Alcock; and on Pharmacy, delivered on Friday evenings, from 9 till 10 o'clock, by Mr. G. E. Perry. There will also be a "Preliminary" class, meeting on Monday and Wednesday evenings at 8.30 o'clock under the charge of Mr. Stokes Dewson. Details as to fees, etc., may be obtained from Mr. Alcock, Temple Chambers, Bridge Street Corner, Birmingham.

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We have been requested to say that copies of the photograph of the members of the Conference, taken at Bolton Abbey, 15 inches by 12, will be supplied post free for three shillings, upon application to Mr. Woods, 12, Kelsall Street, Leeds.

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We regret to report the death, at the age of seventy-two years, of Mrs. Mary Elizabeth Dixon, who since 1882 had been an annuitant on the Benevolent Fund.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday the 3rd instant, at No. 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. Charles Evans, in the chair. The other members of the Council present were, Messrs. Hayes, McCormack, Baxter, Doran, Dr. Gordon, Professor Tichborne, Mr. Merrin, Dr. Burnes, Messrs. Grindley, Hodgson and Simpson.

A report from the Examiners on the July Examinations was submitted.

The President said the report was satisfactory for it showed that nine out of ten candidates passed. The one who did not pass, failed in theoretical chemistry. The highest answering was 233 marks out of a possible 300. At the Preliminary examination eight candidates passed and six were rejected.

The following report from the Pharmacy Act Amendment Committee was read:—"Meeting held on Monday, August 18, 1890.—A resolution was proposed by the President, seconded by Dr. Burnes, and passed unanimously, to the effect that a vote of thanks be sent to the Most Hon. the Marquis of Waterford for his kindness in devoting so much time and trouble to the amendment of the Pharmacy Act, in consequence of which a debt of gratitude is due to his lordship by every licentiate in Ireland, and by the public for shielding them from the danger which would be caused by the registration of a large number of men throughout the country as retailers of poisons without examination; and that a vote of thanks be forwarded to His Grace the Duke of Abercorn, the Right. Hon. the Earl of Aberdeen, the Right. Hon. the Earl of Meath, and the Right Hon. Lord de Ros, for their kindness in meeting the deputation from the Pharmaceutical Society, and in having the matter referred to the Standing Committee of their lordships' house, to whom the Pharmaceutical Society are indebted for their amendments to the Pharmacy Bill."

The President said that that resolution was to have been moved at the August meeting of the Council. There was no quorum on that occasion, but the letter of thanks which it recommended had been sent.

The report was adopted.

The President: Since I returned from London I saw Mr. Boyd, who expressed a desire that we should appoint a sub-committee, consisting of four members of the Society, to meet four members of the Chemists and Druggists' Societies of Belfast and Dublin, in order to see what it is advisable to do with respect to the examinations prescribed by the new Act, and especially the temporary examinations for the men who are already in business. The Act gives the Lord Lieutenant power to appoint the examiners and to settle the fees, and the places where the examinations are to be held for the men already in business. The examination will be in force up to next June.

Mr. McCormack: Does it lie with the Council to appoint the examiners?

The President: No. We shall have to come to an understanding with the chemists and druggists, and whatever nomination is made by both parties will be submitted to the Lord Lieutenant; but otherwise the appointment has been entirely taken out of the hands of the Pharmaceutical Society.

Professor Tichborne: I think it very satisfactory to find that the chemists and druggists are anxious to work with this Society. Of course, during the passage of the Bill through Parliament there were many points of divergence between us; but that is all past and gone, and it looks as if we were now going to work together for the benefit of the Society. I think we ought at once to show our willingness to co-operate with them by authorizing our Pharmacy Act Committee to act in the matter.

The President: I think it well to say a few words as to what we did in London. We are greatly indebted to the Marquis of Waterford for having supported our amendments. No one could have taken more trouble or given us a more patient hearing than he did. We were over two weeks in London, and during that time we were constantly with him, and he went most fully into the matter with us. It was only at the last moment that the chemists and druggists gave way on the education point. They resisted the proposal that the men already in business should be examined; and it was only at the eleventh hour that they accepted it. It is not worth while delaying you with details of each interview. We were at the House of Lords and met their Committee, to whom we wrote before we went over. It was nearly the same committee that heard the evidence which the Society gave in 1888. They suggested that it would be well if we could get the Lord Chancellor of Ireland or Lord Morris to take the matter up on our behalf, but we failed in doing so, their time being too fully occupied. Finally Lord Aberdeen saw the Marquis of Waterford, who said he would be most happy to do so. We had a great many interviews with him at his house and in the House of Lords, and the result of those interviews and his defence of the Pharmaceutical Society in the House of Lords have already been published in the journals.

Mr. Hayes: I should like to make a short statement in connection with the subject now before the Council. We meet here to-day like the remnant of an army after a sanguinary battle; but we are glad to see our general again at our head to rally his remaining forces. In the late warfare there was very little quarter shown on either side. Now and then there was a truce to negotiate a treaty of peace; but neither side seemed willing to accept any terms but its own. So after a few fruitless attempts on the part of the right centre to find a *modus vivendi* hostilities were renewed, with the firm determination on both sides to fight "to the bitter end." We must acknowledge that in the first encounter the opposition gained a signal victory, all along the line, through the strange and incongruous union of the forces of the right, left and centre in the battlefield of the House of Commons; for, indeed, it was a strange and unusual sight to see William Johnston and Thomas Sexton arm in arm together, and the attorney-general and Mr. Tim Healy interchanging civilities, in their fond desire, "to hurl with hideous ruin and combustion down to bottomless perdition" the Pharmaceutical Society and its friends. The combination was irresistible. The Bill was run through the Commons, almost without an amendment, and in a most crude and unsatisfactory condition from every point of view; and to the Council, which would have to carry out the Act, the task seemed an insurmountable impossibility. The Committee appointed by the Council felt that the crisis was a grave one, and they determined that no effort on their part should be spared to remedy the serious defects of the Bill. With this view we put ourselves in communication with the members of the select committee of the House of Lords of 1888, and any other Irish peer we thought likely to be able to assist us. After a good deal of negotiation we arranged a meeting with the select committee of the Lords, all of whom were present; but we failed to receive from any of them a promise of taking the matter thoroughly up. The fact was they were not able to rightly grasp the subject. They suggested our gaining the assistance of a law-lord—the Lord Chancellor or Lord Morris—both of whom we saw, but were unable to gain their active interest. The Earl of Aberdeen showed a very kindly interest in the matter, and if he could, would have assisted us; but he was not on the side of the house to be able materially to assist and he felt too that an Irish peer would be much more useful. At this juncture there were two members of the Select Committee who were silently working the oracle for us: I mean Lord Lingen and Earl de Ros, and especially the latter, who brought out to us the Duke of Abercorn, who, though he said he was not prepared to take the matter up for us, felt it was most important that he should thoroughly understand the subject, and appointed to meet us the next day, at his private residence, Hampton House. He there gave us an audience of about an hour: and although he could scarcely be expected to have freely grasped the whole question, he was so thoroughly in earnest and so much alive to the importance of our views being well considered, that he promised it should at all events be referred to a Committee of the House. This was gaining a great deal; but to put our views before the Committee, it was absolutely necessary to get a noble lord who was able and willing to study and grasp the whole subject. On our again visiting the House our good friend Earl de Ros introduced us to the Marquis of Waterford, who having heard an epitome of our case, invited us to meet him next day at his residence. We did so and went *seriatim* through the Bill, and explained our suggested amendments. Words would fail to express to you the patience and care, the sharpness and wisdom, which he showed in his investigation of the whole subject; and his gentleness and kindness and urbanity made us feel as much at home with him in his study, as if we were conversing with one another in our own board room. But this was not all. The noble Marquis not being a man to be satisfied with a little knowledge of his subject invited us to meet him again on the morning of the day the Bill was to be read the second time in the Lords; and on that occasion, for an hour and a half he questioned us on doubtful points and thoroughly learned his lesson. Then he went down to the House; and by his grasp of the whole subject, surprised both the friends and opponents of the Bill, and had it referred to a Committee of the House, where through his ability and knowledge, assisted by his grace the Duke of Abercorn, the Bill became law, but so changed that its dearest friends scarcely recognized it. Certainly we may feel thankful that there is a House of Lords, where unfettered by party strife and prejudice, truth and justice are established and reign supreme. So much for the House of Lords, and our noble friends who did their duty without fear or favour, and who have earned the gratitude of not only the Irish pharmacist, but the Irish public, for whose protection and safety they fought this battle. Without detracting from the merits of our many kind advocates in the Upper House we can with truth say of the Marquis of Waterford in the words of Shakespeare—"We will not easy see his like again." But I should be wanting in fidelity and grace if I did not give to our President and Vice-President, Mr. Charles Evans and Mr. W. F. Wills, the praise which is justly due to them for all the care and anxiety they have given to this work which they have so ably accomplished. No one who was not present could possibly understand how much patience and perseverance was necessary, coupled with wisdom and moderation. And the thanks of all pharmacists are justly due to them; for though personally I should have wished a compromise with our opponents from the beginning, I could not but respect the consistency of my friends, who held out for the views and wishes of their constituents, as long as there was a possibility of their gaining even one of them. And now in conclusion, I do not in making this statement wish in any way to crow over those who were our opponents in the past, but who for the future will be our fellow-workers; for I respect them the more for the hard fight they made, and they are to be congratulated for the work which they have accomplished on behalf of the druggists. And I sincerely trust that from this time forth we and they will work hand in hand, living as brethren with courtesy and kindness; and that if there has been in the past any harsh or unkind words hastily or unadvisedly spoken, such will not only be forgiven but forgotten.

Professor Tichborne: I desire to say that our very best thanks are due to the President and the Vice-President of this Society, conjointly with Mr. Hayes, who has just spoken, for the hard work which they underwent and the judiciousness with which they acted in the carriage of this matter. They all know that when the Bill was first brought forward matters looked very serious indeed for this Society. The Bill was introduced without the consent of the Society at all, and there were many things in it which would have been very serious if they had passed into law. I have been interested in the Society since its formation after the passing of the Act of 1875, and therefore I feel very strongly how much it owes on the present occasion to our President and Vice-President. I am the better able to appreciate our obligation to them from the circumstance that they did me the honour to consult me on some matters from London. I have been to some extent behind the scenes, and I know that nothing could exceed the trouble which they took in the matter. I therefore move—

> "That the best thanks of the Council are due and are hereby given to the President, the Vice-President, and Mr. Hayes, for the great trouble they took in London in connection with the amendments to the Pharmacy Act of 1890."

Mr. Hodgson: I have great pleasure in seconding the motion, and endorsing what Professor Tichborne has said. I was not in favour of this Bill being brought in, and I believe that to have been the feeling of the Council at large. The Bill having been rejected that was proposed by Mr. Brunker, the feeling of the Council was that it would be just as well that no further movement should have taken place in Parliament at present. The Bill that was recently put forward was unquestionably propounded by the Chemists and Druggists' Society. Three or four active members of that body were the prime movers of it, and as Professor Tichborne has said, we have now very sincerely to thank our President and Vice-President for having got that Bill thrashed into the shape in which it was produced from the House of Lords. It did not, in the first instance, look to be one that was likely to benefit the Pharmaceutical Society; but it has been greatly altered and is now law, and an Act that we should be fairly pleased with. It is for us now to make the best of it. It contains a great many provisions favourable to the Society, and I think we should now sheathe the sword and look the matter in the face and receive those gentlemen, if they wish to approach us in a friendly spirit and make the best of the Act. I certainly felt sore at the action those gentlemen took; but it is over now, and I think it is desirable for us to meet those gentlemen in a friendly and gracious spirit, and endeavour to make the Act as little objectionable to the trade of Ireland as possible, consistently with carrying out its provisions. I most sincerely second the vote of thanks proposed by Professor Tichborne.

The motion was unanimously agreed to.

The President: I thank you on my behalf and on that of the Vice-President for the extremely kind manner in which you received this resolution. I am extremely indebted to Professor Tichborne for having included Mr. Hayes's name in it. Those who accept office must expect to find work attached to the honour; but Mr. Hayes, although holding no official position, nevertheless helped us in every way in his power and worked most indefatigably, and we are greatly indebted to him for the work he did in London.

Mr. Hayes: It is not necessary for me to make another speech, but I have only to say that anything that I did was merely in the way of advice to my friends in London on whom all the responsibility fell. I have always taken an interest in pharmaceutical matters since the passing of the Act of 1875; and it is no credit to me to have endeavoured to prevent the passing of a measure which, in its original shape, would have virtually ruined pharmacy in Ireland. It was therefore natural that I should endeavour to assist my friends in making the Bill as perfect as possible. I am very much obliged to you for your kind words.

On the motion of Mr. Mc Cormack, seconded by Mr. Baxter, it was resolved that the Pharmacy Act Committee be requested to communicate with Mr. Boyd in reference to his letter asking that a committee should be appointed to consult about the examinations.

The Registrar then read the following letters:—

"Curraghmore, Portland, August 24, 1890.

"Dear Sir,—I have to thank you very much for the resolution which you were kind enough to send me. It gives me great pleasure to think that I was able to be of some slight use to the Pharmaceutical Society with regard to the amendments of the Pharmacy Act; and I am glad that the Act as amended has now become law, as I think it is now a useful Act. Please express to the President and Committee of the Pharmaceutical Society how much I feel their kindness in passing so flattering a resolution. Believe me,

"Faithfully yours,
"WATERFORD.

"Arthur Ferrall, Esq., *Registrar*."

"Barons Court, August 21, 1890.

"Dear Sir,—I have been directed by the Duke of Abercorn to acknowledge the receipt of your letter of the 18th instant and to inform you that his Grace is much flattered by the receipt of the memorial.

"I remain, Yours faithfully,
"Arthur Ferrall, Esq. GERALD WALSH."

"Haddo House, Aberdeen, August 22, 1890.

"Dear Sir,—In the absence of the Earl of Aberdeen, who with Lady Aberdeen is at present in Canada, I have the honour to acknowledge the receipt of your letter of the 18th, which, with the accompanying resolution, I shall have pleasure in at once forwarding to his lordship.

"I beg to remain, Yours faithfully,
"Arthur Ferrall, Esq. GEORGE BOGUE."

A letter dated Birr Castle, August 4, from the Earl of Ros, was also read, stating that it would be out of his lordship's power to receive the deputation from the Council who then sought an interview with him, as he did not think he could be in town for the purpose. The letter mentioned that his lordship had been abroad and had only then just received the letter.

The President: We wrote to his lordship before we went to London asking an interview.

A letter was read from Messrs. Casey and Clay stating that fines of £5 each had been imposed in the three cases heard on July 18, in Belfast.

The President: Everyone of the Belfast cases went in our favour. There is one still untried.

Dr. Burnes called attention to the answering of one of the candidates at the last Preliminary examination. The gentleman totalled 47, but was rejected; nevertheless another who only scored 47 and one who scored 45 and a third who only scored 42 were passed. The candidate who scored 45 failed entirely in one subject. The gentleman whose case he was particularly referring to did not, he believed, score sufficient marks in English to carry him through, but he scored 6 in elementary chemistry, and he (Dr. Burnes) thought that his answering was of a better character than that of the other candidates.

Mr. Hayes: Did he fail in dictation and spelling?

Dr. Burnes: He got 9 in English composition out of a possible 20, and 4 out of a possible 10.

Mr. Hayes: Dr. Tweedy conferred with the Council as to what was to be done with the candidates who failed in spelling, and we decided that they should be put back.

The President: According to the regulations the candidate must score 50 per cent. of the marks in English and arithmetic, and 40 per cent. of the marks for the entire course, in order to entitle him to pass; so that this gentleman could not have been passed.

A letter was read from Mr. W. C. Hinchy, of the Medical Hall, Kilmallock, suggesting that great care should be taken in carrying out the provision of the new Act, under which persons in business prior to 1875 were to be registered.

Professor Tichborne: The answer to his letter is to refer him to the Act.

A letter was read from Mr. W. H. Madden, of No. 2, Gloucesterville, Fitzroy Street, Belfast, asking could a limited liability company trade as dispensing chemists by employing a pharmaceutical chemist as manager, and also, whether it was necessary that the name of such manager should be on the labels.

Mr. Mc Cormack: Refer him to clause 17 of the Pharmacy Amendment Act.

A letter was read from Mr. S. M. Martin, 5, Yarrow Street, Crumlen Road, Belfast, asking whether a registered chemist and druggist would be required to pass the Preliminary examination of the Pharmaceutical Society before he could be admitted to their final examination; and also whether the Council would accept a certificate of having passed the Army Compounders' examination in lieu of that of a chemist and druggist or a registered druggist.

The President: The regulations do not permit a gentleman to present himself for our final examination without having passed the Preliminary examination, or a Preliminary examination which is accepted by the General Medical Council.

The Registrar was directed to reply to Mr. Martin accordingly.

A donation was received from the Pharmacy Board of Victoria of a copy of their Report for 1889.

On the motion of Mr. Mc Cormack, seconded by Mr. Baxter, thanks were voted for the donation.

The Registrar submitted a statement of the fees which had been received in connection with the Society's Night School of Chemistry.

Mr. Grindley considered that the accounts of the school should be kept entirely distinct from those of the Society, and that full particulars of income and expenditure should be given.

Mr. Hodgson remarked that the Council was quite right in providing this school for the benefit of young men who could not attend day schools; but he thought that its accounts should be kept separate from those of the Society. And a fuller statement of the accounts of the school should be prepared against the next meeting of the Council, in order that they might see what they were making themselves liable for. He also thought that if the school was to be advertised the expenses of that should be borne by the professors who had a monetary interest in the school.

The President said he did not think it would be fair to ask the professors to advertise the school. If the Council did not take care of the school, the candidates would not have the necessary means of acquiring knowledge, and they would be asking them to do impossibilities.

Professor Tichborne said it would be necessary to advertise the school immediately.

After some discussion as to the best mode of advertising,

It was ordered, on the motion of Mr. McCormack, seconded by Dr. Burnes, that the Registrar should advertise the night school of chemistry in the *General Advertiser* until the 1st of October, and should also get one hundred cards containing a prospectus of the school printed for distribution in the shop windows of members of the Society.

On the motion of Mr. Baxter, seconded by Mr. Hayes, Mr. John Evans, L.A.H., was re-elected Examiner in Practical Pharmacy.

On the motion of the President, seconded by Dr. Burnes, Mr. Alexander Ferguson Allan, of the Adelaide Hospital, was elected a member of the Society.

The following gentlemen were nominated for membership of the Society:—Mr. Christopher Garry, Greville Street, Mullingar; Mr. Robert M. Lees, Main Street, Wicklow; and Mr. James Aloysius Walsh, 30, Westmoreland Street, Dublin.

The Council then adjourned.

British Pharmaceutical Conference.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held at the Philosophical Hall, Leeds, on Monday, September 1, at 10 p.m.

Present: Mr. Umney (President), in the chair, Professor Green, Messrs. Atkins, Branson, Conroy, Davies, Gerrard, Groves, Kinninmont, Martin, Reynolds, Schacht and Ward, Mr. Martindale (Treasurer), Messrs. Naylor and Ransom (Hon. Gen. Secs.), and Mr. J. C. Nightingale (Assistant Sec.).

The minutes of the previous meeting were read and confirmed.

A draft report for presentation at the annual meeting was submitted by the Hon. General Secretaries and after a slight verbal alteration was agreed to.

The Treasurer's financial statement for the year 1889–90 was read and approved.

Copies of a draft programme of the business of the general meeting were placed before the members. The programme was discussed, amended and finally arranged.

A proposed list of officers for the ensuing year was adopted for recommendation to the general meeting for election.

Mr. Martindale presented a report of the Formulary Committee, in which attention was called to the fact that the whole of the original grant of £25 had been expended. The report was accepted, and it was agreed to recommend to the general meeting the reappointment of the Committee. A further grant of £10 was made for current expenses.

The place of meeting for 1891 was considered. Mr. Naylor read a letter from Mr. Alfred Coleman, of Cardiff, conveying on behalf of a committee of pharmacists of that town a cordial invitation to the Conference to hold its next session there. It was resolved to recommend the invitation to the general meeting for acceptance.

A conversation ensued touching the advisability of the Conference continuing to hold its annual meeting at the same place and about the same time as the British Association. After a free expression of opinion on the matter it was decided to consult the views of the members generally. The President was therefore authorized to ventilate the subject in open meeting and request the members to give their thoughtful consideration to it during the current year.

A letter was read from the Assistant Secretary tendering his resignation of the office which he has held for the past three years. Mr. Naylor expressed personal regret at losing the services of Mr. Nightingale, and desired to refer especially to the wholeheartedness, thoroughness and neatness which had characterized his discharge of the duties of his post. These sentiments were unanimously endorsed, and Mr. Nightingale was thanked for his work in connection with the Conference. At the same time the hope was expressed that the relative affliction which called for his resignation might speedily be removed. A number of gentlemen were elected to membership.

MEETING AT LEEDS.

FIRST DAY'S PROCEEDINGS.

Tuesday, September 2.

(*Continued from page* 193.)

Reading of Papers.

The first paper read was on—

The Alkaloidal Value of Annual and Biennial Henbanes.

BY A. W. GERRARD, F.C.S.

A question which some years ago occurred to me as worthy of investigation, a question which no doubt has often occurred to others, was, whether any differences would be found in the alkaloidal values of the annual and biennial varieties of henbane. It is well known to be the custom in most countries to regard biennial henbane as possessing superior or more active therapeutic properties than the annual kind. Support is given to this view, and, moreover, it is encouraged by the fact that the biennial is the kind found in most pharmacopœias. A search for evidence in support of this preference has not yielded satisfactory results, and there does not appear to have been any chemical or pharmacological investigations made, which give support to the supposed superiority of the one kind of henbane over the other. As regards annual henbane, however, Royle in his 'Materia Medica' says that some cultivated in the botanical gardens of Saharunpore, and the extract made from it, were of excellent quality, as proved by trials made in the General Hospital, Calcutta. Something is known, too, of the first year's biennial root, for the late Mr. Peter Squire pointed out that this root and an extract made from it were relatively far more active than the leaf or its extract, and this statement was based upon some therapeutic experiments conducted by Dr. Gee of St. Bartholomew's Hospital. No estimation of the active principles of this root appears to have been made. Thus it is seen that information on the question I wish to decide appears to be of a very meagre description. This is shown by the remark in Flückiger and Hanbury's 'Pharmacographia' that "no attempt has been made with accuracy to determine the relative merits of the two sorts of henbane." Likewise in Pereira's 'Materia Medica,' which states, "as the biennial variety is more highly developed than the annual, it probably possesses more medicinal activity, and, therefore, should be preferred." I am, however, unacquainted with any experiments demonstrative of its superiority.

The experiments I have conducted on this subject extended over four years; this was necessary in order to enable me to obtain three good specimens of each kind of henbane from different parts of the country. The parts of the plants used were, the leaves and tops of the annual variety, the first year's leaves and root of the biennial kind; likewise the second year's tops of the latter. These selections were made as, except the root, they represent the various sorts of henbane grown and sold in this country. As regards period of collection, the biennial first year's leaf was collected at the end of June, and the root of the same plant at the end of August, excepting in one case, when the root was collected in December. The flowering tops of the biennial plant were gathered in June and July. The annual leaf and tops, being always a later crop than the biennial, were picked at the end of July.

The method of treatment or process of extraction of the various parts was the same in each case, and may thus be detailed. The air dried root or leaf was placed in a large shallow pan and dried over a water bath until its weight remained constant. One kilogram of the dried substance was at once taken and reduced to powder; this was macerated and percolated with proof spirit till exhaustion was complete. The fluid portion was now distilled to remove spirit, and the residue from the still evaporated to a semi-fluid extract. For the purpose of removing resin-like and colouring matters, the extract was diluted with water containing 1 per 1000 hydrochloric acid until it ceased to precipitate, then again filtered and made to a volume of 100 c.c. by addition of water. For the removal of alkaloid the solution of the former process was treated with ammonium hydrate in excess, and the alkaloid shaken out therefrom three consecutive times with chloroform. The mixed chloroformic solutions were exposed to the air for a few hours to allow some free ammonia to escape, after which the chloroform was shaken with dilute hydrochloric acid, which treatment removed the whole of the bases as hydrochlorates. After concentrating the hydrochlorates to a small volume, the bases were finally removed by a fresh addition of ammonium hydrate and several shakings with ether; on evaporation of the ether the bases were obtained in a partly crystalline, partly amorphous state.

The estimation of the bases in the previous residue was done volumetrically by means of a solution of hydrochloric acid, containing 35·5 of the acid in 10,000 parts. Each c.c. of this solution is equivalent to ·0289 grams of either hyoscyamine or atropine, so assuming both alkaloids to be present, no error can arise from this method of analysis. In all cases but one, check analyses were made and the figures obtained were confirmatory of the main results.

The accompanying table shows the variety of henbane, part used, where grown, and yield of alkaloids.

Variety and part used.	Where grown.	Yield of alkaloids from 1000 parts.
Biennial roots.	Middlesex. . .	1·602·
” ”	Sussex. . . .	1·550.
” ”	Lincolnshire. .	1·729.
” first year's leaf.	”	·690.
” ” ” ”	Sussex. . . .	·667.
” ” ” ”	Middlesex. . .	·592.
” second year's tops.	”	·672.
” ” ”	Sussex. . . .	·680.
” ” ”	Lincolnshire. .	·656.
Annual leaves and tops.	Leicestershire .	·641.
” ” ”	Surrey. . . .	·689.
” ” ”	Middlesex. . .	·701.

An examination of this table shows unmistakably three important facts. First, that annual henbane leaf, first year's biennial leaf and second year's biennial tops have practically the same alkaloidal value. Second, that first year's biennial henbane root is much richer in alkaloids than leaf or top of either variety, containing two and a half times as much. Third, that locality of growth does not appear to have much influence on the amount of alkaloid present.

A few bearings of pharmaceutical interest having arisen in the course of the work, they may be referred to at this point. With rectified spirit the biennial root yields an excellent extract, an extract which could be standardized with ease; the dose would be less bulky, being one-sixth to one-third that of the present official extract; it has also a comparative freedom from objectionable taste and odour. Should henbane and its preparations at any time receive consideration from the Pharmacopœia Committee of the General Medical Council, that body may be reasonably urged to make the biennial root and an alcoholic extract thereof official. Such an extract, I feel sure, especially if standardized, would prove a valuable addition to the armoury of drugs; it would provide the medical practitioner with a reliable alternative to the present uncertain and unpleasant extract, and an economical alternative to the very costly hyoscyamine.

As regards the preference which is shown for biennial over annual henbane leaves, it would seem that the preference has no good grounds, but is founded entirely upon prejudice. This prejudice may be accounted for by the more interesting natural history of the biennial plant, its two years of life, its fine and luxuriant growth, and probably its more profitable character; these, together with its selection by the pharmacopœias, have given it a position to which it certainly does not appear entitled.

Turning to the question of the therapeutic value of the two henbanes, it is highly improbable any differences will be found, as their active principles are no doubt the same and present in the same proportions. This view is supported not only by Royle's remarks already referred to, but by the fact that tinctures of both kinds of the drug have been used alternately for the same cases at University College Hospital, without any difference in action having been observed.

One other point brought out in the analyses is the fairly uniform alkaloidal strength of both varieties of leaf, which shows that if care be exercised by the pharmacist in selecting good, fresh English grown henbane, he may rely upon his preparations of the drug being of good quality and uniform strength.

In conclusion, I have to thank Mr. W. Holland, of Market Deeping, for providing me with an excellent supply of first year's biennial root, and, although collected so late as December, it proved to be the best of the three samples examined.

The **President** said the Conference was much indebted to Mr. Gerrard for bringing forward this subject again. He recollected that some five or six years ago he corroborated some statements that had been made by Mr. Gilmour of Edinburgh with reference to henbane, and he was glad to find that he had been continuing his observations. It was quite clear that pharmacists had been acting on a rule of thumb in only using the biennial plant, as it now appeared that the annual variety was quite as good. There had been some very remarkable researches lately with regard to the alkaloids and the conversion of hyoscyamine into atropine, which of course, Mr. Gerrard had not lost sight of. He did not understand whether he had examined the roots of the annual henbane, but that was grown very largely by Mr. Holland, and it was certainly a subject on which more ought to be known.

Mr. **Martindale** remarked on the abundance with which biennial henbane grew on the south coast near Rye. The root of the annual plant was so small that he thought it would be of very little service. It was only when the plant continued growing during the winter that the root became fleshy and attained any appreciable size.

Mr. **Hasselby** (Doncaster) said he had taken a deal of interest in the growth of the various henbanes, his attention having been drawn to it by practical experience. When he was in business at Goole he purchased some biennial leaf without midrib, which he believed was the best, and made a tincture from it. Shortly afterwards, having to dispense a prescription written by a Hull physician, he made use of this tincture, but in a few days after the customer brought it back and asked him if he wished to poison her, for it was quite different from what she had previously obtained at first class establishments. He got down the various bottles from which the prescription had been compounded, and when he came to the biennial henbane she at once said that was what was wrong, for it smelt quite differently from anything she had had before. He suggested that he should take the bottle and ask his opinion of the physician, who at once said that was the right medicine, and since then he had nearly all that physician's prescriptions which came to his district. Mr. Gerrard, however, had shattered the delusion that the biennial henbane was the strongest. He had stated at the Hastings Conference that any chemist who had a garden could grow henbane for himself, but he had met with great initial difficulty in getting the seed, though he had tried in every conceivable direction. He tried some seed he had in his shop but it was no good, probably from having been kiln dried; and though he tried north, east, south and west he failed to get any that would grow. All the seed he could get was annual, and he had the annual plant coming up year by year, and had sent seed to a great many people, but had never heard whether it had been used successfully. If it were now settled that the alkaloidal value of the two tinctures was the same, still some would give up the biennial with regret; the odour it possessed and the resinous deposit it gave on being mixed with water gave the idea that it was the stronger. He had often thought that it would be well if experiments were made with tincture from the root or the seeds, and if that proved efficacious it would be for the Pharmaceutical Committee to decide whether the tincture of the leaves should be retained. He understood that owing to the high price of henbane, belladonna was being largely used in the London hospitals in its place, in one-sixth doses. He had made some experiments with a stock pill, substituting one-sixth quantity of belladonna for extract of hyoscyamus, and had had no complaints, but he thought it better to revert to the hyoscyamus, despite its high price.

Mr. **R. H. Davies** asked if the estimations had been made on the dried root or in the fresh condition in which it was shown, and the same with regard to the comparative estimations made of the leaves.

Mr. **Corder** said this paper threw a considerable light on a very vexed question. It had often been remarked that a quantity of dried medicinal leaves came from the Continent, which were of but small value, and they had been accustomed to think that it was because the annual henbane had been supplied; but he had good reason to think that it was not the *Hyoscyamus niger* at all which was sent in many cases, but another variety, *H. aureus*, which grew very plentifully in many parts of South Germany and which possessed little medicinal value.

Mr. **Cripps** asked if the percentages stated referred to the alkaloids atropine and hyoscyamine only, because the dose of tinct. belladonnæ given in the Pharmacopœia was far less than that of henbane, and yet, according to his experience, belladonna leaf contained usually not more than ·6 per cent. of alkaloid. It seemed strange, if the only alkaloids present were hyoscyamine and atropine, that a full dose of tincture of henbane did not sometimes act as a poison, and he hoped Mr. Gerrard would continue his experiments with a view of seeing whether there were any other alkaloids present. He was somewhat surprised to see the large amount of alkaloid obtained from the root, but he did not think it would be good commercial policy to depend on the root alone, as it would lead to the destruction of the plants.

Mr. **Wright** (Buxton) said he found, as a rule, that henbane leaves obtained in commerce did not yield more than one-third the amount of alkaloid Mr. Gerrard had obtained from his samples. With regard to the tincture of belladonna, his experience was that it yielded a larger quantity of alkaloid than the tincture of henbane.

Mr. **Conroy** asked if the percentage stated of alkaloid in the root was from the annual or the biennial root.

The **President** said it was the biennial root, at the end of the first year.

Mr. **Gerrard** said he regretted it had not occurred to him to refer to Mr. Gilmour's paper, in which he believed the characteristics of the annual and biennial henbane were treated. There was a good deal of what was called plant lore connected with this drug included in the paper, which made it very pleasant reading. There were many stories connected with henbane coming down from the monasteries in the middle ages, and Mr. Gilmour's paper went a good deal into that side of the subject. As had been said already, the annual root was so small that it was not worth any one's while to make a research upon it. The difficulty Mr. Hasselby got into over his bottle of mixture no doubt arose from the fact that the leaf of the biennial henbane did contain far more of the odorous principle than that of the annual plant; moreover, the age of the tincture had an influence on the odour. The difficulty of obtaining biennial seed had been referred to, but if he remembered aright he sent Mr. Hasselby some, and he could vouch for its honesty. But there was a great difficulty in getting henbane seed to grow; he believed a large part of it was never fertilised, and sometimes the seed would lie fallow for years, and then suddenly spring up in large quantity. There was no doubt that belladonna was taking the place of henbane to a considerable extent, partly, he believed, because the physician felt that he could rely more on the uniform character of the former. In the hospital with which he was connected they now used a hundredweight of extract of belladonna per annum, whereas fifteen or sixteen years ago they did not use more than a few pounds. He had made a mistake in reading the figures, stating the quantity as ·6 per cent. when he should have said per 1000. The yield of alkaloid in the root was 2½ times as much as in the leaves, and he did not agree with Mr. Cripps that the root should not be used. The alkaloidal value was 2½ times as great, and that might be put against the size of the root. The active principle also was of a more definite character, and was reliable, besides which an alcoholic extract could be made which always worked up better in any preparation than an aqueous extract, and kept better.

The **President** tendered Mr. Gerrard the thanks of the meeting for his very able and interesting paper.

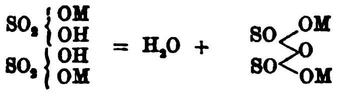
The next paper read was on—

Commercial Alkaline Sulphites.

BY C. H. BOTHAMLEY, F.I.C., F.C.S.

Alkaline sulphites are now of considerable practical importance by reason of their use as disinfectants; as reducing agents; for the separation of aldehydes and ketones; and latterly, and in large quantities, in photographic processes.

Sulphurous acid is dibasic, and is generally supposed to form with alkali metals two classes of salts, the *normal sulphites*, represented by the general formula M_2SO_3, and the *hydrogen sulphites, acid sulphites*, or *bisulphites*, represented by the formula $MHSO_3$. Recently, a third class of sulphites has been brought prominently forward—the so-called *metasulphites* or *metabisulphites*—and there seems to be a prevalent belief that they are new products. As a matter of fact they are not at all new, but were described many years ago by Muspratt, who gave to them their proper name *anhydro-sulphites.* They have the general formula $M_2S_2O_5$, and may be regarded as derived from two molecules of the hydrogen sulphite, with elimination of a molecule of water; thus—



$$\left.\begin{array}{l}SO_2\left\{\begin{array}{l}OM\\OH\end{array}\right.\\SO_2\left\{\begin{array}{l}OH\\OM\end{array}\right.\end{array}\right. = H_2O + \begin{array}{l}SO\langle^{OM}\\ \quad >O\\SO\langle_{OM}\end{array}$$

They stand to sulphurous acid in the same relation as the dichromates to chromic acid or the disulphates to sulphuric acid. They contain no hydrogen and when heated give off no water, but evolve sulphurous anhydride and yield a residue of sulphate and free sulphur, no normal sulphite being formed at any stage of the decomposition (Berthelot), $2M_2S_2O_5 = 2M_2SO_4 + SO_2 + S$. They are very stable and lose sulphur dioxide very slowly indeed at the ordinary temperature.

The object of my paper is to call attention to the character of the alkaline sulphites as they are met with in commerce.

The method of analysis which I always use is that described by Giles and Shearer (*Journ. Soc. Chem. Ind.*, iii., 197 and iv., 303). The salt is added to a measured quantity (in excess) of decinormal iodine solution, and when all the sulphite has dissolved, the liquid is diluted and the excess of iodine determined by means of decinormal thiosulphate solution in the usual way.

Normal sodium sulphite, which crystallizes with seven molecules of water, is frequently met with in a well crystallized and pure form, but, on the other hand, it is not unfrequently contaminated with carbonate and sulphate. Any considerable proportion of the two latter salts makes the crystals efflorescent. Their presence arises from imperfect saturation with sulphurous anhydride, imperfect protection from the oxidizing action of the air, and the use of impure alkaline carbonate on hydroxide in the preparation of the salt.

From a laboratory point of view the acid sulphites and the anhydrosulphites or metasulphites are of greater importance, and they are also very important to photographers.

Potassium bisulphite I was unable to get even after repeated application to several sources, and it may be taken that this salt is not an ordinary commercial product. This is true also of normal potassium sulphite. Sodium bisulphite, or, to be correct, a substance which was called sodium bisulphite, I obtained from several sources.

Here are the percentage amounts of sulphurous anhydride in different commercial samples of this salt.

I.	II.	III.	IV.
8·1	34·14	22·3	39·0

The calculated percentage for the anhydrous salt $NaHSO_3$ is 61·54! The chief impurity is usually sulphate.

As a matter of fact, the bisulphites are extremely difficult to isolate, and it is doubtful whether they have ever been prepared in a state of purity. The analyses given by Marignac indicate the presence of much too low a proportion of hydrogen, and Berthelot (*Ann. Chim. et Phys.*, [6], i., 86) endeavoured to obtain potassium bisulphite, but succeeded only in preparing products which when heated lost 2·6 to 3·9 per cent. of water, the calculated loss for the bisulphite being 7·5 per cent. I may add that I have made several attempts to prepare both sodium and potassium bisulphites, but without success. The difficulty arises from the fact that even in solution the bisulphites quickly change into the anhydrosulphites, the change in the case of the potassium salt being accompanied by the development of + 5·2 calories for each molecule of anhydrosulphite formed (Berthelot, *loc. cit.*, p. 84).

The anhydrosulphites are met with in commerce in small crystals and also in large well-formed crystals, which at first are transparent but soon lose some sulphurous anhydride and become covered with a white opaque film, after which the salt undergoes very little alteration. The percentage of sulphurous anhydride in several commercial samples of the potassium salt I found to be—

I.	II.	III.
52·54	56·02	57·42

The calculated amount is 57·63 per cent. Sample III. was in large crystals; sample I. was in somewhat small crystals. Two samples of the sodium salt were examined with the following results:—

I.	II.
65·60	50·4

The calculated percentage is 67·37. The first sample was in large crystals; the second was granulo-crystalline.

Samples of potassium anhydrosulphite which I prepared myself by saturating cold or hot solutions of potassium carbonate with sulphurous anhydride contained 56·1, 56·5, 56·2, 57·2, 57·5 and 57·6 per cent. of sulphurous anhydride respectively, the impurity in the first three cases being sulphate. A sample of the sodium salt prepared in a similar manner contained 64·3 per cent., but the preparation and crystallization of the sodium salt is more difficult than that of the potassium compound, at any rate on a small scale.

The practical conclusions to be drawn from my observations are: (1) That the so-called sodium bisulphite of commerce is, as a rule, a very impure preparation. (2) That whenever a pure acid sulphite is required, potassium or sodium anhydrosulphite (metasulphite, meta-bisulphite) in large well-developed crystals should alone be used, the finely crystalline samples being trustworthy for only a short time after their preparation.

My thanks are due to Mr. F. W. Booth, a student in the chemical laboratory of the Yorkshire College, for his assistance in making these experiments.

The **President** said the alkaline sulphites were of great value both in the arts and in medicine, when large quantities of sulphurous anhydride were required.

Dr. **Thresh** said he was not aware that these salts were used except for disinfecting purposes, and, even for that purpose, it would be a great advantage if any chemist could discover a more effective germicide. When a medical officer of health had all the doors and windows of a cottage closed up, and burned sulphur, he satisfied the minds of the people that the place was disinfected, but he did not always satisfy his own mind, and, if some aerial disinfectant could be obtained which would kill all bacteria, and yet would not take the polish off the furniture, or affect the colour of the draperies, it would be a great boon to medical officers and to humanity at large. He remembered that during the time of the cattle plague, some veterinary surgeons were anxious to try the effect of bisulphites, and he had obtained and experimented with a good many samples, but he came to the conclusion that they contained very little sulphurous acid, so that, if that were the potent agent, it was a mistake to employ bisulphites.

Mr. **Siebold** asked if Mr. Bothamley had also extended his experiments to calcium bisulphite, and, if so, whether that was not a much more satisfactory preparation than the corresponding sodium or potassium salt? Many years ago, Dr. Gerland had shown that when calcium phosphate was dissolved in sulphurous acid, the solution could be evaporated practically without any loss of sulphurous anhydride. He had not, however, seen any allusion to the subject in literature since.

Mr. **Naylor** said he was very much surprised to see the result shown with regard to the normal sulphite of sodium. He had had an opportunity of examining this compound for some years, from time to time, and had found in years gone by quite as much as 20 or 30 per cent. of sulphate, but he did not know where the author's samples had been collected. It was quite an easy matter to obtain sulphite of sodium which contained as small a quantity as 5 per cent. of sulphate. He did not think bisulphite of potassium was obtainable in the market except in the form of a very strong solution, and the same with bisulphite of ammonium, which he was not aware ever had been obtained in the crystalline form.

Mr. R. H. **Davis**, referring to the statement that the acid bisulphite was used for the removal of ketones and aldehydes, asked whether the use of metasulphite or anhydrosulphite was equally effectual with the more usual compounds for that purpose.

Mr. **Bothamley**, in reply, said one point raised by Dr. Thresh was the use of sulphur dioxide as a disinfectant. It did not bear exactly upon the paper, but it raised one or two interesting points. It had been shown that when sulphur was burnt at least 8 per cent. of the sulphur was converted, not into sulphur dioxide, but into trioxide, and the corrosive effect of sulphur dioxide produced by burning sulphur in that way would be very much greater than that of perfectly pure sulphur dioxide. The germicidal action of sulphur dioxide seemed to be of a selective kind. Dr. Percy Frankland had shown some years ago that whilst it did certainly kill a large number of germs, others flourished quite vigorously in its presence. He was not aware whether any special experiments had been made with regard to its action on the zymotic germs as distinguished from numerous other kinds. He had not made any experiments on calcium bisulphite, because it was not a product commonly used in the laboratory, and his attention was called to this matter by the extremely unsatisfactory action of the sodium bisulphite which he obtained for laboratory and other purposes. The mere fact that one could evaporate solution of calcium bisulphite so called without loss was tolerably conclusive evidence that it was not calcium bisulphite, but calcium anhydrosulphite. It appeared as far as all the evidence went now, that the hydrogen sulphites or bisulphites could not be got in a pure state any more than hydrogen chromates or true bichromates. Just as upon adding to chromate of potassium half the amount of base you got, not a hydrogen chromate but potassium dichromate, $K_2Cr_2O_7$, so it was with the sulphites, $Na_2S_2O_5$. So far as he knew bisulphite of ammonium had not been obtained in a crystalline form. In answer to Mr. Davis's question, whether the anhydrosulphites were equally effective in separating aldehydes and ketones, the answer was in the affirmative. Berthelot had shown conclusively that even if caustic potash or caustic soda were mixed with sulphur dioxide in the proportion necessary to form a bisulphite in about ten minutes at the outside at ordinary temperatures all the salt in the liquid had changed into the anhydrosulphite, and therefore what was commonly regarded as a solution of bisulphite was simply a solution of anhydrosulphite, exactly the same as would be made by dissolving one of those salts in water. The much greater purity of those anhydro salts was doubtless the reason why they were so much more satisfactory for that kind of work, and was one of the reasons which had led him to bring these notes before the Conference.

The **President** said he was sure the meeting would accord its thanks to Mr. Bothamley for his interesting communication.

The British Association for the Advancement of Science.

FIFTY-NINTH ANNUAL MEETING.

The President's Address.

(*Concluded from page* 130.)

A nearly smokeless sporting-powder had, in the meantime, been produced by Colonel Schultze, of the Prussian Artillery, from finely divided wood, converted after purification into a mildly explosive form of nitro-cellulose, and impregnated with a small portion of an oxidizing agent. Subsequently this powder was produced in a granular form, and rendered considerably more uniform in character and less hygroscopic; it then closely resembled the well-known E.C. sporting powder, which consists of a nitro-cotton reduced to pulp, incorporated with the nitrates of potassium and barium, and converted into grains through the agency of a solvent and a binding material. Both these powders produce very little smoke compared with black powder, but do not compete with the latter in regard to accuracy of shooting when used in military arms.

In past years both camphor and liquid solvents have been applied to the hardening of the surfaces of granulated or compressed masses of gun-cotton and of this class of its preparations, with a view to render them non-porous. In some smokeless powders of French, German, Belgian and English manufacture, acetic ether and acetone have been also used, not merely to harden the granules or tablets of the explosive, but to convert the nitro-cellulose, in the first instance, into a more or less gelatinous condition, so that it can readily be incorporated with other components and rolled, or spread into sheets, or pressed into moulds, or squirted into wires, rods, or tubes, while still in a plastic state. When the solvent has afterwards been removed, the hardened, horn-like, or somewhat plastic product is cut up into tablets, or into strips or pieces of suitable dimensions, for conversion into charges or cartridges.

Another class of smokeless powder, similar in physical characteristics to these nitro-cellulose powders, but containing nitro-glycerine as an important component, has been originated by Mr. Alfred Nobel, the well-known inventor of dynamite, and bears resemblance in its physical characteristics to another of his inventions, called blasting-gelatine, one of the most interesting of known violent explosive agents. When one of the lower products of nitration of cellulose is impregnated with the liquid explosive, nitro-glycerine, it gradually loses its fibrous nature, becoming gelatinized while assimilating the liquid; and the resulting product almost possesses the characters of a compound. This preparation, and certain modifications of it, have acquired high importance as blasting-agents more powerful than dynamite, and possessed of the valuable property that their prolonged immersion in water does not separate from them any appreciable proportion of nitro-glycerine. The nitro-glycerine powder first produced by Mr. Nobel was almost perfectly smokeless and developed very high energy, accompanied by moderate pressures at the seat of the charge, but it possessed certain practical defects, which led to the development of several modifications of that explosive and various improvements in manufacture. The relative merits of this class of smokeless powder, and of various kinds of nitro-cellulose powder, are now under careful investigation in this and other countries, and several more or less formidable difficulties have been met with in their application, in small-arms especially. These arise in part from the comparatively great heat they develop, which increases the erosive effects of the products of explosion, and in part from the more or less complete absence of solid products. The surfaces of the barrel and of the projectile being left clean, after the firing, are in a condition favourable to their close adhesion while the bullet is propelled along the bore, with the consequent establishment of very greatly increased friction. The latter difficulty has been surmounted by more than one expedient, but always at the cost of absolute smokelessness.

Our knowledge of the results obtained in France and Germany with the use of smokeless powders in the new rifles and in artillery is somewhat limited. Our own experiments have demonstrated that satisfactory results are attainable with more than one variety of them, not only in the new repeating-arm of our infantry, but also with our machine-guns, with field-artillery, and with the quick-firing guns of larger calibre which constitute an important feature in the armament of our Navy. The importance of ensuring that the powder shall not be liable to undergo chemical change detrimental to its efficiency or safety, when stored in different localities where it may be subject to considerable variations of temperature (a condition especially essential in connection with our own naval and military service in all parts of the world), necessitates qualities not very easily secured in an explosive agent consisting mainly of the comparatively sensitive nitro-compounds to which the chemist is limited in the production of a smokeless powder. It is possible, therefore, that the extent of use of such a material in our ships, or in our tropical possessions, may have to be limited by the practicability of fulfilling certain special conditions essential to its storage without danger or possible deterioration. If, however, great advantages are likely to attend the employment of a smokeless explosive, at any rate for certain services, it will be well worth while to adopt such special arrangements as may be required for securing these without incurring special dangers. This may prove to be especially necessary in our ships of war, where temperatures so high as to be prejudicial even to ordinary black powder, sometimes prevail in the magazines, consequent mainly upon the positions assigned to them in the ships, but which may be guarded against by measures not difficult of application.

The press accounts of the wonderful performances of the first smokeless powder adopted by the French —which, it should be added, were in some respects confirmed by official reports of officers who had witnessed experiments at a considerable distance— engendered a belief that a very great revolution in the conduct of campaigns must result from the introduction of such powders. It was even reported very positively that noiselessness was one of the important attributes of a smokeless powder, and highly-coloured comparisons have, in consequence, been drawn in service-periodicals, and even by some military authorities, between the battles of the past and those of the future; the terrific din caused by the firing of the many guns and the roar of infantry-fire, in heavy engagements, being supposed to be reduced to noise so slight that distant troops would fail to know in what direction their comrades were engaged, and that sentries and outposts would no longer be able to warn their comrades of the approaching foe by the discharge of their rifles. Military journals of renown, misled by such legendary accounts, chiefly emanating from France, referred to the absence of noise and smoke in battles as greatly enhancing the demands for skill and courage, and as surrounding a fight with mystery. The absence of recoil when a rifle was fired with smokeless powder was another of the marvels reported to attend the use of these new agents of warfare. It need scarcely be said that a closer acquaintance with them has dispelled the credit given to such of the accounts of their supposed qualities as were mythical, and a belief in which could only be ascribable to a phenomenal combination of credulity with ignorance of the most elementary scientific knowledge.

The extensive use which has been made in Germany of smokeless or nearly smokeless powder in one or two special military displays has, however, afforded interesting indications of the actual change which is likely to be wrought in the conditions under which engagements on land will be fought in the future, provided these new explosives thoroughly establish and maintain their position as safe and reliable propelling agents. Although the powder adopted in Germany is not actually smokeless, the almost transparent film of smoke produced by independent rifle-firing is not visible at a distance of about 300 yards; at shorter distances it presents the appearance of a puff from a cigar. The most rapid salvo-firing by a large number of men does not have the effect of obscuring them from distant observers. When machine-guns and field artillery are fired with the almost absolutely smokeless powder which we are employing, their position is not readily revealed to distant observers by the momentary vivid flash of flame and slight cloud of dust produced.

There now appears little doubt that in future warfare belligerents on both sides will alike be users of these new powders; the screening or obscuring effect of smoke will therefore be practically absent during engagements between contending forces, and while, on the one hand, the very important protection of smoke, and its sometimes equally important assistance in manœuvres, will thus be abolished, both combatants will, on the other hand, secure the advantages of accuracy of shooting and of the use of individual fire, through the medium of cover, with comparative immunity from detection. Such results as these cannot fail to affect, more or less radically, the principles and conditions under which battles have hitherto been fought. With respect to the naval service, it is especially for the quick-firing guns, so important for defensive purposes, that a smokeless powder has been anxiously looked for; by the adoption of such a powder as has during the past year been elaborated for our artillery, should experience establish its reliability under all service conditions and its power to fulfil all reasonable requirements in regard to stability, these guns will not only be used by our ships under conditions most favourable to their efficiency, but their power will also be very importantly increased.

The ready and safe attainment of very high velocities of projection through the agency of these new varieties of explosive agents, employed in guns of suitable construction, would appear at first sight to promise a very important advance in the power of artillery; the practical difficulties attending the utilization of these results are, however, sufficiently formidable to place, at any rate at present, comparatively narrow limits upon our powers of availing ourselves of the advantages in ballistics which they may present. The strength of the gun-carriages and the character of the arrangements used for absorbing the force of recoil of the gun, need considerable modifications, not easy of application in some instances; greater strength and perfection of manufacture are imperative in the case of the hollow projectiles or shells to be used with charges of a propelling agent, by the firing of which in the gun they may be submitted to comparatively very severe concussions; the increased friction to which portions of the explosive contents of the shell are exposed by the more violent setting back of the mass may increase the possibility of their accidental ignition before the shell has been projected from the gun. The increase of concussion to which the fuse in the shell is exposed may give rise to a similar risk consequent upon an increased liability to a failure of the mechanical devices which are applied to prevent the igniting arrangement, designed to come into operation only upon the impact or graze of the projected shells, from being set into action prematurely by the shock of the discharge. Lastly, the circumstance that the rate of burning of the time-fuse, which determines the efficiency of a projected shrapnel shell, is materially altered by an increase in the velocity of flight of the shell, also presents a source of difficulty.

The fallibility of even the most simple forms of fuse, manufactured in very large numbers, although it may be remote, must always engender a feeling of insecurity, when shells are employed containing an explosive agent of the class which, in recent years, it has been sought, by every resource of ingenuity, combined with intimate knowledge of the properties of these explosives, to apply as substitutes for gunpowder in shells, on account of their comparatively great destructive power.

One of the first uses, for purposes of warfare, to which it was attempted to apply gun-cotton, was as a charge for shells. But even when this was highly compressed, and accurately fitted the shell-chamber, with the intervention only of a soft packing between the surfaces of explosive and of metal, to guard against friction between the two upon the shock of the discharge, no security was attainable against the ignition of the comparatively sensitive explosive by friction established within its mass at the moment when the shell is first set in motion. By the premature explosion of a shell charged with gunpowder, no important injury is inflicted upon the gun, but a similar accidental ignition of a gun-cotton charge must almost inevitably burst the arm. The earlier attempts to apply gun-cotton as a bursting-charge for shells were several times attended by very disastrous accidents of this kind; but the fact, afterwards discovered, that wet compressed gun-cotton, even when containing sufficient water to render it quite uninflammable, can be detonated through the agency of a sufficiently powerful charge of fulminate of mercury, or of a small quantity of dry gun-cotton imbedded within it, has led to the perfectly safe application of gun-cotton in shells, provided the fuse, through the agency of which the initiative detonating agent in the shell comes into operation, is secure against any liability to premature ignition when the gun is fired. Many successful experiments have been made with shells thus charged with wet gun-cotton, which is now recognized as a formidable destructive agent applicable in shells with much less risk of casualty than attends the use of many other of the violent explosive bodies which it has become fashionable, in professional parlance, to designate as "high explosives."

Many devices and arrangements, more or less ingenious and complicated, have been schemed, especially in the United States, for applying preparations of the very sensititive liquid, nitro-glycerine, such as dynamite and blasting-gelatine, as charges for shells. Some of these consist in subdividing the charge by more or less elaborate methods; in others the shell is also lined with some soft elastic packing-material, and paddings of similar material are applied in the head and the base of the shell-chamber, with the object of reducing the friction and concussion to which the explosive is exposed when the projectile is first set in motion. Such arrangements obviously reduce the space available for the charge in the shell, and the best of them fail to render these explosives as safe to employ as wet gun-cotton. In order to avoid exposing shells loaded with such explosives to the concussion produced when propelling them by a powder-charge, compressed air has been applied as the propelling agent, and guns of special construction and very large dimensions, from which shells containing as much as 500 lbs. of gun-cotton or dynamite are projected through the agency of compressed air, have recently been elaborated in the United States, where great expectations are entertained of the value, for war purposes, of these so-called pneumatic guns.

A highly ingenious device for utilizing a class of very powerful explosives in shells, without any risk of accident to the gun, was not long since brought forward by Mr. Grüsen, the well known armour plate and projectile manufacturer of Magdeburg. It consisted of a thoroughly efficient arrangement for applying the fact, first demonstrated by Dr. Sprengel, that mixtures of nitric acid of high specific gravity with solid or liquid hydrocarbons, or with the nitro-compounds of these, are susceptible of detonation, with development of very high energy. The two agents, of themselves non-explosive—nitric acid and the hydrocarbon, or its nitro-product—are separately confined in the shell. When it is first set in motion by the firing of the gun, the fracture of the receptacle containing the liquid nitric acid is determined by a very simple device; the two substances are then free to come into contact, and their very rapid mixture is promoted by the rotation of the shell, so that almost by the time that it is projected from the gun, its contents, at first quite harmless, have become converted into a powerfully explosive mixture, ready to come into operation through the action of the fuse. Although safety appears assured by this system, the comparatively complicated nature of the contrivance, and the loss of space in the shell thereby entailed, place it at a disadvantage, especially since some other very violent explosive agents have come to be applied with comparative safety in shells.

Between four and five years ago intelligence first reached us of marvellously destructive effects produced by shells charged with an explosive agent which the French Government was elaborating. The reported results surpassed any previously recorded in regard to violently destructive effects and great velocity of projection of the fragments of exploded shells, and it was asserted that the employment of this new material, mélinite, was unattended by the usual dangers incident to this particular application of violent explosive agents, an assertion scarcely consistent with accounts which soon reached us of several terrible calamities due to the accidental explosion of shells loaded with mélinite.

Although the secret of the precise nature of mélinite has been extremely well preserved, it transpired ere long that extensive purchases were made in England, by or for the French authorities, of one of the many coal-tar derivatives which for some years past has been extensively manufactured for tinctorial purposes, but which, although not itself classed among explosive bodies until quite lately, had long before been known to furnish, with some metals, more or less highly explosive combinations, some of which have been applied to the production of preparations suggested as substitutes for gunpowder.

The product of destructive distillation of coal from which, by oxidation, this material is now manufactured, is the important and universally known antiseptic and disinfectant, carbolic acid, or phenol. Originally designated carbazotic acid, the substance now known as picric acid was first obtained in small quantities as a chemical curiosity by the oxidation of silk, aloes, etc., and of the well known blue dye indigo, which thus yielded another dye of a brilliant yellow colour. To the many who may regard this interesting phenol-derivative as a material concerning the stability and other properties of which we have little knowledge, it will be interesting to learn that it has been known to chemists for more than a century. It was first manufactured in England for tinctorial purposes by the oxidation of a yellow resin (*Xanthorrhœa hastilis*), known as Botany Bay gum. Its production from carbolic acid was developed in Manchester in 1862, and its application as a dye gradually extended, until, in 1886, nearly 100 tons were produced in England and Wales.

Although picric acid compounds were long since experimented with as explosive agents, it was not until a very serious accident occurred, in 1887, at some works near Manchester where the dye had been for some time manufactured, that public attention was directed in England to the powerfully explosive nature of this substance itself. The French authorities appear, however, to have been at that time already engaged upon its application as an explosive for shells. It is now produced in very large quantities at several works in Great Britain, and it has been extensively exported during the last four years, evidently for other than the usual commercial purposes. Large supplies of phenol, or carbolic acid, have, at the same time, been purchased in England for France, and lately for Germany, doubtless for the manufacture of picric acid, very extensive works having been established for its production in both those countries. It has been made the subject of experiment by our military authorities, and its position has been well established as a thoroughly stable explosive agent, easily manufactured, comparatively safe to deal with, and very destructive when the conditions essential for its detonation are fulfilled.

The precise nature of mélinite appears to be still only known to the French authorities. It is asserted to be a mixture of picric acid with some material imparting to it greater power; but accounts of accidents which have occurred even quite recently in the handling of shells charged with that material appear to show that, in point of safety or stability, it is decidedly inferior to simple picric acid. Reliable as the latter is, in this respect, its employment is, however, not unattended with the difficulties and risks which have to be encountered in the use, in shells, of other especially violent explosives. Future experience in actual warfare can alone determine decisively the relative value of violent explosive agents, like picric acid or wet gun-cotton, and of the comparatively slow explosive, gunpowder, for use in shells. It is certain, however, that the latter still presents distinct advantages in some directions, and that there is no present prospect of its being more than partially superseded as an explosive for shells.

With regard to submarine mines and locomotive torpedoes, such as those marvels of ingenuity and constructive skill, the Whitehead and Brennan torpedoes, the important progress recently made in the practical development of explosive agents has not resulted in the provision of a material which equals wet compressed gun-cotton in combining with great destructive power the all-important essential of safety to those who have to deal with these formidable weapons, and to man the small vessels which have to perform the very hazardous service of attacking ships of war at short distances by means of locomotive torpedoes.

Although the subject of the development of explosive force for purposes of war has of late received from workers in applied science, from seekers of patentable inventions, and even from the public generally, a somewhat predominating share of attention, considering that we congratulate ourselves upon the enjoyment of a period of profound peace, yet the production of new explosive agents for mining and quarrying purposes, which present or lay claim to points of superiority over the well-established blasting-agents, has been by no means at a standstill. For many years the main object sought to be achieved in this direction was to surpass, in power or adaptability to particular classes of work, the well-known preparations of nitroglycerine and gun-cotton, which, during the past twenty years, have been formidable competitors, and, in many directions, absolutely successful rivals of black powder. It is both interesting and satisfactory to note, however, that this object has of late, and especially since the publication of the results of labours of English and foreign Commissions on the causes of mine-accidents, been prominently associated with endeavours to solve the important problems of combining, in an explosive agent, efficiency in point of power with comparative non-sensitiveness to explosion by friction or percussion, and of securing its effective operation with little or no accompaniment of projected flame. Safety-dynamites, flameless explosives, water-cartridges, and other classes of materials and devices connected with the getting of coal, the quarrying of rock, or the blasting of minerals, have claimed the attention of those who guide the minor's work; in some of these directions the practical results obtained have been beyond question important, and, indeed, conclusive as regards the great diminution of risks to which men need be exposed in those coal-mines where the ordinary use of explosives, although not altogether inadmissible, may at times be attended with danger. It is to be feared that those results are still far from receiving the amount of application which might reasonably be hoped for; but, at any rate, there are among the extensive mining districts where the employment of explosives in connection with the getting of coal cannot be dispensed with, several of importance where the use of gunpowder has almost entirely given place to the adoption of blasting-agents or methods of blasting, the employment of which is either not, or only very exceptionally, attended by the projection of flame or incandescent matter into the air where the shot is fired.

The mining public is especially indebted to German workers for much of the success which has been obtained in this direction, and also to the eminent French authorities, Mallard and Le Chatelier, for their thorough theoretical and practical investigations bearing upon the prevention of accidental ignition of fire-damp during blasting operations. Having arrived at the conclusion that fire-damp- and air-mixtures are not ignited by the firing of explosive preparations which develop by their detonation temperatures lower than 2220° C., they found that ammonium nitrate, although in itself susceptible of detonation, does not develop a higher temperature than 1130° C., while the temperature of detonation of nitro-glycerine and gun-cotton are, respectively, 3170° and 2636°. The admixture of that salt with nitroglycerine or gun-cotton in sufficient proportion to reduce the temperature of detonation to within safe limits allows, therefore, of the employment of those explosive agents in the presence of fire-damp mixtures without risk of accident, and this fact has led to the effective use of such mixtures as safe blasting agents in coals.

Those who have been content to labour long and arduously with the objects steadily in view of advancing our knowledge of the causes of mine accidents and of developing resources and measures for removing or combating those causes, can cherish the conviction that recent improved legislation in connection with coal mines, based upon the results of those labours, has been already productive of decided benefits to the miner, even although it has fallen short of what might reasonably have been hoped for as an outcome of the very definite results and conclusions arrived at by the late Royal Commission on Accidents in Mines (in the recent much lamented death of whose universally respected chairman, my late esteemed friend and colleague, Sir Warington Smyth, the scientific world has sustained the loss of an ardent worker, and the miner of an invaluable friend).

The fearful dangers arising from the accumulation of inflammable dust in coal-mines, and the equality of mine-dust with fire-damp in its direful power of propagating explosions, which may sometimes even be, in the first instance, established chiefly or entirely through its agency, have now been long recognized as beyond dispute; and it is satisfactory to know that permission to fire shots in mine-workings which are dry and dusty has, by recent legislation, been made conditional upon the previous laying of the dust by effective watering. In some mining districts, moreover, the purely voluntary practice has been extensively adopted by mine-owners of periodically watering the main roads in dry and dusty mines, or of frequently discharging water-spray into the air in such roads, which must tend greatly to reduce the possible magnitude of the disastrous results of a fire-damp or dust-explosion in any part of the mine-workings.

The encouragement given to the application of the combined resources of ingenuity, mechanical skill, and acknowledge of scientific principles, through the elaborate, but thoroughly practical comparative trials to which almost every variety of safety-lamp has, during the last few years, been submitted by competent and conscientious experimenters, has resulted in the provision of lamps to the hand of the miner which combine the essential qualities of safety, under the most exceptional severe conditions, with good illuminating power, simplicity of construction, lightness, and moderate cost. Very important progress has also been made, since the first appointment of the late Accidents in Mines Commission, towards the provision of thoroughly serviceable and safe portable electric lamps for use in mines. Of those which have already been in the hands of the miners, several have fairly fulfilled his requirements as regards size, weight, and illuminating power of sufficient duration; but much still remains to be accomplished with respect to durability, simplicity, thorough portability, and cost, before the self-contained electric lamp can be expected to compete successfully with the greatly improved miners' lamps which are now in use, or available.

The recent legislation in connection with mines is certainly deficient in any sufficiently decisive measure for excluding from mine-workings certain forms of lamps which, while fairly safe in the old days of sluggish ventilation, are unsafe in the rapid air-currents now frequently met with in mines. It is, however, very satisfactory to know that the strong representations on this subject, made by the late Commission, combined with force of example and with the conclusive demonstration of the superiority of other lamps, by exhaustive experiments, have led within the last two years to the very general abandonment of the unprotected Davy, Clanny, and Stephenson lamps in favour, either of simple, safe modifications of these, or of other safe and efficient lamps, and that one possible element of danger to the miner has thus been eliminated, at any rate in many districts. In one important respect recent improved legislation has failed to effect a most desirable change, namely, in the substitution of safety-lamps for naked lights in workings where small local accumulations of fire damp are discovered from time to time. There appears little doubt that one of the three fearful explosions which have occurred within the last twelve months—the explosion at Llanerch Colliery, near Pontypool—was caused by the continued employment of naked lights in a mine where inspection constantly revealed the presence of fire damp. This explosion, and two other terrible disasters, at Mossfield Colliery, in Staffordshire, and at Morfa Colliery, near Swansea, which have occurred since the last meeting of the Association, may have seemed to weaken the belief that the operation of the recent Mines Regulation Act, which was based upon some of the results of seven years' arduous labour of the late Mines' Commission, must have resulted in very substantial improvement in the management of mines and in the conduct of work by the men. Happily, however, there is a consensus of opinion among those most competent to judge—*i.e.*, the Government Mine Inspectors—that very decided benefits have already accrued from the operation of the new Act. Although far from embodying all that the experienced mine owners, miners, and scientific workers upon that Commission, as well as practical authorities in Parliament, concurred in regarding as reasonably adaptable, from the results of observation and experiment, to the furtherance of the safer working of mines, this Act does include measures, precautionary and preventive, of undeniable utility, well calculated to lessen the dangers which surround the miner, and to add to his personal comfort underground. We may hope, moreover, that the operation of the Act is paving the way to more comprehensive legislation in the near future; for it can scarcely be doubted, by the light of recent sad experience, that there are directions in which both masters and men still hesitate to adopt, of their own free will, measures or regulations, methods of working or appliances and precautions, which are calculated to be important additional safeguards against mine accidents, and which are either left untouched, or only hesitatingly and imperfectly dealt with in the recent enactments.

My labours upon the late Mines' Commission represent only one of several subjects in connection with which it has been my good fortune to have opportunities of rendering some slight public service in directions contrasting with one of the main functions of my career, by endeavouring to apply the results of scientific research to a diminution of the risks to which particular classes of the community, or the public at large, are exposed—of being sufferers by explosions, the results of accidents or other causes.

During the pursuit of bread-winning vocations, and even in orderly domestic life, the conditions, as well as the materials, requisite for determining more or less disastrous explosions are often ready to hand, and their activity may be evoked at any moment through individual heedlessness or through pure accident. Steam, or gases confined under pressure, volatile inflammable liquids, combustible gases, or finely divided inflammable solids, are now all well recognized as capable of assuming the character of formidable explosive agents; but with respect to the three last-named, it is only of late that material progress has been made towards a popular comprehension and appreciation of the conditions conducive to danger, and of those, by the fulfilment of which, danger may be avoided. Thus, the causes of explosions in coal-laden ships, together with the occurrence of spontaneous ignition in coal cargoes, another fruitful source of disaster, were made the subject of careful inquiry some years ago by a Royal Commission, upon which I had the pleasure of working with the late Dr. Percy, whose invaluable labours for the advancement of metallurgic science will always be gratefully remembered. The light thrown by that inquiry upon the causes of those disasters, and upon the conditions to be fulfilled for guarding against the accumulations of fire-damp, gradually escaping from occlusion in coal, and of heat, developed by chemical changes occurring in coal cargoes, has unquestionably led to an important reduction of the risks to which coal-laden ships are exposed. Subsequent official inquiries and experimental investigations, in which I took part with the late Sir Warington Smyth and other eminent naval officers, consequent upon the loss of H.M.S. "Doterel" through the accidental ignition of an explosive mixture of petroleum spirit vapour and air (and other calamities in war-ships originating with the gradual emission of fire-damp from coal), have resulted in the adoption of efficient arrangements for ventilating all spaces occupied by, and contiguous to, the large supplies of fuel which these vessels have to carry.

The thorough investigation, by Rankine and others, of the causes of explosions in flour-mills, which in years past were so frequent and disastrous, has secured the adoption of efficient measures for diminishing the production, and the dissemination through channel and other spaces in the mills, of explosive mixtures of flour-dust and air, and for guarding against their accidental ignition. The numerous terrible accidents caused by the formation and accidental ignition of explosive mixtures of inflammable vapour and air in ships carrying cargoes of petroleum stored in barrels or in tanks, have, by the investigations to which they have given rise, led to the indication of effective precautionary measures for guarding against their recurrence. Again, the many distressing accidents, frequently fatal, which have attended the domestic use of those valuable illuminants, petroleum and mineral oils of kindred character, have been made the subject of exhaustive investigations, which have demonstrated that these disasters may readily be prevented by the employment of lamps of proper construction, and by the observance of very simple precautions by the users of them: and a recent official inquiry which I have conducted with Mr. Boverton Redwood has furnished most gratifying proof that very substantial progress has been made within the last few years by lamp-manufacturers in the voluntary adoption of such principles of construction as we had experimentally demonstrated to be essential for securing the safe use of mineral oils in lamps for lighting and heating purposes, the employment of which has, within a brief period, received enormous extension in this and other countries.

The creation and rapid development of the petroleum industry has, indeed, furnished one of the most remarkable illustrations which can be cited of industrial progress during the period which has elapsed since the British Association last met in Leeds. One year after that meeting, viz., on August 28, 1859, the first well, drilled in the United States with the object of obtaining petroleum, was successfully completed, and the rate of increase in production in the Pennsylvania oil-fields during the succeeding years is shown by the following figures:—

In 1859, 5000 barrels (of forty-two American gallons) were produced. In the following year the production increased to 500,000 barrels; while in the next year (1861) it exceeded 2,000,000 barrels, at which figure it remained, with slight fluctuations, until 1865. The supply then continued to increase gradually, until, in 1870, it reached nearly 6,000,000 barrels; while in 1874 it amounted to nearly 11,000,000 barrels. In 1880 it amounted to over 26,000,000 barrels, and in 1882 it reached 31,000,000. Since then the supply furnished by the United States has fallen somewhat, and last year it amounted to 21,500,000 barrels. The production of crude petroleum in the Pennsylvanian fields, large has it has been, has not, however, kept pace with the consumption, for we find that the accumulated stocks, which on December 31, 1888, amounted to over 18,000,000 barrels, had become reduced to about 11,000,000 barrels at the close of last year. At this rate the surplus stock above ground will have vanished by the end of the current year. In addition to the petroleum raised in Pennsylvania, there is now a very large production in the State of Ohio; but this has not as yet been employed as a source of lamp-oil; it is, however, transported by pipe line in great quantities to Chicago, for use as liquid fuel in industrial operations.

A few years after the development of the United States petroleum industry, the production of crude petroleum in Russia also began to extend very rapidly. For more than 2500 years Baku, on the borders of the Caspian Sea, has been celebrated for its naphtha springs and for the perpetual flames of the Fire Worshippers fed by the marvellous subterranean supplies of natural gas. To a limited extent neighbouring nations appear to have availed themselves of the vast supplies of mineral oil at Baku during the past one thousand years. By the thirteenth century the export of the crude oil had already become somewhat extensive, but the production of petroleum from it by distillation is of comparatively recent date. In 1863 the supplies of petroleum from the Baku district amounted to 5018 tons; they increased to somewhat more than double during the succeeding five years. In 1869 and following three years the production reached about 27,000 tons annually, and in 1873 it was about 64,000 tons; three years later, 153,000 tons were produced, and in the following five years there was a steady annual increase, until, in 1882, the production amounted to 677,269 tons; in 1884 it considerably exceeded 1,000,000 tons, and last year it had reached the figure of about 3,300,000 tons. The consumption of crude petroleum as fuel for locomotive purposes, has, moreover, now assumed very large proportions in Russia, and many millions of gallons are annually consumed in working the vast system of railways on both sides of the Caspian Sea.

The imported refined petroleum used in this country in lamps for lighting, heating and cooking, was exclusively American until within the last few years, but a very large proportion of present supplies comes from Russia. The imports of kerosene into London and the chief ports of the United Kingdom during 1889 amounted to 1,116,205 barrels of United States oil, and 771,227 barrels of Russian oil. During the same period the out-turn of mineral oil for use in lamps by the Scottish Shale Oil Companies probably amounted to about 500,000 barrels.

Another important feature connected with the development of the petroleum industry is the great extent to which the less volatile products of its distillation have replaced vegetable and animal oils and fats for lubricating purposes in this and other countries. The value of petroleum as a liquid fuel and as a source of gas for illuminating purposes has, moreover, been long since recognized, and it is probable that one outcome of the attention which is now being given to the hitherto unworked deposits of petroleum in the East and West Indies, South America, and elsewhere, will be a very large increase in its application to these purposes. In the East Indies there are vast tracts of oil fields in Burmah, Baluchistan, Assam, and the Punjab. The native Rangoon oil industry is one of great antiquity, although the oil was only used in the crude condition until about thirty-five years ago, at which time Dr. Hugo Müller, with the late Warren De la Rue, whose many-sided labours and generous benefactions have so importantly contributed to the advancement of science, made valuable researches on the products furnished by crude oil imported from Rangoon. The resources of the oil fields of Upper Burmah, especially of the district of Yenangyoung (or *creek of stinking water*), have since then been developed by British enterprise, and have attained to considerable importance since our annexation of Upper Burmah.

The great extension of the petroleum trade is gradually leading to very important improvements in the system of transport of the material over water and on land. Until recently this has been carried out entirely in barrels and tin cases; the consequent great loss from leakage and evaporation, accompanied by risk of accident, is now becoming much reduced by the rapidly increasing employment of tank steamers, which transport the oil in bulk. Tank railway waggons have for some time past been in use in Russia, and there is prospect of these and of tank barges being adopted here for the distribution of the oil; while in London, the practice is already spreading gradually of distributing supplies to tradesmen from tank road-waggons. Some considerable doubt as to whether the risk of accident has not rather been altered in character than actually reduced by the new system of transport, has not unnaturally been engendered in the public mind by the occurrence within a comparatively short period of several serious disasters during the discharge of cargoes from tank-vessels. The memorable explosion which took place in October, 1888, on board the *Ville de Calais*, in Calais Harbour, with widespread, destructive effects was followed by a similarly serious explosion in the *Fergusons*, at Rouen last December, and, more recently, by a fire of somewhat destructive character at Sunderland, resulting from the discharge into the river of petroleum residues from a ship's tanks. In all these cases the petroleum was of a nature to allow inflammable vapour to escape readily from the liquid, so that an explosive mixture could be rapidly formed by its copious diffusion through the air. No similar casualty has been brought to notice as having happened to tank-ships carrying petroleum oil of which the volatility is in accordance with our legal requirements, and this points to the prudence of restricting the application of the tank system to the transport and distribution of such petroleum as complies with well-established conditions of safety.

Another most remarkable feature connected with the development of the petroleum industry is presented by the utilization, within the last few years, of the vast supplies of natural inflammable gas furnished by the oil-fields.

In America this remarkable gas supply was for a long time only used locally, but before the close of 1885 its conveyance to a distance by pipes for illuminating and heating purposes, had assumed large proportions, one of the companies in Pittsburgh having alone laid 335 miles of pipes of various sizes, through which gas was supplied equivalent in heating value to 3,650,000 tons of coal per annum. Since then the consumption in and around Pittsburgh has probably been at least tripled. At the close of 1886 six different companies were conveying natural gas by pipes to Pittsburgh from 107 wells; 500 miles of pipe, ranging in diameter from 30 inches to 3 inches, were used by these companies, 232 miles of which were laid within Pittsburgh itself. The Philadelphia Company, the most important of these associations, then owned the gas supply from 54,000 acres of land situated on all the anticlinals around Pittsburgh, but drew its supplies only from Tarentum and the Murraysville field. It supplied, in 1886, 470 factories and about 5000 dwellings within the city, besides many factories and dwellings in Alleghany, and in numerous neighbouring villages. The average gas-pressure at the wells, when the escape is shut off, is about 500 lbs. per square inch, and in the case of new wells this pressure is very greatly exceeded. In order to minimize the danger from leakage, the gas-pressure in the city is reduced to a maximum of 13 lbs., and is regulated by valves at a number of stations under the control of a central station. The usual pressure in the larger lines is from 6 to 8 lbs., while in the low pressure lines it does not exceed 4 to 5 ounces,

The effect of the change from coal gas to natural gas upon the atmosphere over Pittsburgh has been most marked. Formerly the sky was constantly obscured by a canopy of dense smoke, now the atmosphere is clear, and even white paint may with impunity be employed for the house fronts.

The very rapid development of the employment of natural gas is not confined to the neighbourhood of Pittsburgh; it is used for heating purposes in the cities of Buffalo, Erie, Jamestown, Warren, Olean, Bradford, Oil City, Titusville, Meadville, Youngstown, and perhaps twenty more towns and villages in Pennsylvania and North-western New York. In North-western Ohio, the cities of Toledo and Sandusky, the towns of Findlay, Lima, Tiffin, Fostoria, and others in that section are also supplied with natural gas. A pipe line has, moreover, been recently laid to Detroit, Mich., and it is estimated that in these localities 36,131,669,000 cubic feet of the gas were consumed during last year, displacing 1,802,500 tons of coal. To the south-west of Pittsburgh there are many smaller places which consume natural gas; it also occurs in considerable quantity, and is being utilized, in Indiana (whence an account has recently reached us of a terrific subterranean explosion of the gas); and it is at the present time contemplated to carry a natural gas-supply to Chicago.

The utilization of the natural gas of the Russian oil-fields, although of very ancient date, has hitherto not been extensive, neither does the magnitude of the supply appear to bear comparison with that of the Pennsylvanian district.

A form of gaseous fuel which has long been known to technical chemists and metallurgists, but which has of late attracted considerable attention, especially in connection with the recent interesting work relating to its applications pursued by Mr. Samson Fox, of Leeds, has become, within the last four years, a competitor in the United States, both of the natural gas of Pennsylvania and of coal gas. Since Felix Fontana first produced so-called water gas in 1780, by passing vapour of water over highly heated fuel, many methods, differing chiefly in small details, have been proposed for carrying out the operation, with a view to the ready and cheap production of the resulting mixture of hydrogen and carbonic oxide, and numerous technical applications of water-gas have been suggested from time to time, with no very important results, excepting as regards its use for lighting purposes. Being of itself non-luminous, its utilization in this direction is accomplished, either by mixing it with a highly luminous gas, or by causing a hydrocarbon vapour to be diffused through it, or the non-luminous flame, produced by burning it in the air, is made to raise to incandescence some suitably prepared solid substance, such as magnesia, lime, a zirconium salt, or platinum, whereby bright light is emitted. The objection to its employment as an illuminant for use in buildings, to which great weight is attached by us, and rightly, as sad experience has shown, viz., that, as it consists, to the extent of about one-half its volume, of the highly poisonous gas carbonic oxide, the atmosphere in a confined space may be rendered irrespirable by a small accidental contamination with water-gas, by leakage or otherwise, not detectable by any odour—appears to constitute no great impediment to its employment in the United States, as it is now manufactured for illuminating and heating purposes by a large proportion of their gas-works, being in some places employed in admixture with a highly luminous coal-gas, in others rendered luminous by the alternative methods mentioned. It is stated that about three-fourths of the illuminating gas now supplied to the cities of New York, Brooklyn, Philadelphia, Jersey, St. Paul, and Minneapolis, is carburetted water-gas; in Chicago the entire supply now consists of this gas, and Boston will also soon be supplied exclusively with it. The use of water-gas for metallurgic work does not appear to be contemplated in the United States, but it is especially to such applications of the gas that much attention has been devoted here in Leeds; and although some eminent experts are sceptical regarding the attainment of advantages, especially from an economical point of view, by the employment of this form of gaseous fuel, especially after practical experience in the same direction acquired in Germany, the technical world must feel grateful to Mr. Fox for his work in this direction, affording, as it does, an interesting illustration of the qualities of perseverance and energy which, when combined with sound knowledge, often achieve success in directions that have long appeared most unpromising—qualities which have been characteristic of many pioneers in industrial progress in this country.

Leeds has been especially fortunate in the possession of such pioneers who, when competition brought about great changes in the particular trade through which, for many generations, this city chiefly enjoyed prosperity and high renown, developed its power and resources in new directions, from which success soon flowed in continually increasing measure. The rapid rise of Leeds to its present high position in industrial prosperity and national importance most probably dates from the period when its chief staple industry began to experience serious rivalry, in its own peculiar achievements, on the part of other districts of the kingdom and of other countries. From early days a flourishing centre of one of the provinces of Great Britain, most richly endowed with some of Nature's best treasures, Leeds could scarcely have failed, through the energy, acute intelligence, and powerful self-reliance especially characteristic of the men of Yorkshire, to rapidly acquire fresh renown in connection with industries which either were new to the town and district, or had been pursued in comparatively modest fashion, and which have combined to place the Leeds of to-day upon a higher pinnacle of commercial prosperity, power, and influence than her patriotic citizens of old could ever have dreamt of.

An examination into the present educational resources of Leeds places beyond any doubt the fact that her present prosperity in commerce and industries is in no small degree ascribable to the paramount importance long since attached here to the liberal provision of facilities for the diffusion of knowledge among the artisan and industrial classes, and especially for the acquisition of a sound acquaintance with the principles of the sciences and their applications to technical purposes, with particular reference to the prominent local industries, by all grades of those who pursue or intend to pursue them. There is, probably, no town in the kingdom more amply provided with efficient elementary and advanced schools for both sexes, while the special requirements of the artisan are efficiently met by the prosperous School of Science and Technology. The resources of the Yorkshire College provide, in addition, a combination of thorough scientific education with really practical training in the more important local industries; indeed, during the sixteen years of its continually progressive work, this institution has acquired so widespread a reputation that students come from abroad to reap the advantages afforded by the unrivalled textile and dyeing departments of the Leeds College. The keen competition now existing between these departments and the corresponding branches of the much younger but most vigorous sister College at Bradford, can only conduce to the further development of both, and to their thorough maintenance up to the requirements of the day.

The very important pecuniary aid afforded to these establishments, and to a number of other technical schools in Yorkshire, by one of the most important of the ancient companies of the City of London, the Clothworkers, affords an interesting illustration of the good work in the cause of education performed by those guilds and, especially of late years, by means of their flourishing Institute for the advancement of technical education which, through its two great instructional establishments in London, and through the operation of its system of examinations throughout the country, extending now even to the Colonies, has afforded very important aid towards eradicating the one great blot upon our national educational organization. To have been first in the field in practically developing a far reaching scheme for the advancement of technical education in this country must continue to be a source of pride to the City of London and its ancient Guilds in time to come, when the operation of efficient legislation, supported and extended by patriotic munificence and by the hearty co-operation of associations of earnest and competent workers in the cause, shall have placed the machinery and resources for the technical instruction of the people upon a footing commensurate with our position among nations.

The remarkable address delivered by Owen here in 1858, wherein the condition, at that time, of those branches of natural science which he had made particularly his own was most comprehensively reviewed, included some especially interesting observations on the importance to the cultivation and progress of the natural sciences, and to the advancement of education of the masses in this country, of providing adequate space and resources for the proper development of our National Museum of Natural History; and it cannot but be a source of great satisfaction and pride to him to have lived to witness the thoroughly successful realization of the object of his own indefatigable strivings and powerful advocacy in that direction. Comprehensive as were the views adopted by Owen regarding the scope and possible extension of that museum, it may, however, be doubted whether they ever embraced so extensive a field as was presented for our contemplation by his successor last year, when he told us that a natural history museum should, in its widest and truest sense, represent, so far as they can be illustrated by museum specimens, all the sciences which deal with natural phenomena, and that the difficulties of fitly illustrating them have probably alone excluded such subjects as astronomy, physics, chemistry, and physiology, from occupying departments in our National Museum of Natural History.

The application, in its broadest signification, of the title, Natural History Museum, may doubtless be considered to include, not only illustrations and examples of the marvellous works of the Creator and of the results of man's labours in tracing their intimate history and their relations to each other, but also illustrations of the means employed, and of the results attained, by man in his strivings to fathom and unravel the laws by which the domains of Nature are governed. But the reason why representative collections illustrative of the physical sciences do not form part of our National History Museum has, I venture to think, scarcely been correctly ascribable to any difficulty of organizing fit illustrations of methods of investigation, of the attendant appliances, and of the results attained by experimental research; it appears rather to exist in the fact that physical science has hitherto had no share in such a combination of circumstances as has been favourable to the good fortunes and advancement of the natural sciences, and is analogous to those which, from time to time, give rise to the provision of increased accommodation for our National Art Treasures. Our present National Science Collection, which has, indeed, had a struggle for existence, does not owe the development it has hitherto experienced to any such moral pressure as has been several times exercised in the case of our art collections, by the munificence of individuals, with the result of securing substantial aid from national resources; its gradual increase in importance has been due to the untiring perseverance of men of science, and of a few prominent influential and public spirited authorities, in keeping before the public the lessons taught by careful inquiries, such as those entrusted to the Royal Commission on Scientific Instruction, into the opportunities afforded for the cultivation of science and the development of its applications, in other countries, as compared with those provided here.

The success of the efforts made in 1875 by a committee thoroughly representative of every branch of experimental science, to bring together in London an international loan collection of scientific apparatus, and the widespread interest excited by that collection, led the President of the Royal Society, in union with many distinguished representatives of science, to lay before our department of education a proposal to establish a national museum of pure and applied science, including the Museum of Inventions, which had already existed since 1860 as a nucleus of a science museum, the establishment whereof had formed part of the original scheme of the science and art department. The loan collection of 1876 did, in fact, and in consequence of the urgent representations then made, first put into practical shape the long-cherished desire of men of science to see an institution arise in England similar to the Conservatoire des Arts et Métiers of France, and it became the starting-point of the national collection, representative of the several branches of experimental science, which has been undergoing slow but steady development since that time, patiently awaiting the provision of a suitable home for its contents. This collection, which illustrates not only the means whereby the triumphs of scientific research have been and are achieved, but also the methods by which these departments of science are taught, yields, small as it is, to none of our national museum treasures in interest and importance.

In yet another way did that loan collection become illustrious. One of the most interesting features connected with it was the organization of a series of important conferences and explanatory lectures, serving to illustrate, and also greatly to enhance its value, and affording most invaluable demonstration of the way in which such collections must exercise direct influence upon the advancement of science and upon the diffusion of scientific knowledge. These lectures and conferences demonstrated the wisdom of the suggestion made by the illustrious representative of associated science in Leeds eighteen years previously, that public access to museums should be combined with the delivery of lectures emphasizing and amplifying the information afforded by their contents. The example there set of thoroughly utilizing for instructional purposes, and for the advancement of science, a collection illustrative of the physical sciences, has since been followed by the science and art department; illustrative lectures connected with the existing nucleus of a national science-collection therewith have been delivered from time to time, and the objects in the collection are constantly utilized in the courses of instruction of the adjoining Normal School of Science.

Although the national importance of thoroughly representative and continuously-maintained science collections has long been manifest, not only to all workers in science, but also to all who have cared to inquire, even superficially, into the influence of the cultivation of science upon the industrial and commercial prosperity of the country, the labours of a Royal Commission, and of successive committees, in demonstrating the necessity for the provision of adequate accommodation for such collections, and for their support upon the basis of that afforded to the natural history collections, have been very long in bearing fruit. However, lovers of science, and those who have the prosperity of the country near at heart, have at length cause for rejoicing at the acquisition by the nation of a site in all respects suitable and adequate for the accommodation of the science collections, which, as soon as appropriate buildings are provided for their reception, will not fail, in comprehensiveness and completeness, to become worthy of a country which has been the birthplace of many of the most important discoveries in science, and of a people who have led the van among all nations in making the achievements of science subservient to the advancement of industries and commerce.

The site selected as the permanent home of our national science collections is immediately in rear of the Natural History Museum, and faces the stately edifice, now rapidly progressing towards completion, for the erection of which, as an Imperial memorial of the Queen's Jubilee, funds were provided by voluntary contributions from every portion of the Empire and every class in the Empire's nations. The Imperial Institute, the conception of which we owe to His Royal Highness the Prince of Wales, occupies a central position among buildings devoted to the illustration and cultivation of pure and applied science and of the arts—*i.e.*, the Normal School of Science, the Technical College of the City and Guilds of London, the National Schools of Art, the Science Museum, the South Kensington Museum, and the Royal College of Music; to which we may ere long see added a national gallery of representative British art. A more fitting location could scarcely be conceived for this pre-eminently national institution, which has for its main objects the comprehensive and continuously progressive illustration: of the practical applications of the vast resources presented by the animal, vegetable, and mineral kingdoms to industries and the arts; of the extent and the progressive opening up of those resources in all parts of the Empire; of the practical achievements emanating from the results of scientific research; and of the utilization of the arts for the purposes of daily life. With the attainment of these objects it will be the function of the Imperial Institute to combine the continuous elaboration of systematic measures tending to stimulate progress in trades and handicrafts, and to foster a spirit of emulation among the artisan and industrial classes. Another branch of the Institute's work, upon which it is already engaged, is the systematic collection of data relating to the natural history, commercial geography, and resources of every part of the Empire, for wide dissemination together with all current information, bearing upon the commerce and industries of the empire and of other countries, which can be comprised under the head of commercial intelligence. The achievement of these objects should obviously tend to maintain intimate intercourse, relationship, and co-operation between the great home and colonial centres of commerce, industries, and education, and to enhance importantly our power of competing successfully in the great struggle, in which nations are continuously engaged, for supremacy in commercial and industrial enterprise and prosperity.

To the elaboration of the practical details of a system of operation calculated to serve the objects I have indicated, eminent public-spirited men are now devoting their best energies, with the sanguine expectation of realizing the hope cherished by the royal founder of the Imperial Institute, that this memorial of the completion, by our beloved Sovereign, of fifty years of a wise and prosperous reign, is destined to be one of the most important bulwarks of this country, its colonies and dependencies, by becoming a great centre of operations, ceaselessly active in fostering the unity, and developing the resources, and thus maintaining and increasing the power and prosperity of our Empire.

Erratum.—On p. 184, in the summary of the paper on tests for methylated spirit, the authors' names should have been given as Messrs. Millard and Stark.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hill, Kirkby, Farr, Catford, Siebold, Davies, Martin.

LESSONS FROM FIELDS AND LANES.

SEPTEMBER.

The gaily coloured flowers, which, during the sunny months of summer, have greeted us in our rambles through field and lane, have now disappeared. The energy of plant life appears to be on the wane, but appearances here, as elsewhere, are often deceptive; the vigour which during the months gone by showed its presence in highly coloured petals and healthy looking leaves, is still existent although not so evident. True, the petals have disappeared and the leaves look withered and limp, but the fruit is ripening and to the perfecting of this the plant devotes as much attention as it did to its production. The production of offspring is the event towards which all plants struggle from their birth. The flowers are the organs most directly concerned in the process, and most plants which have a sufficiency of food stored up in rhizome or bulb produce these on the first advent of light and warmth; the leaves which are produced afterwards being only for the purpose of laying up a store of food for the flowers of the following season. As soon as fertilization has taken place the plant juices become mainly directed towards the embryo plant, for it is necessary that this should be fitted up with a quantity of food sufficient to maintain it till it has developed its own bread-winning organs—the leaves. It is this nutritive material which forms the most bulky portion of seeds and fruits and whose formation is fraught with such disastrous consequences to leaves and petals. The practical bearing of what has just been said is that gardeners who wish to make their blooms last take precautions to prevent them getting fertilized. It is also well known that fruit trees after a bad season are much more luxuriant in growth than after a good one, because in the latter case all the energy of the tree has been utilized in perfecting the fruit.

Hedgerows and moist woods still furnish some of our umbelliferous friends, such as the hedge-parsley, the angelica, and the burnet saxifrage (*Pharm. Journ.*, xx., 183), in both flower and fruit. A cornfield walk may be productive of some of the mints, and should certainly supply an abundance of the scarlet pimpernel and the field scabious (*Pharm. Journ.*, xx., 183), while in the pasture lands the composites appear to have it all their own way. Foremost among these is the common ragwort (*Senecio Jacobæa*), which, like its near relation the groundsel (*S. vulgaris*), seems to be everywhere. The characters which enable the order to which these belong to secure such a universal foothold need not again be referred to, as they were described in the article of July, 1889 (*Pharm. Journ.*, xx., p. 21). The close resemblance between the groundsel and the ragwort should, however, be noted, the latter looking more like a grown up specimen of the former than a different species. The leaves are good examples of the *pinnatifid* type. In the *capitula* the greatest difference between the plants will be found, although here, too, it is only one of degree. The florets of the groundsel are nearly all tubular, there being only a feeble attempt on the part of the ray florets to develop into the *ligulate* form, while in the ragwort the ligulate ray-florets are the most conspicuous feature of the head. The *pappus*, however, and even the involucral bracts show the close affinity of the plants, and the comparison of such structural features as these, simple as they appear, constitutes one of the best of lessons in classification. The heads of the ragwort are arranged in *corymbs*. The flowers of the hawkbits (*Leontodon hispidus* and *autumnalis*), which are still common in meadows and on waste land, should be compared with those of the ragwort; it will be found that not only the ray but also the disk florets are ligulate, just as in the dandelion. The other end of the chain of development which terminates upwards in the dandelions and the hawkbits may be found in the hardheads (*Centaurea*) and the thistles (*Carduus*) in which all the florets are tubular.

The purple heads of the common hard-head or knapweed are now conspicuous on the borders of every field, and the composite character of its inflorescence will at once be seen. The *pectinate* (comb-like) borders of the bracts of the involucre should be noted, and also their very dark colour. The most common of the thistles is the creeping or field thistle (*Carduus arvensis*), with flower-heads somewhat resembling those of the knapweed, but smaller. The bracts of the involucre are bristle-tipped, while the leaves are *pinnatifid*, somewhat wavy, very hard in texture, and *spinous*. The aerial stems arise from a long creeping rhizome; and cut them down as you will you only stimulate the rhizome to renewed effort, and up comes another flowering stem. The plant is diœcious, and it is very probable that the separation of the sexes leading to constant crossing has much to do with its robust habit and tenacity of life. The spear-thistle (*Carduus lanceolatus*) is almost as common as the creeping thistle, and will be found shedding its pappus-crowned fruit in great profusion on banks and by roadsides. It occasionally attains a height of six feet, and is even at its worst a most forbidding looking plant; the spinous margins of the leaves, and winged stem, should be noted. The long, slender, branched stems of the marsh thistle (*C. palustris*), terminated by clustered heads, are still conspicuous in the marsh lands, looking like so many sentinels; its leaves are *decurrent* (adherent to the stem throughout a portion of their length). It is interesting to note that the form taken by the pappus hairs is a means of dividing the genus *Carduus* just as it is in the grouping of the order. In the species mentioned the hairs are all feather-like or *plumose*, while in the musk-thistle, whose solitary looking stems and large drooping heads may be met with occasionally on waste ground, it is destitute of the feathery character and is somewhat rough. The pappus of the knapweed is scarcely developed at all, so that its seeds when compared with those of the thistles have only a poor chance of distribution. The pappus of the dandelion is provided with a long stalk (*stipitate*), while in the hawkbit the stalk is short, and in the groundsel absent, the pappus being then *sessile*. In the hawkweeds (*Hieracium*) the pappus is rigid and turns brown as the fruit ripens, thus distinguishing them from almost every other member of their suborder. A composite of great interest and, unlike the rest of its order, readily recognized, may be found by roadsides during this and next month. The chicory (*Cichorium Intybus*) is most readily recognized by its heads of blue flowers springing in pairs from the axils of the leaves; the lower leaves are *runcinate* (pinnatifid with the segments pointing backwards, as in the dandelion) and the upper *cordate* and *amplexicaul* (embracing the stem); the branches are very tough and rigid. The pappus of chicory consists of *scales*, not hairs, such as we have found in so many composites.

The grass of Parnassus (*Parnassia palustris*) may still be found blooming on some of our northern moorlands. It is one of the prettiest and at the same time most remarkable of our native wild flowers. It belongs to the saxifrage order, and its general resemblance to the meadow saxifrage will at once be seen by those familiar with the latter plant. The leaves are mostly radical, with a slender petiole, *entire* and *ovate-cordate*. The petals are white and copiously streaked with "honey-guides." The stamens are five in number, but alternating with them are five stamen-like bodies or *staminodes*. These staminodes are tipped with glands whose glistening appearance attracts insects to the honey secreted by the nectaries at their base.

The same bog which yielded the grass of Parnassus may yet furnish us with that most interesting little plant the sundew (*Drosera rotundifolia*). The order to which it belong (*Droseraceæ*) is very little removed from the saxifrage order, and the plant itself reminds us both in the appearance of its flowers and the shape of its leaves of the common little "London Pride." The most interesting feature of the plant, however, is its relation to insects, and in this case it is not the flowers but the leaves which play the important part. The services which insects render plants in effecting fertilization and the return received by the insects in the form of honey and pollen have been constantly referred to in the course of our lessons. The present case has no relation whatever to these, for the sundew simply catches insects, kills and eats them; the only return made to the insect being its conversion from animal into vegetable tissue. An examination of the leaves will show that their upper surface is covered to the number of one or two hundreds with "tentacles," purple on the margin and green towards the centre of the leaves, each surmounted by a gland. It may be that some fragments of insects linger among the tentacles, or the latest victim may still be struggling against fate. Darwin devotes over two hundred pages of one of his most interesting books to a description of the digestive apparatus and its properties, but it will only be possible to refer to them very briefly here. If one of the tentacles be irritated it will, in the course of a few minutes, bends inwards; there will also be a tendency on the part of the surrounding tentacles to bend towards the point of irritation. If a piece of meat or albumen or a fly be placed on the leaf all the tentacles begin to bend inwards and downwards over it; the leaf also soon assumes a concave form, and the glands pour out quantities of an acid fluid exactly resembling in properties the gastric juice of the human stomach; the result is complete digestion of the meat or albumen, and not only digestion but absorption, the process being exactly analogous to what takes place in the stomach of an animal. It is a remarkable fact that a piece of meat causes much more energetic inflection of the tentacles than an inorganic substance of equal size; indeed the presence of nitrogen is detected by the leaves with unerring certainty; a decoction of peas is as powerful in its action as an infusion of raw meat, while a decoction of grass is much less powerful. The extreme sensitiveness of the tentacles is shown by an experiment of Darwin's, in which a piece of hair weighing 1–78740 of a grain was sufficient to cause movement. The tentacles are also readily affected by certain chemicals in solution, particularly salts of ammonia; a twenty-millionth of a grain of phosphate of ammonia was found to cause a tentacle to bend inwards. It is noteworthy that the poison of the cobra does not arrest the movements of the tentacles, while alcohol, chloroform, and carbon dioxide act on them pretty much as they do on animals. That the catching and digestion of insects is not a mere freak on the part of the sundew, but an essential of health, was conclusively shown by Darwin in an elaborate series of experiments in which "fed" plants were not only themselves much larger and healthier than "unfed" plants but the seed produced by the former weighed nearly four times as much as that produced by the latter. The flimsy character of the roots of *Drosera* suggests that little nutriment is to be got from that quarter even if there were any present in the sterile bog-land which the plant frequents.

Those who dwell in the southern counties may perchance know a meadow where the meadow-saffron (*Colchicum autumnale*) grows. A very remarkable looking little plant is this, with its long, pale-purple *perianth*, looking as if it had first been "stuck" in the ground, but really situated on a short, dense, scaly underground stem or corm. The stamens with their large yellow anthers are situated on the perianth, and the ovary is subterranean. It will be remembered that the seeds and corm of this species are largely used in medicine. A plant of somewhat similar habit and appearance (*Crocus nudiflorus*) is to be found here and there in a few English counties, and is interesting from its close relationship to the pharmaceutically interesting saffron crocus, which is not found wild in this country. Both colchicum and crocus belong to the petaloid division of monocotyledons, but the former belongs to the order *Liliaceæ*, in which it will be remembered we found that the ovary was *superior* and the stamens *six*; while the latter is claimed by the order *Iridaceæ*, in which the ovary is *inferior* and the stamens *three*.

In spite of the increasing scarcity of flowers there is still a superabundance of botanically interesting material to be found in the fields and lanes. The leaf-buds of next year are now well-formed on trees and bushes, and their position in the axils of the leaves of the present year should be noted. The *stolons* (branches bending earthwards and rooting at their extremities) of the gooseberry and blackberry may be compared with the *flagella* or runners (similar in structure to stolons, but lying on the ground throughout their whole length) of the strawberry and crowfoot, and the *suckers* (totally underground branches sending out leaves and roots from their extremities) of the rose and the mint. Even the digging up of a potato plant may be made to furnish us with some of the most important facts known to botanical science. The potato itself will be seen to be simply a storehouse formed at the extremity of an underground branch, each of its "eyes" being a leaf-bud capable of producing with the help of the nutriment stored up in the *tuber* a new plant.

The flowering of the ivy (*Hedera helix*) is the next floral event of the season, and next month when the flowers appear they should be compared with those of the *Umbelliferæ*, which closely resembles in most of its characters the order (*Araliaceæ*) to which ivy belongs.

When the ivy begins to flower most of our companions of field and lane have reached their annual resting period, while many have already completed their short span of life. This lesson must therefore form the concluding one of the present series, but it is hoped that the sunshine of the coming spring when it calls forth the life stored up in root and stem and seed will not fail to find a "growing point" in the student of fields and lanes.

CALIFORNIA RAISINS.*

There is one vast fruit industry of which California has and is likely to hold a practical monopoly. That is the production of raisins. Vineyards elsewhere may compete with those of California in wine making, but nowhere else are there combinations of soil and climate so favourable to raisin-making as here. This fact was discovered a long time ago. Dried grapes of various kinds were prepared in the old missions long before California became a part of the United States. And fully thirty years ago the manufacture of raisins, for home consumption chiefly, was systematically carried on, and on a considerable scale. But it was not until five years ago that the State began fully to realize its capabilities in that direction. In 1885, there were almost as many raisins produced as in all the twenty years preceding put together. Since then increase has been phenomenal, amounting to about 250 per cent. in four years. There has been, however, no overproduction and no reaction. A ready and profitable market has been found for all the output, and every one who has gone into the business has been more than satisfied with the results. Next year there will be a greatly increased acreage, and the output of raisins will be enormous.

The Spaniards and Indians used to dry the Mission grapes. That was about the only kind of grape grown here down to 1860, and the first experiments in genuine raisin-making were made with it. That they were not highly successful was due simply to the fact that nature did not design the Mission grape to be turned into raisins. But the men who made the experiments were not discouraged. They were convinced that California might easily be made the greatest vineyard in the world. But to accomplish that end it would be necessary to introduce some other varieties of grapes. So they sent to Europe and brought over shiploads of cuttings from the vineyards of France, Spain, Italy, Germany and Hungary. These were scattered all over the State, and from them have sprung the vast vineyards of the present day. The chief object aimed at then was the production of wine, and the cuttings were selected accordingly. But among the varieties imported were three of the best raisin grapes in the world—the *Feher Zagos*, the *Muscatel* and the *Muscat* of Alexandria. From these, and especially from the second, much wine is made. But they supply also the raw material for the millions of boxes of raisins that are each year shipped from California to the markets of the world.

Where, when and by whom raisins were first successfully made for market is not well established, but it was probably in 1863, and the grapes used were Feher Zagos and Muscat. For some years thereafter, however, little interest was taken in the subject. A few raisins were made, experimentally, out of curiosity, or to supply a small local demand. That was all. Not until 1873 was the work taken up in thorough earnest. But in that year it was entered into extensively in several parts of the State at the same time and the result was the production of 6,000 boxes, or 120,000 pounds, of pretty good raisins. There was much to discourage the growers, however. They were trying to make raisins according to the methods practised in Spain and elsewhere in the Old World. But these methods would not work well here. Nor, indeed, were American manufacturers willing to follow out the full formula of Spain, which involved some utterly disgusting details. And as yet they had discovered no new system of their own. For several years there was much work and no profit. Sometimes a man would turn out as good raisins as ever were seen. Then he would make a lot that were too moist, and they would mould and rot; while a third attempt would result in dry, shrivelled things that rattled about in the boxes like so many hickory nuts. Many men grew quite discouraged, and either rooted up their vineyards altogether or took to making wine. But there were some who stubbornly persevered in trying to make raisins.

Their labours were at last rewarded by the discovery that the best formula was no formula at all. That is, that raisins were to be made best by the simplest possible process, without any dipping into strange mixtures, or spreading on gravel beds, or any such work. The fruit must be just at the proper point of ripeness, and the less it is handled the better. The bunches are laid on wooden trays, about 20 pounds to the tray, and thus exposed to the sunlight and sun heat for several days. Six to eight days generally suffice, but considerable skill is required to determine when exactly the proper stage of drying has been reached. Then they go into what are called the sweat-boxes for a week or so, where the moisture that remains in them is equally distributed, throughout the whole berry. Then they are sorted and packed, the whole bunches being packed in that form, while the broken clusters have all the stems removed and are packed as stemless raisins. The stemming is done by machinery, but the packing is done by hand, women and girls being employed for the purpose.

The three grapes mentioned form the mainstay of the raisin industry. In some places the seedless sultana does well, and it is believed by many that it will soon become the favourite raisin grape. In the southern part of the State the Malaga grape succeeds better than any other, but at the present time the Muscat is grown probably more than all others put together. It has a rich and spicy flavour that no other raisin grape possesses, and on this account Muscat raisins are most in demand. It grows well in almost any soil, and is the most steady and trustworthy of all in its bearing. The vines are usually planted 5 feet apart, in rows 14 feet apart. Artificial irrigation has, of course, to be employed. The returns from a vineyard come very quickly. The second year a fair crop may be gathered from rooted vines, and the third year from cuttings. A year or two later the vineyard is in full bearing. There are cases on record of more than 50 dollars' worth of grapes being taken from an acre of vines that had been in the ground only a year and a half. Good raisin land can be purchased in the various localities adapted to the industry at from 50 dollars to 200 dollars per acre. The location governs the price, and the 50 dollar land will be just as good as the 200 dollar, except that it will be more remote from shipping facilities. It is calculated, from the experience of hundreds of growers, that an expenditure of 60 dollars an acre will cover the entire cost of planting and cultivating for three years. If the raisin grower does his work himself this expense will be reduced solely to the outlay required for the vines and possibly a little help in planting.

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* From a correspondence dated Los Angeles, July 28, 1890, published in *The New York Tribune*. Reprinted from the *Amer. Journ. Pharm.*, September.

In the early days of raisin production it was customary for the growers to pack their own fruit and market it themselves. There was a great deal of loss from this system, caused by the irregularity of grading and the difficulty of finding a market for the fugitive shipments thus made. Subsequently there grew up a system of wholesale packing, by which firms established themselves in the raisin districts, put up large warehouses and then contracted for the fruit in the sweat-boxes. The producer received cash on delivery, while the packer assorted and graded all the fruit received, and so was able to establish uniform brands. The price for the raisins in the sweat-box has varied considerably. It has been as low as four cents a pound, but with the increase in production and the widening of the market there has been a steady stiffening in prices, and last year from five to six cents was paid.

The greatest raisin county in the State is Fresno, where the soil is peculiarly adapted to grape culture. That county last year produced about 625,000 boxes of raisins of the best quality. Riverside came next with 225,000 boxes. Twenty years ago there were less than 1500 grape vines in all San Diego County. Now there are 3,000,000. Yolo was the scene of some of the earliest raisin making, and its output last year was 130,000 boxes. The most carefully prepared statistics show the entire raisin product of the State to have been in various years as follows: 1875, 222,000 pounds; 1880, 1,500,000 pounds; 1885, 9,500,000 pounds; and in 1889, 32,678,000 pounds. What the yield of the present year will be cannot be estimated as yet with any accuracy, but it will probably reach 45,000,000 pounds, for the increase in acreage is very great. Last year there were less than 60,000 acres of vines in bearing, but planting was carried on extensively. Perhaps 10,000 acres of new vineyards are in bearing this year, and next year nearly 95,000 acres will be in full bearing. This should swell the output of raisins in 1891 to at least 55,000,000 pounds.

PRIESTLEY AND LAVOISIER.[*]

BY PROFESSOR T. E. THORPE, B.SC., PH.D., F.R.S., TREAS., C.S.

Leeds has one most notable association with chemistry of which she is justly proud. In the month of September, 1767, Dr. Joseph Priestley took up his abode in this town. The son of a Yorkshire cloth-dresser he was born in 1733 at Fieldhead, a village about six miles hence. His relatives, who were strict Calvinists, on discovering his fondness for books, sent him to the Academy at Daventry to be trained for the ministry. In spite of his poverty and of certain natural disadvantages of speech and manner, he gradually acquired, more especially by his controversial and theological writings, a considerable influence in dissenting circles. A pressing invitation and the offer of one hundred guineas a year, induced him to accept an invitation to take charge of the congregation of Mill Hill Chapel here. He was already known to science by his 'History of Electricity,' and the effort was made to attach him still more closely to its cause by the offer of an appointment as naturalist to Cook's Second Expedition to the South Seas. But thanks to the intervention of some worthy ecclesiastics on the Board of Longitude, who had the direction of the business, and who, as Professor Huxley once put it, "possibly feared that a Socinian might undermine that piety which in the days of Commodore Trunnion so strikingly characterized sailors," he was allowed to remain in Leeds, where, as he tells us in his memoirs, he continued six years, "very happy with a liberal, friendly and harmonious congregation," to whom his services (of which he was not sparing) were very acceptable. "In Leeds," he says, "I had no unreasonable prejudices to contend with, and I had full scope for every kind of exertion."[*]

We have every reason to feel grateful to the "worthy ecclesiastics," since their action indirectly occasioned Priestley to turn his attention to chemistry. The accident of living near a brewery led him to study the properties of "fixed air," or carbonic acid, which is abundantly formed in the process of fermentation, and which at that time was the only gas whose separate and independent existence had been definitely established. From this happy accident sprang that extraordinary succession of discoveries which earned for their author the title of the Father of Pneumatic Chemistry, and which were destined to completely change the aspect of chemical theory and to give it a new and unexpected development.

I have been led to make this allusion to Priestley, not so much on account of his connection with this place as for the reason that, as it seems to me, there has been a disposition to obscure his true relation to the marvellous development of chemical science which made the close of the last century memorable in the history of learning. Our distinguished fellow-worker, M. Berthelot, the Perpetual Secretary of the French Academy, has recently published, under the title of 'La Révolution Chimique,' a remarkable book, written with great skill, and with all the charm of style and perspicacity which invariably characterises his work, in which he claims for Lavoisier a participation in discoveries which we count among the chief scientific glories of this country. From the eminence of M. Berthelot's position in the world of science his book is certain to receive in his own country the attention which it merits, and as it is issued as one of the Bibliothèque Scientifique Internationale it will probably obtain through the medium of translations a still wider circulation. I trust that I shall not be accused of being unduly actuated by what Mr. Herbert Spencer terms "the bias of patriotism" in deeming the present a fitting occasion on which to bring these claims to your notice with a view of determining how far they can be substantiated.

All who are in the least degree familiar with the history of chemical science during the last hundred years will recognize, as I proceed, that the claims which M. Berthelot asserts on behalf of his illustrious predecessor are not put forward for the first time. Explicitly made, in fact, by Lavoisier himself, they were uniformly and consistently disallowed by his contemporaries. M. Berthelot now seeks to support them by additional evidence and to strengthen them with new arguments, and asks us thereby to clear the memory of Lavoisier from certain grave charges which lie heavily on it. You have doubtless anticipated that these claims have reference to Lavoisier's position in relation to the discovery of oxygen gas and the determination of the non-elementary nature of water.

The substance we now call oxygen—a name we owe to Lavoisier—was discovered by Priestley on August 1, 1774; he obtained it, as every schoolboy knows, by the action of heat upon the red oxide of mercury. We all remember the characteristically ingenuous account which Priestley gives of the origin of his discovery. M. Berthelot sees in it merely the evidence of the essentially empirical character of his work. "Priestley," he says, "the enemy of all theory and of every hypothesis, draws no general conclusion from his beautiful discoveries, which he is pleased, moreover, not without affectation, to attribute to chance. He describes them in the current phraseology of the period with an admixture of peculiar and incoherent ideas, and he remained obstinately attached to the theory of phlogiston up to his death, which occurred in 1804" (p. 40). Such a statement is calculated to give an erroneous idea of Priestley's merit as a philosopher. That the implication it contains is wholly opposed to the real spirit of his work might be readily shown by numerous quotations from his writings. Perhaps this will suffice: "It is always our endeavour, after making experiments, to generalize the conclusions we draw from them, and by this means to form a *theory* or system of principles to which all the *facts* may be reduced, and by means of which we may be able to foretell the result of future experiments." This quotation is taken from the concluding chapter of his "Experiments and Observations on Different Kinds of Air," in which he actually seeks to draw "general conclusions" concerning the constituent principles of the various gases which he himself made known to us and to show the bearing of these conclusions on the doctrine of phlogiston. That he was content to rest in the faith of Stahl's great generalization, even to the end, is true, and the fact is more remarkable when we recall the absolute sincerity of the man, his extraordinary receptivity, and, as he says of himself, his proneness "to embrace what is generally called the heterodox side of almost every question." If it is argued that this merely shows Priestley's inability to appreciate theory, it must be at least admitted that there is no proof that he was inimical to it. His position is clearly evident from the concluding words of the section of his work from which I have already quoted: "This doctrine of the composition and decomposition of water has been made the basis of an entirely new system of chemistry, and a new set of terms has been invented and appropriated to it. It must be acknowledged that substances possessed of very different properties may, as I have said, be composed of the same elements in different proportions and different modes of combination. It cannot, therefore, be said to be absolutely *impossible* but that water may be composed of these two elements or any other. But then the supposition should not be admitted without *proof*; and if a former theory will sufficiently account for all the *facts* there is no occasion to have recourse to a new one, attended with no peculiar advantage (*loc. cit.*, p. 543). . . . I should not feel much reluctance to adopt the *new doctrine*, provided any new and stronger evidence be produced for it. But though I have given all the attention that I can to the experiments of M. Lavoisier, &c., I think they admit of the easiest explanation on the *old system*" (*loc. cit.*, p. 563).

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[*] Presidential Address to the Chemical Section of the British Association.

[*] Leeds still enjoys one of the fruits of Priestley's insatiable power of work in her admirable Proprietary Library. He seems to have suggested its formation, and was its first honorary secretary.

The fact that Priestley was the first to consciously isolate oxygen is not contested by M. Berthelot, although he is careful to point out, what is not denied, that the exact date of the discovery depends on Priestley's own statement, and that his first publication of it was made in a work published in London in 1775. It was known before Priestley's famous experiment that the red oxide of mercury, originally formed by heating the metal in contact with air, would again yield mercury by the simple action of heat and without the intervention of any reducing agent. Bayen, six months before the date of Priestley's discovery, had observed that a gas was thus disengaged, but he gave no description of its nature, contenting himself merely by pointing out the analogy which his experiments appeared to possess to those of Lavoisier on the existence of an elastic fluid in certain substances. Afterwards, when the facts were established, Bayen drew attention to his earlier experiments, and claimed, not only the discovery of oxygen, but all that Lavoisier deduced from it. "But," says M. Berthelot, in reference to this circumstance, "his contemporaries paid little heed to his pretensions, nor will posterity pay more" ('La Révolution Chimique,' p. 60).

M. Berthelot, however, does not dismiss Lavoisier's claims to a participation in the discovery in the same summary fashion. On the contrary, whilst not explicitly claiming for him the actual isolation, in the first instance, of oxygen, the whole tenor of his argument is to extenuate and even to justify his demand to be regarded as an independent discoverer of the gas. He begins by asserting that Lavoisier had already a presentiment of its existence in 1774, and he quotes, in support of this assumption, an abstract from Lavoisier's memoir, published in December, 1774, in the *Journal de Physique* of the Abbé Rozier: "This air, deprived of its fixable portion (by metals during calcination) is in some fashion decomposed, and this experiment would seem to afford a method of analysing the fluid which constitutes our atmosphere and of examining the principles of which it is composed. . . . . . I believe I am in a position to affirm that the air, as pure as it is possible to suppose it, free from moisture and from every foreign substance, far from being a simple body, or element, as is commonly thought, should be placed on the contrary. . . . . . in the group of the mixtures, and perhaps even in that of the compounds."

M. Berthelot further asserts that Lavoisier was at this time the first to recognize the true character of air, and he expresses his belief that it is probable that he would himself have succeeded in isolating its constituents if the path of inquiry had been left to him alone. It is no disparagement to Lavoisier's prescience to say that there is nothing in these lines, nor in the memoir of the repetition of Boyle's experiments on the calcination of tin to which they refer, to show that Lavoisier had made any advance beyond the position of Hooke and Mayow. It has been more than once pointed out that the chemists of the seventeenth century understood the true nature of combustion in air much better than their brethren of the last quarter of the eighteenth century. Hooke, in the 'Micrographia,' and Mayow, in his 'Opera Omnia Medicophysica,' indicated that combustion consists in the union of something with the body which is being burnt; and Mayow, both by experiment and inference, demonstrated in the clearest way the analogy between respiration and combustion, and showed that in both processes one constituent only of the air is concerned. He distinctly stated that, not only is there increase of weight attending the calcination of metals, but that this increase is due to the absorption of the same *spiritus* from the air that is necessary to respiration and combustion. Mayow's experiments are so precise, and his facts so incontestable, that, as Chevreul has said, it is surprising that the truth was not fully recognized until a century after his researches. (*Vide* Watts' 'Dictionary of Chemistry,' by Morley and Muir, art. 'Combustion,' p. 242.)

It is now necessary to examine Lavoisier's claims rather more closely and in the light of M. Berthelot's book. A *résumé* of his work 'On the Calcination of Tin' was given by Lavoisier to the Academy in November, 1774, but the complete memoir was not deposited until May, 1777. A careful comparison of an abstract of what was stated to the Academy in November, 1774, contributed by Lavoisier himself, in December, 1774, to the 'Journal de Physique' of the Abbé Rozier, makes it evident that very substantial additions were made to the communication before it was finally printed in the 'Mémoires de l'Académie des Sciences.' The possibility of this is allowed by M. Berthelot. He says (p. 58), "A summary communication, often given *vivâ voce* to a learned society, such as the Academy of Sciences of Paris or the Royal Society of London, would immediately call forth verifications, ideas, and new experiments, which would develop the range and even the results of such communication. The original author, when printing his memoir, would in return—and for this he is hardly blameable—embody these additional results and later interpretations. It thus becomes most difficult to assign impartially to each his share in a rapid succession of discoveries" (*loc. cit.*, p. 58).

But although, as we shall see, Lavoisier was certainly aware of Priestley's great discovery, no allusion is made to the gas, nor to Priestley's previous work on the other constituent of air, which is printed in the 'Philosophical Transactions' for 1772, and for which he was awarded the Copley Medal by the Royal Society. It is simply impossible to believe that Lavoisier could have been uninfluenced by this work. Indeed, we venture to assert that the full and clear recognition of the non-elementary nature of air which he eventually made was based upon it. It is noteworthy that in the early part of his memoir he states his opinion that the addition not only of powdered charcoal, but of any phlogistic substance to a metallic calx is attended with the formation of fixed air. It is certain that at this period he had not only not consciously obtained any gas resembling Priestley's dephlogisticated air from any calx with which he had experimented, but that none of his experiments had afforded him any idea that the gas absorbed during calcination was identical with it.

At Easter, 1775, Lavoisier presented a memoir to the Academy 'On the Nature of the Principle which Combines with Metals during Calcination.' This was '*relu le* 8 *août*, 1778.' To the memoir there is a note stating that the first experiments detailed in it were performed more than a year before; those on the red precipitate were made by means of *a burning glass* in the month of November, 1774, and were repeated in the spring of 1775 at Montigny in conjunction with M. Trudaine. In this paper Lavoisier first distinctly announces that the principle which unites with metals during their calcination, which increases their weight, and which transforms them into calces, is nothing else "than the purest and most salubrious part of the air; so that if that air which has been fixed in a metallic combination again becomes free, it reappears in a condition in which it is eminently respirable, and better adapted than the air of the atmosphere to support inflammation and the combustion of substances" ('Œuvres de Lavoisier,' official edition, vol. ii., p. 123). He then describes the method of preparing oxygen by heating the red oxide of mercury, and compares its properties with those of fixed air. There is, however, no mention of Priestley, nor any reference to his experiments. It can hardly be doubted that in this memoir Lavoisier intended his readers to believe that he was "the true and first discoverer" of the gas which he afterwards named oxygen. This is borne out by certain passages in his subsequent memoir 'On the Existence of Air in Nitrous Acid; *lu le* 20 *avril*, 1776, *remis en décembre* 1777.' He had occasion incidentally to prepare the red oxide of mercury by calcining the nitrate, and says that he obtained from it a large quantity of an air "much purer than common air, in which candles burnt with a much larger, broader, and more brilliant flame, and which in no one of its properties differed from that which *I* had obtained from the calx of mercury, known as *mercurius precipitatus per se*, and which Mr. Priestley had procured from a great number of substances by treating them with nitric acid."

In another part of this memoir he says that "perhaps, strictly speaking, there is nothing in it of which Mr. Priestley would not be able to claim the original idea; but as the same facts have conducted us to diametrically opposite results, I trust that, if I am reproached with having borrowed my proofs from the works of this celebrated philosopher, my right at least to the conclusions will not be contested." Mr. Berthelot remarks on the irony of this passage: we may infer from it that the friends of the English chemist had not been altogether idle. In his 'Memoir on the Respiration of Animals,' read to the Academy in 1777, he again appears to admit the claim of Priestley to at least a share in the discovery: "It is known from Mr. Priestley's and my experiments that *mercurius precipitatus per se* is nothing but a combination," etc. In several subsequent communications Priestley's name is mentioned in very much the same connection until we come to the classical memoir 'On the Nature of the Acids,' when it is said: "I shall henceforth designate the dephlogisticated air, or the eminently respirable air. . . . by the name of the *acidifying principle*, or, if it is preferred to have the same signification under a Greek word, by that of the '*principe oxygine*.'"

In none of the memoirs after that of Easter, 1775, is the claim for participation more than implied; it is made explicitly for the first time in the paper 'On a Method of Increasing the Action of Fire,' printed in the 'Mémoires de l'Académie,' for 1782, and in these words: "It will be remembered that at the meeting of Easter, 1775, I announced the discovery which I had made some months before with M. Trudaine,* in the laboratory of Montigny, of a new kind of air, up to then absolutely unknown, and which we obtained by the reduction of *mercurius precipitatus per se*. This air, which Mr. Priestley discovered at very nearly the same time as I, and I believe even before me, and which he had procured mainly from the combination of minium and of several other substances with nitric acid, has been named by him *dephlogisticated air*."

In the 'Traité Elémentaire de Chimie' the claim for participation is again asserted in these words: "This air, which Mr. Priestley, Mr. Scheele and I discovered at about the same time."

Now there is no question that Lavoisier knew of the existence of oxygen some months before he made the experiments with the burning glass of M. Trudaine at Montigny, *for the simple reason that Priestley had already told him of it*. Priestley left Leeds in 1773, to become the librarian and literary companion of Lord Shelburne, and in the autumn of 1783 he accompanied his lordship on to the Continent, and spent the month of October in Paris. Lavoisier was famous for his hospitality; his dinners were celebrated; and Priestley, in common with every foreign *savant* of note who visited Paris at that period, was a welcome guest. What followed is best told in Priestley's own words: "Having made the discovery [of oxygen] some time before I was in Paris, in the year 1774, I mentioned it at the table of Mr. Lavoisier, when most of the philosophical people of the city were present, saying that it was a kind of air in which a candle burnt much better than in common air, but I had not then given it any name. At this all the company, and Mr. and Mrs. Lavoisier as much as any, expressed great surprise. I told them I had gotten it from *precipitate per se* and also from *red lead*. Speaking French very imperfectly, and being little acquainted with the terms of chemistry, I said *plombe rouge*, which was not understood till Mr. Macquer said I must mean *minium*."

(*To be continued.*)

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* M. Trudaine de Montigny died in 1777.

The Pharmaceutical Journal,

SATURDAY, SEPTEMBER 20, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

INLAND REVENUE REPORT.

The report of the Commissioners of Her Majesty's Inland Revenue that has just been published for the year ending 31st March, 1890, contains several items of information that are of interest to pharmacists. Under the head of medicine stamps it appears that the net receipts for the year amounted to no less than £217,264, showing an increase over the receipts of the previous year of £14,889. This is evidence of a very considerable extension of the trade in so-called patent medicines, and it is referred to in the report as a surprising fact that has been observed for several years. Much of this increase in the sale of stamped medicines is no doubt a consequence of the alteration of the licence duty some years ago, the very small amount of licence duty now charged being a strong inducement to various classes of traders to sell stamped medicines. The effect of the change has undoubtedly been detrimental to the interests of chemists, and in view of this fact it is worth the consideration of those who advocate the total abolition of the medicine stamp duty, whether such a change would not be a further disadvantage by giving a still further impetus to the trade in those articles. Even the medical papers which have advocated the repeal of the patent medicine law on the mistaken ground that it imposes a tax on the medicine required for the relief of disease have latterly modified their views in this respect, and have confined themselves to claiming that secret preparations containing scheduled poisons or potent and dangerous drugs should have their composition declared and their sale conducted in conformity with the regulations applying to the sale of poisons. This is a most reasonable demand, and one that has been proved by experience to be essentially necessary in the interests of the public.

The returns relating to methylated spirit show that its use in arts and manufactures is still increasing, the quantity of British and foreign spirit received into warehouses for methylation having been in the past year 3,188,306 gallons, or an increase of 227,402 gallons over that of the previous year. Considering the large quantity of methylated spirit that is used there have been doubts at times whether some part of it may not be applied to other purposes than those for which it is intended to be used free of duty. It would appear that there is some ground for these doubts, for the Report of the Principal of the Inland Revenue laboratory mentions that it has been found necessary to appoint an additional analyst, who is set apart for the entirely new duty of visiting the premises of manufacturing chemists and others who use methylated spirit to see that such spirit is used only in accordance with the law and the Board's regulations. The report goes on to say that the results so far have amply justified the course adopted, for many irregularities have already been corrected, and in several more serious cases penalties have been enforced. No particulars of these cases are given, but it is evident from the statement made that there is difficulty in preventing the unlawful use of methylated spirit, and that it is necessary for that purpose to adopt special measures of supervision. If that be the case under existing conditions, the fact would seem to show that the system of methylation is but an imperfect means of protecting the revenue and of protecting manufacturers who conform to the law against unfair competition. At the present time there is a considerable agitation in Germany in favour of the use of spirit free of duty and without being methylated. Pharmacists especially are striving to obtain this concession and they propose that for the protection of the revenue their use of spirit should be subject to strict supervision in such a way that the spirit received into stock free of duty shall be exactly accounted for in their manufactured products, any deficiency being chargeable with duty. If it be necessary now to exercise supervision of the use of methylated spirit to prevent misapplication, some still more thorough system of control over the use of spirit for manufacturing purposes might perhaps render the device of methylation superfluous and be conducive in other ways to the promotion of manufactures in which the use of spirit is indispensable.

PROBLEMS IN EXAMINATION PROBABILITIES.

Examinations have long been regarded as an imperfect method of testing candidates, and unsuccessful competitors always command a certain amount of sympathy on the ground of bad luck, nervousness or sudden ill-health. Sufferers from this necessary evil should therefore be grateful to Professor Edgeworth for his study of the subject as a problem in probabilities. The professor's estimate of the extent to which the results of competitive examinations depend upon the accident of one examiner rather than another equally competent being appointed to mark the work of the candidates, may afford comfort to many a disappointed one, whilst probably it will not give rise to any qualms of conscience among the more fortunate. The fundamental axiom of Professor Edgeworth's mathematical reasoning is the proposition that "the marks given by different examiners to the "same piece of work are apt to be arranged accord-

"ing to some law of error or facility-curve which "is constant for the same class of examiners and "work examined." But although there is an evident analogy between errors of observation and discrepancies in marking, the transition from objective qualities observed by the senses to degrees of intellectual quality estimated by the judgment is so abrupt that the proposition calls for confirmation before it can be accepted as an axiom. Professor **Edgeworth** has endeavoured to meet this demand by instancing the results obtained from a set of independent answers to the question, "What is my weight?" This would form a kind of intermediate case, where the quantity to be determined is objective, but the operation by which it is determined is an estimate rather than a simple observation. These and similar experiments show that such estimates obey not only *a* law, but *the* law of error, so far as may be expected in dealing with so limited a number as ninety-six. The cautious application of the theory of errors to the more specific experience adduced appears therefore warranted.

Two kinds of examination statistics are available, marks given by two examiners to several papers and marks given to the same paper by several examiners. The former kind are more copious, and in some respects more valuable, for they admit of being freed from a constant difference, of the nature of a "personal equation," between the marking of two examiners, which equally affecting all the competitors does not disturb their order. The method employed in the determination of the mean deviation, the coefficient which Professor **Edgeworth** considers to be the most suitable for use as a measure of discrepancy, is analogous to that employed in the extraction of the **Gaussian** mean error. This mean deviation is conveniently expressed as a percentage of the mean mark for the whole set of examination papers, and must naturally be computed for each set, the results ranging from 15 to 30 per cent. These data can be adapted to several problems of practical interest, in which the number of subjects, candidates and examiners, as well as the predetermined number of marks or prizes, are all factors to be regarded in the calculations.

As an example of the deductions which may be furnished by examination statistics with the aid of these formulæ, Professor **Edgeworth** cites the following instance. Let a prize be given to the one of two candidates who obtains the higher mark for a piece of Latin prose, of about the same calibre as the composition at the Indian Civil Service or Cambridge Classical Tripos Examination. Even if the successful candidate exceeds his rival by 50 per cent. of the mean between the two marks, there is some probability, say one in a hundred, that the verdict would be reversed by another equally competent examiner.

From the statistics of examinations in the twentieth Report of the Civil Service Commission, Professor **Edgeworth** has calculated the most probable number of candidates who would have been displaced if the work had been marked by different but equally competent examiners. Among 171 candidates for 50 second class clerkships, he estimates there would have been 7 displacements; among 198 candidates for 37 appointments in the Indian Civil Service 3 displacements; among 351 candidates for 110 appointments in the cavalry and infantry 4 displacements. Thus in the case of the India Civil Service it might be said—or, rather, might have been said at the period to which the statistics relate, twelve years ago—that the most probable amount of displacement or degree of failure of justice which might be expected amounts to 8 per cent. of the successful.

Further, since the improbable error or discrepancy is found by multiplying the probable error or discrepancy proper to the case by 3·5, a much larger number of candidates are uncertain in the sense that there is an appreciable chance of any assigned one of them who was previously successful coming out unsuccessful or *vice versâ* upon a change of examiners. Thus in the computations for the above examinations 33 successful and 49 unsuccessful candidates for clerkships are classed as uncertain, whilst of the successful and unsuccessful candidates for Indian appointments 29, and for military appointments 52, are placed under the same heading.

In a General Order issued from the Inland Revenue Department, and dated the 10th of September, it is announced that in future spirit of wine will be allowed to be exported with medicinal tinctures in quantities not exceeding two gallons in any case or package, and drawback thereon will be allowed. The special allowance of 4 per cent. for waste is, however, to be withheld in the case of such spirit.

* * *

We have received a copy of a prospectus of classes to be held during the coming session in connection with the North of England Pharmaceutical Association, at the Durham College of Science, for giving instruction adapted to the requirements of students in pharmacy. There will be two courses of twenty lectures each upon Theoretical Chemistry, to be delivered, the first on Monday and the second on Tuesday evenings, and a class in Organic Chemistry on Tuesday and Friday evenings, the Professor being Dr. P. Phillips Bedson. The Chemical Laboratory will be open on Tuesday and Friday evenings. A course of lectures on Botany will be delivered by Mr. M. C. Potter, on Monday evenings, supplemented by Laboratory work on Friday evenings. In addition there will be a course of twenty lectures on Botany on Wednesday evenings, by Mr. Alfred Wright, and a course of about ten lectures on Pharmacy, by Mr. B. S. Procter, on Monday evenings.

* * *

In the advertisement of an examination for appointments as Surgeon in Her Majesty's Indian Medical Service, which appeared in this Journal on the 16th and 23rd ultimo, the date at which the examination is to be held was given as February, 1890, instead of February, 1891, and we take this opportunity of correcting the error.

* * *

It is announced that the Chelmsford County Cattle Disease Committee has decided to recommend the appointment of Dr. J. C. Thresh as Medical Officer for the county of Essex.

British Pharmaceutical Conference.

MEETING AT LEEDS.

FIRST DAY'S PROCEEDINGS.

Tuesday, September 2.

(*Continued from page* 216.)

The following papers were, in the absence of the authors, read by Mr. Ransom, Honorary General Secretary:—

Note on Strophanthus Hispidus.

BY E. M. HOLMES, F.L.S.

Since the introduction of strophanthus into the practice of medicine, the seeds obtainable in commerce have been observed to vary considerably in appearance and quality. The preparations made from them have also been found to differ so much in strength, or at all events in therapeutical action, (some being almost inert,) that many physicians have discontinued the use of the drug.

The remarks I have now to offer, are made therefore with the view of obtaining a greater uniformity both in the preparations of strophanthus, and in the quality of the seeds employed to make the preparations, since uniformity of strength will depend more on the quality of the seed employed, than on the exact proportions of seed, and strength of spirit used. The physiological experiments made by Professor T. R. Fraser were, he informs me, made with the greenish-fawn coloured seed, of which a specimen presented to the Museum of the Society in Bloomsbury Square, is now placed on the table. The plant which yields these seeds has been described and figured by Professor Fraser in the 'Transactions of the Royal Society of Edinburgh' vol. xxxv., pl. iv. (No. 21), pl. i–viii. The first specimens of the plant, consisting of a few leaves and flowers, were described some years ago by Professor Oliver in Hooker's 'Icones Plantarum' (3) vol. i., pl. iv., 1871, p. 79. pl. 1098, under the name of *Strophanthus Kombé*, Oliv.; but this he now regards as "a variety, a geographical race of *S. hispidus*" ('Trans.,' *S. hispidus*, *l.c.*, p. 975).

Further specimens of the plant said to yield the seed employed by Professor Fraser, were sent by Mr. Buchanan to the latter, and from these the description and figures given in the paper above quoted are drawn. The flowers of these specimens have been submitted by Professor Fraser to Professor Oliver, who "expresses the opinion that they are the flowers of *S. hispidus*."

But the seeds employed by Professor Fraser differ both in size and colour from those obtained from the typical *Strophanthus hispidus* of the West Coast of Africa, as will be seen by comparison of the commercial specimen of *S. hispidus* seeds (on the table), with those presented by Professor Fraser. This difference is not confined to one particular sample; the seeds from the Niger territory presented some years ago by the late D. Hanbury, and others from the Gold Coast recently contributed by Dr. J. F. Easmon having the same brown colour and small size as the commercial seeds of *S. hispidus*. All the plants of *S. hispidus* that I have seen at the Kew Herbarium and elsewhere present the same character of thin leaves with brownish, hispid hairs and differ from the thicker leaves with more prominent veins, present both in the original specimen of *S. Kombé* and in a recent specimen of the plant sent by the Rev. M. Frere to Sir John Kirk and by him to Professor Fraser, and which the last named gentleman kindly allowed me to examine. If further material should subsequently show that the plant deserves specific rank, the name *S. Kombé*, Oliv., can then be restored without causing any confusion. I would suggest therefore that until good flowering and fruiting specimens of the plant have been procured, Professor Fraser's seeds should be distinguished by the name of *S. hispidus*, var. *Kombé*, so that they may be kept distinct in commerce from the smaller dark brown seeds from the West Coast of Africa.

Without entering further at present into the somewhat intricate facts connected with the plants stated to afford the strophanthus seeds of commerce, I wish now only to emphasize the fact that the seeds used by Professor Fraser, and therefore the kind from which the medicinal action described by him should be expected, differ from those yielded by the typical *S. hispidus* of West Africa. Consequently, if seeds of *Strophanthus hispidus* be obtained commercially from the West African plant the preparations made from them *may differ considerably in action* from those obtained commercially from East Africa. To say the least, one factor contributing to the variability of preparations of strophanthus may be eliminated by refusing to employ the West African seeds until they have actually been proved to be chemically and physiologically identical with those from East Africa. The other points to which I wish more particularly to direct attention are:—

1. That the seed used by Professor Fraser possessed the following characters. In bulk some of the seeds appear to be of a greyish green colour and others of a fawn colour. This, however, is an optical illusion, which is readily dissipated by altering the angle and direction of the seeds to the light. The hairs on the seeds all point in one direction and are somewhat appressed to the seed coat. If the seed be first presented towards the light so that the apex is towards it, and then the seed be reversed, so that the base of the hair is presented to the light, it will be seen, by varying the angle of incidence, that the fawn colour appears green and *vice versâ*.

2. The seeds vary in quality according to the degree of ripeness of the pods and the carefulness with which they have been dried. On breaking a seed across it should exhibit a firm white endosperm, showing under a good lens a line marking the enclosed cotyledon. All seeds that are shrunken or shrivelled, or that show a yellow or dark coloured interior, should be discarded. The average length of the seeds is given by Professor Fraser as 0·6 to 0·7 inch, and the maximum width 0·14 to 0·16 inch, the average weight being 0·4 to 0·6 grain.

3. All seeds that have not a hairy surface, and in which the hairs do not present the alternating greyish green and fawn colour should not be employed. There has occurred in commerce a *mixture* of glabrous seeds with hairy seeds, and also a somewhat twisted non-hairy seed belonging to a different genus, *Kickxia africana*. The latter are easily recognized by the different shape and the fact that the cotyledons are seen to be doubly folded when a seed is broken transversely. If the above directions are followed and the uniformity in strength of tincture already proposed by Professor Fraser be adopted, this valuable and powerful drug will I think regain in great measure the favour which it has lost in the hands of some physicians.

It may be of further interest to point out that ouabain, which is said to differ slightly in chemical formula and therapeutical strength from strophanthin, is now obtained (exclusively, I believe) from the smooth strophanthin seeds sold under the unscientific name of "*Strophanthus glabrus*." Ouabain was first obtained from the wood of a plant which has been named *Acocanthera Ouabaio*, but of which, I believe, the pods have not been seen. As the "*Strophanthus glabrus*" seeds come from the Gaboon, and these appear in commerce mixed with the hairy strophanthus seeds, it is obvious that strophanthin obtained from such a mixture will necessarily be a mixture of a strophanthin with ouabain. The reason why ouabain (which is, I believe, chiefly manufactured in France) is now prepared from the "*Strophanthus glabrus*" seeds is because a much larger percentage of the active principle is obtainable than from the wood. The plant must unfortunately still go by its commercial name, since it cannot be accurately described until fruit and flowers and leaves of the *same plant* are available. There is already in the Herbarium of the Pharmaceutical Society a specimen of a strophanthus from the Gold Coast with glabrous leaves, which probably yields the seeds in question, but as the fruit did not arrive with the flowering specimen, this point cannot at present be definitely proved. For the same reason another specimen of apparently the same species from W. Africa remains unnamed in the Kew Harbarium. Under the circumstances it would perhaps be advisable to distinguish this plant by the temporary name of *Strophanthus Ouabaio*, and to apply this name to the smooth Strophanthus seeds from the Gaboon, since there are other species of Strophanthus having glabrous leaves and seeds.

NOTE ON LEAVES OF A PLANT YIELDING OUABAIN.

BY THOMAS CHRISTY.

The two leaves sent herewith are from a plant that I have grown at Sydenham from selected seed similar to that so fully described by Mons. Arnaud, of Paris, in the *Comptes Rendus*, and from which he obtained ouabain. Although I have planted large numbers of this variety of seed, I have only been able to raise one plant which is about 2 feet high. Those members who saw my specimens of strophanthus last year, or those who are conversant with this type of plants, will observe that there is no similarity in the leaves, these being glabrous, but when I closely examined the stem I observed that there is a corky formation at the points from which the leaves have fallen. I have one other variety of plant that has been reared from what has been known as being "long hispidus" seed, which has a very small glabrous leaf about one and a half inches long, and which I exhibited at the last year's Pharmaceutical Conference, with similar formation. I consider it premature to give this variety of plant any name until the full details arrive, which I expect will be next month, more particularly as Mons. Arnaud tells me the properties yielded by this plant are so different from those of any variety of strophanthus he has examined.

The PRESIDENT said the Conference was much obliged to Mr. Holmes for this contribution, which had arrived at a very opportune moment, inasmuch as the General Medical Council desired that strophanthus should be one of the drugs added to the B.P. He was constantly seeing strophanthus in the London drug market, and the more he saw of it the less certain he felt about it. His colleagues on the pharmaceutical committee also felt a certain amount of uncertainty about this drug, and therefore the co-operation of Mr. Holmes was most opportune. They all knew that Professor Fraser's work on this subject had been of the most thorough character, and that hardly any paper ever sent to the Conference had been of such great value. Mr. Christy had sent him that morning some leaves from some of the plants growing in his greenhouse, but he was by no means certain of the actual variety of strophanthus that the ouabain was derived from.

Mr. MARTIN (Newcastle) said he had had a fairly large experience of the use of strophanthus, and considered it the most valuable drug of vegetable origin which had been introduced into medicine during the last decade. It was therefore most important that its botanical and commercial history should be better known. There was no doubt a certain amount of confusion surrounding the collection and importation of the seed, arising from circumstances which it was almost impossible to control, because it was very difficult indeed to trace the seeds which were offered in the market and know what plant it was which actually yielded them. The great importance of the drug was shown by the fact that during the last five years about one hundred papers and monographs had appeared with regard to it. The earlier experiments by medical men on the physiology and therapeutics of the drug were undoubtedly made with seeds which corresponded to the greenish fawn-coloured variety, and when those were obtainable good results were almost uniformly recorded; but when it became impossible in the London market to get those seeds and they were thrown back on the brown variety, which were nearly glabrous, complaint arose of the difference of results, the therapeutic effect not being the same. He had hoped that Mr. Holmes's paper would have cleared up the history of the seed rather more than it appeared to have done, and that there would have been something more certain to guide them as to the botanical and geographical sources of the seeds which are imported and used in this country. He had had no experience with ouabain.

A vote of thanks was accorded to the author.

The next paper read was on—

THE ESTIMATION OF NITRITES IN POTABLE WATERS.

BY JOHN C. THRESH, M.B., D.SC.,

Medical Officer of Health.

At first sight the subject of my paper may seem somewhat out of place at a meeting specially intended for the advancement of pharmacy, but so many of our advanced pharmacists are interested in water analysis, and on previous occasions when kindred subjects have been brought before you they have been discussed with so much ability, that I feel no further apology is needed as an introduction to my paper.

Probably no analyst feels that he has made a complete examination of a water unless he has at least made a qualitative test for nitrites, and if he finds indications of their presence he justly regards the water with suspicion, but, uncertain what further inference to draw, a quantitative examination is rarely made. Though this quantitative analysis therefore does not seem to be a matter of much importance in the present state of our knowledge, a series of experiments I am now making on the changes in composition of certain waters, by keeping under varied conditions, lead me to believe that ere long the study of these changes will be of great aid in enabling us to judge of the quality of a water, and especially of those waters which at the present time the chemist or medical officer can only state to be suspicious. One of these changes and one of the most easily followed is the variation in amount of nitrous nitrogen. As an example I will quote that of the most extreme case I have yet met with. A water which from a mere chemical analysis would have been passed as "usable" when examined soon after drawing from the pump showed no trace of nitrites. Three days after it contained no less than 3·5 parts of nitrous nitrogen per litre, and on the sixth day after, it was again free from nitrites. Other changes proceeded *pari passu*, and these together with a bacteriological examination proved the water to be seriously contaminated.

It was when commencing this investigation that the want of a simple and reliable quantitative test for nitrites made itself felt. The metaphenylene-diamine and the napthylamine tests were fairly tried but did not answer my purpose, neither did titration with potassium permanganate. In working out the process for determining the amount of dissolved oxygen in water which I described early this year in a paper read before the Chemical Society, the action of nitrous acid on potassium iodide in the presence of a varying proportion of free oxygen was determined, and the results led me to believe that after all the old potassium iodide and starch test for nitrites could be made a reliable colorimetric quantitative one for water analysis. The results of my experiments having this for their object, may be summarized as follows:—

1. With the same proportions of acid, starch and potassium iodide, the rapidity with which the blue tint is developed, and the depth of tint varies with the degree of oxygenation of the water.

2. The depth of tint increases with the time which elapses between the addition of the reagents and the observation. This is due to the fact that the NO liberated is acting continuously as a carrying agent between the oxygen dissolved in the water, and of the air in contact with the surface of the fluid and the hydric iodide, liberating an equivalent of iodine corresponding to the oxygen carried.

3. The effect of temperature is such that comparisons cannot be made unless the fluids are within 2° or 3° of the same temperature. Thus, *e.g.*, at 65° F., in very weak solutions, the colour is not developed so rapidly as at 60° F., *cœteris paribus*.

4. With the same proportions of starch and iodide and in samples fully oxygenated, etc., the coloration varies with the amount and nature of the acid used.

5. The amount of potassium iodide added affects the result considerably. The larger the proportion of iodide, within certain limits, the greater the rapidity of the reaction.

6. The quantity and nature of the starch solution are also factors requiring recognition. If too large a proportion of starch be added, a marked reddish tint is first developed instead of the blue tint, and this reaction is still more marked if the starch solution has begun to change by keeping.

7. When all the above factors are constant, then the rapidity with which the blue tint is developed and the depth of tint varies directly with the amount of nitrite present in the water.

I need not trouble you with the account of the numerous experiments upon which these conclusions are based, nor of the further investigation conducted to ascertain how the information so obtained could be made available for rendering the iodine and starch reaction reliable as a quantitative test. I will merely give you now an account of the reagents required and the mode of conducting the analysis which I have found to give the most satisfactory results.

Reagents—

1. *Solution of Starch and Potassium Iodide.*

Starch in powder	·2 gram.
Caustic potash	1·0 „
Potassium iodide	2·0 grams.
Water	200 c.c.

Add the starch to 10 c.c. of water, and when uniformly diffused add the caustic potash. Dissolve without the aid of heat and add the remainder of the water and the potassium iodide. Strain or filter. This solution keeps for months without appreciable change. One c.c. is required for each determination.

2. *Dilute Sulphuric Acid.*

Pure sulphuric acid	1 vol.
Distilled water	3 vols.

This is the same strength as used for the permanganate test, and I always employ it for both purposes.

3. *Solution of Sodium Nitrite.*

Sodium nitrite	·493 gram.
Water	1 litre.

Dissolve.

1 c.c. = ·1 mlgr. nitrogen.

Apparatus.—Two or more 50 c.c. Nesslerizing cylinders.

Process.—Shake the sample of water vigorously in a bottle only partially filled, to saturate with air; pour 50 c.c. into the cylinder, and add 1 c.c. of the starch and iodide solution, and afterwards 1 c.c. of the dilute acid. Stir. Assuming the temperature to be about 60° F., if a dark blue tint develops instantaneously the water contains more than 1 per million of nitrous nitrogen. If it becomes blue in a few seconds it contains about ·1 per million. If it requires more than 10 seconds to develop it contains less than this amount.

If the blue colour appears instantly the water must be diluted with known proportions of nitrite free water (saturated with air) until it is found by experiment that the colour takes a few seconds to develop.

With a very little experience the approximate amount of nitrite present can be ascertained with considerable precision by these simple preliminary experiments. Now prepare a standard solution of sodium nitrite by diluting 1 c.c. of the strong nitrite solution with 200 c.c. of water. One cubic centimetre of this weaker solution diluted to 50 c.c. corresponds to ·01 mlgr. nitrous nitrogen per litre.

Measure into the Nessler glasses varying quantities of this dilute nitrite solution and fill up with water. Now take 50 c.c. of the water to be examined, or of the diluted water if dilution were found necessary, and to each add successively 1 c.c. of the starch and iodide solution and dilute acid and note how the blue tint develops. If none of the solutions correspond with the water a fresh series must be prepared. In this way in a very few minutes the amount of nitrite in any sample of potable water can be easily obtained with a very considerable approach to accuracy.

Since I commenced employing this test I have analysed over 180 samples of water, 51 of which contained nitrites, varying from ·005 to 3·4 parts nitrogen per million, and I have had no reason to suspect inaccuracy from the interference of other constituents in any single case.

To render the process more intelligible I will give details of two determinations, and also with the permission of your President make an estimation in your presence. Two solutions were prepared for me by an assistant and marked 'A' and 'B' respectively.

A. Fifty c.c. + reagents gave a blue tint in about ten seconds. It was therefore about the proper strength for estimation.

Ten c.c. of the dilute nitrite solution was diluted to 50 c.c. and compared with the sample. The colour seemed to develop a little more rapidly, but the difference was not very marked. Three solutions were prepared by diluting 5, 7 and 9 c.c. respectively of dilute nitrite solution to 50 c.c.

5 co. = ·05 N per million . . . too weak.
7 co. = ·07 „ . . . „
9 co. = ·09 „ . . . too strong.

Another solution containing ·08 N per million was then made and compared with the sample, the blue tint developed a little more rapidly. The strength was certified to be ·075 N per litre. The actual strength was ·07 per litre.

B. Original water gave a dark blue instantly.
Diluted to $\frac{1}{10}$th a pale blue „
„ $\frac{1}{25}$th colour developed in a few seconds.
Compared $\frac{1}{25}$th with ·05 . . . too weak.
and „ ·10 . . . little too strong.

Now compared with—
.08 . . . . too weak.
·09 . . . . about right.
·10 . . . . too strong.

·09 + 25 = 2·25 N per litre. The actual strength was said to be 2·5 N per litre.

The following results may also be quoted as fair examples of the accuracy obtainable:—

	Nitrous Nitrogen per litre.	
	Present.	Found.
1	·1 per million	·10 per million.
2	·625 „	·65 „
3	·625 „	·625 „
4	·093 „	·095 „
5	·01 „	·01 „
6	·05 „	·05 „
7	·125 „	·13 „

The time occupied by a determination is usually about 5 minutes, the reagents are easily made and preserved, and the necessary conditions easily observed. I can therefore recommend the process to such of you as may desire at any time to estimate the nitrites in potable waters.

The **President** said the Conference was much obliged for this communication. Public analysts and pharmaceutical chemists were frequently called upon to make a determination of the qualities of drinking water, and any process which simplified the matter was very valuable.

Mr. **Strother** asked if any gentlemen present had made an analysis of the water of Leeds. He was given to understand there was an absence of lime from the water which had a certain effect on the osseous formation of young children.

Mr. **Reynolds** said there was very little lime in the water of Leeds. At Newcastle last year some very useful work was done in spreading information as to the great danger which threatened large populations in connection with lead in the water supply. Fortunately the water in Leeds was not so wanting in lime as to have that action upon lead pipes, but one must admit that under some conditions, especially when the pipes were connected with hot water cisterns, a slight action did take place. The question, however, referred to the influence of lime on the growth of young children, and upon this he had no information to offer. Like most other towns which had imitated the example set by Glasgow in taking Loch Katrine water, the people of Leeds had been seeking for moorland water of a soft character, and nearly all towns in the West Riding had done the same. Mr. Rimmington had had a large experience in that matter with reference to the water of Bradford, and anything he might say would be quite as interesting to the meeting as information with regard to Leeds; as to that he would only say that in Leeds water there was under 6 grs. per gallon of solid matter, and the hardness was about 4°.

Mr. **Rimmington** said that the solvent action of water, in his opinion, depended in a great measure upon its softness and the absence of sulphates or calcic salts. The remarkable thing was that in Bradford lead-poisoning had commenced suddenly. Since a certain dry summer, people supplied from the high-level had complained of the dangerous properties of the water, and many cases of illness had been attributed to lead-poisoning. It was rather difficult to trace the matter out, and to find exactly where the point was. The subject, however, was one which he would rather not discuss in public.

Mr. **Strother** said he knew a case in which a child's health was so unsatisfactory that the father had been to Nottingham to consult a physician, who had given the opinion that it was owing to the absence of lime in the water, and recommended lime water and milk as a remedy.

Mr. **Siebold** said he had listened with particular interest to the statement that a sample of water which was free from nitrites when first examined was found to contain nitrites within the short space of a few days, and that after a few days more they had completely disappeared. He regarded the observation of these rapid changes as a very important one, which he hoped Dr. Thresh would follow up further. It showed that the significance of nitrites in water and their relation to bacterial life was not yet fully understood, and that their absence in a sample of water on the day of the analysis afforded no proof that the conditions favourable to their formation might not be, or have been, present in a marked degree. Under these circumstances it appeared to him that the careful watching of changes in a sample of suspected water might in future become a not unimportant feature in the analysis. While touching upon this point, he might be permitted to allude to still another direction in which water analysis might be usefully extended in certain cases. About eighteen months ago he received from a well-known medical gentleman a sample of water suspected of having caused illness. The analysis yielded no result justifying him in condemning the water. But a long time afterwards he noticed that the bottom of the stoppered bottle in which the remnant of the water had been kept was thickly covered with fungoid vegetation. In the course of further experiments he then made with this water he noticed that upon slightly acidifying the filtered water with dilute hydrochloric acid and evaporating down to a few drops, the residue, when treated with potassium ferricyanide and afterwards with ferric chloride, produced a distinct precipitate of prussian blue. As this reaction could in this case not be due to nitrites or sulphites, and as the presence of vegetable alkaloids and similar principles capable of producing it was out of the question, he felt inclined to regard it as possibly due to a ptomaine, since all bodies of this class give the reaction. Unfortunately there was not sufficient material left for submitting this supposition to definite proof. He mentioned this observation in order to point out that in the examination of really suspicious waters a careful search for ptomaines might prove an important link in the chain, and one which had hitherto received little or no attention.

Mr. **Schacht** asked if Dr. Thresh had formed any idea whether the presence of nitrites was likely to be due to the oxidation of nitrogen not previously in combination with oxygen, or from the de-oxidation of a more advanced salt of nitrogen. Probably the general experience was that when nitrites were found it was due to an imperfect oxidation of nitrogen, and that when further opportunities were afforded for the natural purification of water they would ultimately appear as nitrates; but he could hardly understand the slight reference Dr. Thresh had made in this case by that supposition, for in a few days it would be scarcely possible for that large quantity of nitrites to appear from the action of de-oxidation.

Mr. **Rimmington** said he had often found in water containing nitrites there was no albumenoid ammonia.

Mr. **Schacht** thought Mr. Rimmington would hardly mean to lay that down as a universal law.

Mr. **Rimmington** said he had frequently found it.

Mr. **John Barclay** (Birmingham) said some few months ago two samples of water came under his notice, both supplied from the same source, but one coming through lead pipes and the other through zinc. On analysis it was found that that supplied through zinc contained nitrites whilst that which came through lead showed none, the inference being that the zinc had caused the presence of the nitrites. Whether it had converted them from nitrates, or what was the explanation, it was hard to say.

Mr. **Schacht** said he was very glad to find that Dr. Thresh's experience coincided with the view which Mr. Ekin urged on a previous occasion, that they should still place reliance on the old tests.

Dr. **Thresh** in reply said waters containing nitrites might be divided into two classes; one those in which nitrites were found on a first examination, but on examining the water day after day the nitrites decreased until they disappeared. In the other class the nitrites increased up to a maximum, and the probability then was that they would disappear also. In one case in particular, as the nitrites increased the nitrates decreased, until ultimately there was not a trace of nitric nitrogen present, but the whole of it was reduced to the nitrous condition. But to his astonishment there was no increase in the amount of free ammonia, while on the other hand there was a very large increase in the albumenoid ammonia. The study of that water required to be carried further, because it had opened up a number of interesting problems. Mr. Siebold had mentioned ptomaines, and the same thing had occurred to him, because this increase of nitrites he certainly thought pointed to the presence of ptomaines, and on mentioning it to Mr. Siebold he said he had come across a water of a very similar character. He certainly was of opinion that watching the changes which took place in some of these waters would be ultimately of primary importance. It was possible it might be found that those organisms which had a deleterious effect on human life had a certain influence on the organic matter present in the water, whereas other organisms of a different character might have a different influence. By watching carefully these changes results might ultimately be obtained of considerable importance to the health of the community. There was no doubt that some waters contained nitrites, and also traces of zinc. At one time whenever he obtained a water with nitrites he always asked whether it came through a galvanised pipe or an iron pipe; but he laid little stress on that now, when he found in the same water at different times a fairly considerable quantity of nitrites or perhaps none at all. It might be advisable to ask the question in order to ascertain if it were possible that they were reduced by the action of the metal.

The following papers were read by Mr. Naylor in the absence of the authors :—

REPORT ON THREE YEARS' EXPERIENCE OF CHLOROFORM WATER AS A PRESERVATIVE.

BY JOS. F. BURNETT, F.C.S.,

Pharmaceutical Chemist.

It may be remembered that some time ago I published a short note on the use in pharmacy of chloroform as a preservative. My excuses for writing again upon the subject are, that it appeared in the "Blue List" of the Conference, and that I have continued to use it, and do so now systematically.

For the keeping of various chemicals in solution, so as to be convenient in rapid dispensing, nothing that I have tried is so effective, and at the same time, so free from objection. It is of course not needed for the solutions of inorganic substances, such as potassium bicarbonate, magnesium sulphate, potassium bromide, etc., which are kept at most dispensing establishments. The advantage is evident in the case of solutions of organic chemicals, which are prone to decompose, ferment, etc., through the presence of fungoid organisms. The following is a list of those which I regularly keep made, in each instance solution being effected by dissolving the substance in B.P. chloroform water, and adjusting the strength by a final addition of more chloroform water. Citric acid, 1 in 2; potassium acetate, 1 in 2; potassium citrate, 1 in 2; citrate of iron and ammonia, 1 in 2; sodium salicylate, 1 in 2; ammonium chloride, 1 in 4; ammonium bromide, 1 in 4; quinine sulphate, 1 in 10; by the aid of a sufficiency of dilute sulphuric acid.

Never in any of the above do I find any trace of fungoid growth, even though occasionally I have had a solution by me, in the varying temperatures of summer and winter, for months. In speaking of solutions I will refer to two mixtures which are of equal convenience, viz., powdered rhubarb and aromatic powder of chalk, both of which I keep ready rubbed down with chloroform water (1 in 8), so that the time and trouble required in dispensing these in mixtures may not have to be expended a dozen times an hour. Mucilage of acacia made with chloroform water keeps indefinitely.

Hitherto there can be no drawback to the use of chloroform water as a preservative, for the addition of one or two drachms, or even one or two ounces to a mixture cannot have any injurious effect on the patient. All the medical men for whom I dispense are aware of my practice, and none of them make any objection whatever.

The second class of substances I preserve with chloroform is infusions, either B.P. strength or concentrated one to three. Those with which I have experience are quassia, both single and concentrated; gentian (strength as B.P., but without orange and lemon), single and concentrated; senega, single and concentrated; cascarilla, single and concentrated; and calumba, buchu and orange in the concentrated strength only. I find the preservative action of chloroform is perfect in all these when concentrated, the chloroform being added to the strained infusion in the proportion of 1 dram (fluid) to each 40 fluid ounces and dissolved by agitation. The aroma of these preparations when diluted is much more like the fresh infusion than any concentrated one to seven preparations (of wholesale house manufacture) I have used, and in no case does the chloroform cause any deposit, an advantage over alcohol when the infusion contains any mucilaginous matter. Some practitioners object to the use of concentrated infusions preserved with alcohol on this very account. With the infusions made single strength (*i.e.*, B.P.) chloroform in a less proportion than ½ a drachm to 40 ounces will not keep them at all, except in the case of perhaps cascarilla, and if they are required to be kept more than a week, they require rather more than that unless alcohol be added as well. For instance ½ an ounce of chloroform (dissolved by agitation) will not keep 2 gallons of infusion of senega good for seven days, but the same quantity with 2 ounces of tincture of senega will keep the same infusion a fortnight at least. From these experiences I infer that when chloroform is employed as a preservative the liquid must be nearly saturated with it, otherwise it will not preserve for any great length of time. In the case of single strength infusions this is a disadvantage, as it will be seen at once that a dose of 1 or 2 ounces (if saturated with chloroform) contains from 2 to 5 minims of chloroform, which of course is inadmissible, as it becomes a medicinal, if not an injurious dose. In some instances (I have not tried it in all) the chloroform may remain undissolved at the bottom of the bottle, where it exerts its preservative influence (as, *e.g.*, in the case of solutions of citrate and acetate of potassium), but care must be taken not to pour it out when the bottom of the bottle is reached or neared.

In this paper I have but reviewed my experience of the subject in those instances where I constantly employ it. Time has not permited me to make experiments by way of testing its efficacy with other substances. For keeping solutions and concentrated infusions, chloroform seems to me to be all that can be desired.

CHLOROFORM AND CHLOROFORM WATER AS PRESERVATIVES.

BY HAROLD WYATT, JUNR.

Pharmaceutical Chemist.

Since the publication of the "Additions to the B.P. of 1867" in 1874 we have had rather an extended experience in the use of chloroform and chloroform water in preserving pharmacal preparations of an aqueous nature, such as infusions and solutions of inorganic and organic salts, resulting in our daily widening the range of their application.

In hospital dispensing, where it has been necessary to keep large quantities of stock mixtures and solutions, we have used chloroform water instead of water in the mixtures, and in the proportion of 1 in 4 in the solutions where the substance was an ordinary inorganic salt dissolved in water; quinine, morphine and other alkaloid salts were simply dissolved in the chloroform water. We find these mixtures and solutions remain clear and devoid of fungoid growths under conditions which would necessitate the use of at least 25 per cent. of proof spirit for their proper preservation.

An instance of the action of chloroform in this respect may be cited in illustration, viz., an extract of ergot mixture containing solution of strychnine was largely prescribed, and consequently we had no alternative but to keep it concentrated, though we could foresee it was about as bad a specimen of a mixture to keep free from change as we could well have chosen.

Without chloroform it became in about four days covered over with mould on the surface, and developed a strong trimethylamine odour.

When chloroform water was used there was no sign of change after three months of hot weather.

Alkaloid salts keep very well in chloroform water solution; we have tried in this way morphine, quinine, strychnine and cocaine, and have not had a failure so far, and can agree with Mr. H. W. Jones, F.C.S., who states in a paper in the *Chemist and Druggist* of June 21, 1890, on "Permanent Hypodermic Solutions," that "chloroform water is the simplest and best of all preservatives."

Fruit juices keep very well with chloroform added in the proportion of 1 part in 600, the aroma being rather improved than otherwise by the addition; at any rate it has seemed so to us with the juices we have so far tried, viz., raspberry, lemon and blackberry.

The specimen of raspberry juice sent with these "notes" was prepared by allowing the fruit to stand in a lightly covered jar for about a week, during which time a slight fermentation was set up, the fruit bursting and the solid portion rising to the top, leaving the juice nearly clear beneath, the aroma at the same time seeming to improve.

This juice was syphoned off, run through flannel, chloroform added in the proportion of 1 in 600, and the whole shaken. Nothing further has been done with it since it was finished off in July, 1886, the condition of the specimen well showing the value of chloroform as a preservative in such cases.

In the Year Book for 1888, page 30, I saw an extract from a paper by E. Salkowski, who asserts that chloroform water acts very strongly on micro-organisms but not at all on non-organized ferments, and who consequently advocates its use instead of that of glycerine in making pepsine preparations.

I have made use of this suggestion since, when preparing essence of rennet, with great success, the rennet never acquiring the slightest unpleasant odour and being when finished really a "sweet essence."

Recently, having to keep some cucumber juice for a time before using, I tried preserving it by the addition of a fourth of glycerine, but to no purpose, for it soon became acid and spoilt.

Then with another lot I used glycerine in the same proportion and chloroform one part in 600, and there was not the least appearance of change.

Chloroform water I have used with the sanction of, and with satisfaction to, the medical staff of a hospital, in making a solution of opium which was largely used as an external application and in which spirit was not desired.

The PRESIDENT said these papers were very useful. Chloroform was a very valuable preservative, but it would have to be employed only with the sanction of medical men. He was quite sure if it were introduced to the profession as a preservative and approved, it might lead to a great decrease in the amount of alcohol used, which was very desirable, especially as the duty upon it was increasing every year.

Mr. GROVES said his experience of chloroform as a preservative extended over many years, but he had not made any careful and systematic experiments upon it. It was very useful in preserving mucilage and certain unstable syrups which were liable to ferment, and he had also used it in certain hypodermic injections of morphia, and so on; but in such cases only with the sanction of the prescriber. He should study the paper carefully, because he was quite satisfied that some day the use of chloroform would be very greatly extended. One great advantage in connection with it was that if its presence were undesirable it could be very easily dissipated when the medicine was dispensed by warming it very slightly.

Mr. LINFORD said he had had some little experience of the use of chloroform water, and agreed mainly with the statements of the authors that it preserved mixtures very well, especially in the case of acids with an organic base, where there was a tendency to favour a vegetable growth. It was an especially admirable preservative of the citrates. He had lately been using chloroform in another form, and with success. Those who made concentrated infusion of roses knew the difficulty there was to prevent it becoming mouldy at the top, and getting into a pectinous condition. In order to prevent that he put in a large bottle, and suspended in the neck a piece of cotton wool saturated with chloroform, and then corked it tightly. The infusion might be kept then for months without becoming mouldy or pectinous. The same plan might be followed with many substances, the action simply consisting of preventing the access of germs, or killing them on their way. Some recommended putting chloroform into bottles with fruit and bottling them simply with the vapour of chloroform in them. He had tested that with some damsons, introducing 20 up to 60 minims of chloroform in various bottles. The whole of them kept perfectly well, and when cooked there was no flavour of chloroform about them. Of course it was necessary that the bottle should be carefully corked down.

Dr. SYMES thought the authors had pretty well exhausted all that was to be said on this subject. It was certainly not desirable to use chloroform in place of alcohol without the sanction of the medical man, and even if his sanction were obtained, the prescription might be taken somewhere else where it might be dispensed with spirit, and it was always undesirable to have the same prescription sent out differently by different chemists. Some years ago, when he was more in the habit of making fluid extracts by percolation, using a large quantity of fluid he found it very useful to add a little chloroform to that large bulk while waiting its time for evaporation. The chloroform was dissipated in the process of evaporation, and there was no difficulty in the matter; but using pressure more now he did not require to use chloroform as formerly. He could support the statement made by Mr. Wyatt that it was exceedingly good for preserving essence of rennet.

Mr. GERRARD said as a hospital dispenser he had for five or six years past used chloroform as an anti-ferment, especially with infusion of quassia, which was very prone indeed to decomposition, and sometimes in twenty-four hours would become worthless. He made it eight times the strength usually laid down, and added to it the proper proportion of chloroform for preservation. He also prepared an emulsion of chloroform made after a method suggested by Mr. Collier, viz., adding one part of water to six of chloroform, and a few drops of tincture of senega, then shaking it; the chloroform divided extremely fine and formed an emulsion; this was available for solution in an infusion easily. It was simply necessary to shake up the chloroform into an emulsion, pour in a measured quantity, stir it, and the chloroform went into solution immediately. One of the authors mentioned the use of chloroform in connection with solution of citric acid and sodium salicylate (1 in 2); these he kept constantly in stock, but never found any decomposition take place in such strong solutions, and should be surprised to find that sodium salicylate in a solution of 1 in 2 would undergo decomposition, even if kept for two years, unless it were exposed to very improper conditions. He also used it as a preservative of infusion of meat juice. In hospital practice it was customary to give peptones and fluid foods of this character, and it was desirable to preserve the meat juice for a few days, as it was not always convenient to prepare it at the moment. If the meat were carefully cut up, and the juice expressed, and a certain proportion of chloroform added and shaken up well, it would keep for several weeks. After keeping about a month, however, the meat juice underwent some changes. He also used chloroform as a preservative for other peptones, which ought never to be preserved by the addition of alcohol, because there was great difficulty in getting rid of it, and apart from the expense, the presence of alcohol would prevent the absorption of the peptone by the parts with which it came in contact. Alcohol, therefore, should not be used for this purpose, but chloroform might. Whenever he mentioned this subject to medical men, he always found it met with their ready approbation, and they were only too glad to know that there was such a substance at their disposal.

Mr. **Collier** said he could corroborate all Mr. Gerrard had said. At the hospital where he was employed he had used chloroform for a number of years and recommended it to medical men, especially in cases where it was necessary to give medicine to out-patients to be taken several days in succession. The physicians used preparations of ergot to a considerable extent which soon decomposed unless preserved in this manner. One objection, however, to the use of chloroform was the special dislike which certain individuals had to it, so that it could hardly be recommended for universal adoption. Some persons could not bear to take it, just the same as some could not tolerate peppermint.

Mr. **Cripps** said there was one point which had not been adverted to, and that was that chloroform was liable in the light to undergo decomposition whereby hydrochloric acid and very acrid vapours were produced. They knew also that chloroform water possessed that property in an exalted degree, therefore it was most important that anyone using this should keep the preparations in the dark. Some members might be able to give their experience on this matter, and say whether infusions preserved by chloroform became spoilt on account of the production of irritating vapours.

Mr. **Martindale** said he had tried preserving fruits with chloroform, but not with great success. The fruit was preserved very well, but when it was made into pies it could scarcely be eaten. The chloroform was not dissipated even when the fruits were cooked. It was very useful for preserving many decoctions and infusions which had to be set aside for evaporation, but it was better to dilute the chloroform with double its volume of rectified spirit if it had to be mixed with an aqueous fluid; it acted in that way much more satisfactorily he thought than by emulsification.

Mr. **Naylor** said he had been much surprised by the remark made by Mr. Cripps, which was quite contrary to his own experience, and should be glad if that gentleman, or anyone else, could throw any light on the subject by referring to any experiments in confirmation of his statement that chloroform water was an extremely unstable body. That chloroform was liable to decomposition more quickly when in aqueous solution than chloroform itself was quite contrary to his own idea.

Mr. **Siebold** fully endorsed the remarks of Mr. Naylor. Though chloroform, when free from alcohol, was liable to decomposition on prolonged exposure to light, chloroform water, according to his experience, was a very stable preparation.

Mr. **Cripps** said he was aware that a small quantity of alcohol would preserve chloroform. He could not give any definite chemical experiments, of his own or of others, in support of his statements; on the other hand he could not recall any which proved that chloroform water was more stable than chloroform. But he had met with chloroform water which had become acid, and had heard from several pharmacists that such was the case.

Mr. **Branson** said he had found chloroform very useful as a preservative for the reagent solution of starch.

The **President** said some experiments on this subject were made fifteen years ago by Professor Attfield. He thought Mr. Cripps must have forgotten what was then said. He had reason to believe that a great cause of the reaction he observed was the impurity of the iodine. In the presence of acid iodine combined with quinine and a slight acidity in the chloroform water reacted on the iodate and iodide.

Mr. **Groves** said one useful application of chloroform in preserving organic matters was afforded by lemon peel. In making syrup of lemons there was often an excess of peel, which was commonly thrown away, but that might be preserved by putting it in a stoppered bottle and pouring in chloroform. The stopper should be smeared with honey, not fat.

Mr. **Martindale** remarked that the action of chloroform in this way appeared to be inhibitory, not germicidal, as the moment a fluid which had been preserved perfectly was heated and the chloroform evaporated the germs present, but hitherto inactive, would set up a fungoid growth. The chloroform appeared to act as an anæsthetic to the germs.

Mr. **Abraham** also bore testimony to the advantage of using chloroform to preserve fluids in the process of dialysing.

Mr. **Gerrard** said there was another direction in which chloroform was much used as a preservative, viz., in physiological laboratories for the preservation of urine and post mortem fluids.

Mr. **Parkinson** (Liverpool) asked whether chloroform would preserve mucilage, such as gum arabic, for if so it would be most valuable. It was very annoying to have mucilage going rancid in a short time. He had great doubts whether medical men would sanction its general use.

Mr. **Naylor** said that Mr. Burnett had stated in his paper that mucilage of acacia made with chloroform water kept indefinitely, and he could quite confirm that statement from his own experience.

The next paper read was—

On Glycerine.

BY J. LEWKOWITSCH, PH.D.

At the outset, I wish to disclaim any intention on my part of bringing anything new before you. But having been asked to say something about glycerine, with the manufacture of which I am connected, I thought I might perhaps supplement the remarks made last year by Mr. Siebold and several other gentlemen, in the discussion following Mr. Siebold's paper.

This will be done mostly from the manufacturer's point of view, as manufacturing processes cannot be supposed to be generally known, and it is not at all unlikely that erroneous opinions may be current amongst those not conversant with practical processes used in chemical works.

During the last year it has been repeatedly stated that some samples of glycerine destined for pharmaceutical purposes contained arsenic, a fact which was not unknown to manufacturers, but on which, for very obvious reasons, they did not care to enlighten the consumers. The arsenic in the glycerine owes its existence only to the arsenic contained in the reagents used in the manufacturing process. It has been pointed out by several gentlemen in last year's discussion that glycerine purified by distillation would not be contaminated by this poisonous substance; although it is but fair to say that Mr. Allen had some doubts about it, still, in the concluding remarks it was distinctly stated that arsenic could be removed by distillation.

This is not so, as the simple fact will show that nowadays all glycerine for pharmaceutical purposes is distilled, nay even double distilled, glycerine. The times when glycerine was being prepared by other processes of refining have gone by, and a glycerine which had not been purified by steam distillation would be unsaleable for pharmaceutical purposes.

But to remove every doubt I prepared the substance formed when arsenious acid is dissolved in glycerine, a substance which has been described by Schiff and later on by Jackson, who apparently overlooked the earlier publication of Schiff. This substance is the arsenious ether of glycerine $AsO_3\,(C_3H_5)$. On being heated to 250° C. it decomposes, while arseniuretted hydrogen and other volatile arsenious compounds distil over. At the same temperature glycerine distils also over, and it is quite evident therefore that any arsenic contained in glycerine will distil along with it. The experiments which I carried out could not show any other result.

Arsenic contained in glycerine cannot be removed by distillation, and to my knowledge there is no process for completely freeing glycerine from arsenic on a practical scale.

Pure glycerine free from arsenic can therefore be obtained from such sources only, where reagents not contaminated with arsenic are being used. As it has been suggested last year that glycerine emanating from certain processes ought to be rigorously excluded by the Pharmacopœia, I may be allowed here to very briefly review from our point of view the processes used for manufacturing glycerine. The raw materials are exclusively fats and oils, which yield on saponification or hydrolysis the glycerine as a by-product.

Glycerine free from arsenic will be obtained in those processes where the fats are hydrolized by means of water, whether it be used in the liquid state under high pressure or as superheated steam. The lime saponification which is yet largely practised, especially in smaller works, will, as a rule, also yield an arsenic-free glycerine. On the contrary all glycerine coming from works where the sulphuric acid saponification is practised will contain arsenic, as the glycerine will extract all the arsenic from the sulphuric acid. There is, however, no doubt that even such glycerine would be pure as far as arsenic is concerned, if sulphuric acid free from arsenic were used, as it may be prepared from the sulphur obtained by Chance's process.

There is consequently no doubt that there are sources from which one may easily obtain a pure glycerine. With a view to ascertain whether there are in commerce samples of glycerine absolutely free from arsenic —for in many works several processes are simultaneously used and the glycerine will be mixed in the end—I examined 10 samples of glycerine coming from ten different works. As I wished to detect smallest traces, I used silver nitrate instead of mercuric bichloride. Three of the samples would have to be rejected, four samples contained very small traces, which might be disregarded, while three only were absolutely free from arsenic.

There is still another process for saponifying fats, and consequently manufacturing glycerine, practised on a very large scale indeed, that which yields the soap-ley glycerine. At last year's Conference the glycerine derived from that source was very badly treated, and it was demanded that soap-ley glycerine ought to be entirely excluded from pharmacy. Unnecessary precaution! up till now at least; for no chemically pure glycerine has been prepared hitherto from soap-lees, owing to the difficulties incident to the purification of it.

Being wishful to prove here that soap-ley glycerine has a far worse reputation than it—or let me say some of it—deserves, I undertook during the last few weeks to prepare chemically pure glycerine from soap-lees, not in the laboratory, but on a large scale, in the works. I had to use such glycerine as I just had at hand, and as this contained, owing to the impure reagents, some arsenic, I had on starting to expect a glycerine containing traces of arsenic; but this is, from reasons pointed out above, only of secondary importance, as on repeating the manufacture of it I shall have to start with purer reagents, and the real difficulties are lying in quite another direction.

Arsenic, although the most objectionable impurity, is, however, not the only one which may be found in "chemically pure" glycerine. As the British Pharmacopœia treats glycerine somewhat cursorily, I may be allowed to point out here one or two tests which will perhaps be found useful.

The glycerine may contain organic impurities, either fatty acids, etc., or so-called polyglycerols, under which name I may summarize all those substances having a higher boiling point than glycerine itself. The way to test for the latter is to gently evaporate a known quantity of glycerine in a platinum dish at a temperature of 160° C. The residue left, from which the ash, subsequently found on incineration, has to be deducted, will give a fair indication as to the care with which the glycerine has been distilled.

The following table gives the residues for eight "chemically pure" glycerines, arranged according to the quantity of organic residue, to which I have added the analysis of the soap-ley glycerine:—

	Organic Residue.		Ash.	
I. .	0·0243	per cent.	0·00603	per cent.
II. .	0·0327	„	0·0050	„
III. (*a*)	0·0328	„	0·0140	„
(*b*)	0·0267	„	0·0102	„
IV. .	0·0360	„	0·0138	„
V. .	0·0371	„	0·0081	„
VI. .	0·0443	„	0·0066	„
VII. .	0·0738	„	0·014	„
VIII. .	0·0751	„	0·0154	„
IX. .	0·0931	„	0·0305	„

No. III. represents the figures found for the soap-ley glycerine, which I have shown.

Fatty acids, as butyric acid, etc., and other organic impurities will be easily detected by testing with ammonia oil, silver nitrate at ordinary temperature, which is recommended by the German Pharmacopœia. It is required of a good glycerine that it should not reduce the silver within fifteen minutes. This test is far more delicate than that in which silver nitrate alone is used, as the manufacturers of cosmetics do, who reject any glycerine which reduces silver nitrate in less than twenty-four hours. I think that the test with ammoniacal silver nitrate is a little too rigorous, as ammoniacal silver nitrate is easily reduced at an elevated temperature; in fact, of all the glycerine samples I examined there were only two (continental ones) which fairly responded to this test, while all others would have to be rejected. Testing with nitrate of silver alone would perhaps be sufficient to show whether there are any silver nitrate reducing substances in the glycerine.

Under No. 68 of the blue list an answer is requested to the question how to estimate glycerol in pharmaceutical preparations. I am afraid there is no satisfactory answer to that question, as we are not yet in possession of sufficient quantitative material. Lately two methods have been proposed for the estimation of glycerol which seem specially suitable in a great many cases, unhappily not in all. The first method, based on oxidation of glycerol to oxalic acid, can only be of use where no other organic substance is present which might yield oxalic acid. The glycols in glycerinum aluminis might be thus estimated. The second method—boiling of glycerol with acetic anhydride and sodium acetate—requires highly concentrated solutions, and would, of course, be completely useless when other substances are present which combine with acetic anhydride, as would be the case with, *e.g.*, glycerinum acidi carbolici, or glycerinum acidi gallici and glycerinum acidi tannici. For such preparations it would be required to have a method for completely transforming the glycerol into a weighable substance, *e.g.*, a tribromine derivative.

Mr. **Siebold** said, before reading the short note which he had prepared, he wished to make a few remarks by way of preface. He was not aware that anyone in last year's discussion had made any positive assertion to the effect that distillation removed arsenic from glycerine; it was simply an opinion, he then expressed, to that effect, and which he had since found to be erroneous, as would be seen from his present paper. As to anything like a sweeping condemnation of the glycerine of soap works, he felt sure that nothing of the kind occurred in last year's discussion. It was the general presence of arsenic in such glycerine that was objected to as an impurity rendering the preparation unsuitable for medicinal purposes. There would be no prejudice whatever against glycerine from that or any source, if the product only answered all just expectations as regards purity. If soap-makers in the preparation of their glycerine would abandon the use of impure acids, and instead, employ acids free from arsenic, this objectionable impurity would, as a matter of course, no longer occur in their product.

Mr. **Siebold** then read the following note on the purification of glycerine.

NOTE ON THE PURIFICATION OF GLYCERINE.

BY LOUIS SIEBOLD.

It has been pointed out before that glycerine obtained as a by-product in the manufacture of soap is always more or less contaminated with arsenic, which emanates from the acids used in the process. Having convinced myself that re-distillation of the glycerine, even if several times repeated, does not remove this impurity, I made a number of experiments with the object of ascertaining whether the purification can be effected in a simple and inexpensive manner, such as would adapt itself to the purposes of the manufacturer. I will not trouble this meeting with a record of unsuccessful experiments, but will confine myself to a description of a simple process answering all requirements. It is based on the well known property of freshly precipitated ferric hydrate to remove arsenious acid from solutions by converting it into an insoluble compound. The ferric hydrate, after being well washed so as to remove all soluble salts, is added to the glycerine previously diluted with about half its volume of water. The mixture is digested at a slightly elevated temperature with frequent stirring, after which it is allowed to stand till the next day, during which time it is occasionally agitated. It is then filtered and evaporated to the required specific gravity. I found the mixture to filter much quicker than I expected. The product is perfectly colourless and free from arsenic and iron and also free from sulphur compounds. The glycerine I experimented with was a distilled preparation sold as pure, though it contained appreciable quantities of arsenic and traces of sulphur compounds. The process involves very little trouble, and is as easily carried out on a large scale as it is in laboratory experiments.

I may add that the complete removal of arsenic and of sulphur compounds from glycerine may also be effected by a suitable treatment with potassium permanganate; but as this process involves the necessity of subsequent distillation, it appears to me more troublesome than the other.

The **President** said he would ask Mr. Siebold to read what took place in the course of the discussion on this subject last year.

Dr. **Symes** said that since Mr. Siebold first brought forward this matter the attention of manufacturers of glycerine had been directed to the small traces of arsenic which were found in what was assumed to be pure glycerine, and he had had some experience of the results. Mr. Siebold said the process of treating glycerine with oxide of iron removed the arsenic without leaving a trace of iron, but he should like to ask him if he had really tested carefully for traces of iron. As a matter of fact he had had some difficulty with a quantity of glycerine which, when taken from the carboys in which it was imported, was bright, colourless and free from arsenic. It was tested for arsenic, but when placed in a glass bottle and allowed to remain for a week or two it gradually became slightly opalescent and showed signs of colour, and on examining it carefully it was found to contain traces of oxide of iron.

Mr. **Conroy** said this was a very important subject. Since Mr. Siebold had pointed out the presence of arsenic in glycerine most firms had been on the alert and had been very exacting, and rightly so, as to the quality of glycerine, and wholesale dealers had had considerable trouble and anxiety in seeing that what they sold was free from arsenic. It was a difficult matter to obtain commercial glycerine, except one particular make, which he should not mention, which was absolutely free from arsenic. He had known instances in which the manufacturer guaranteed glycerine to be free from arsenic when made from soap lees, but it was found to contain a considerable quantity on applying Mr. Siebold's test. Then the manufacturers endeavoured to tie them down to what they thought a less exacting test, viz., Marsh's. He must say he preferred that test himself, and the manufacturers preferred it. With reference to what had been said by Mr. Symes as to the presence of iron in glycerine, he thought at one time that it was due to the drums in which the glycerine was imported, but Mr. Siebold had thrown considerable light upon it now. In manufacturing glycerine of tannic acid he found it gave a colour which appeared to indicate iron, and on testing it that was found to be so. He had very little doubt this was due to the treatment suggested by Mr. Siebold. At the same time the treatment was very ingenious, and he was sure manufacturers would be thankful to Mr. Siebold for it; but the glycerine should be carefully distilled to free it from iron.

Mr. **Abraham** said Dr. Symes had stated that the glycerine appeared to be pure, but he should like to know whether it was really so. The fact of it simply being clear was hardly sufficient proof.

Dr. **Symes** said it would have been "pure glycerine," but as it contained iron of course he must qualify the term. To show that the iron was not derived from the drums he communicated with the manufacturers in Germany, who admitted they had used an iron process for removing traces of arsenic.

Mr. G. **Ward** (Leeds) said he had noticed the coloration of glycerine referred to by Mr. Conroy in dissolving tannic acid. His own impression was that in this case the discoloration was due to the action of the glycerine on the drums in which it was imported. He never found glycerine imported in tins and kept in the same vessels act in that way on tannic acid, but glycerine coming over in iron drums and kept therein for any length of time was very apt to be contaminated with iron. He had not the slightest doubt that glycerine acted on iron as a solvent, and it would not be fair to say if iron were found in glycerine that it was due to the glycerine having been treated by this oxide of iron process. He had had some correspondence with manufacturers of glycerine abroad, who told him that it was not intended that the glycerine should be kept in the drum, but should be emptied as soon as possible, and they admitted that the glycerine would act on the iron.

Mr. **Conroy** suggested that if the glycerine acted on the iron of the drum, it would most probably act on the hydrate of iron.

Mr. **Siebold**, having quoted the exact remarks made last year by himself on this subject, said the opinion he then expressed with regard to the possibility of removing arsenic by re-distillation was certainly incorrect, as he had convinced himself by subsequent experiments. With regard to the question now raised by some of the speakers, as to whether his process of purifying glycerine by means of ferric hydrate would not cause a contamination with iron, and whether he had tested his product for that impurity, he had to say that he certainly tested it and failed to obtain any indication of iron by ammonium sulphide. More sensitive tests than this he had not applied, nor was there, in his opinion, any occasion for so doing, as any such minute trace of iron that might escape observation by this test could be of no consequence, and was certainly devoid of the significance attaching to the presence of arsenic. He did not consider distillation of the glycerine after the treatment with iron as at all necessary; but even if it were, he was of opinion that the process would still commend itself to the attention of the manufacturer. However, he had no reason whatever for believing that pure glycerine would exercise any solvent action on ferric hydrate; indeed, his own experiments pointed quite to the contrary. His process, being only now introduced, could under no circumstances be the cause of the occurrence of iron in some commercial glycerines to which allusion had been made. He had not studied the action of impure commercial glycerines on tinned iron bottles, but he was quite aware that iron was a common impurity in such qualities, and considered it likely that glycerines of that description might act as a solvent upon iron. His own experiments in connection with this paper had been confined to the removal of arsenic from an otherwise pure glycerine.

Mr. **Branson** said it occurred to him that the action or non-action of glycerine on iron, or ferric hydrate, might be due to the presence or absence of fatty acids in the glycerine.

Mr. **Siebold** said that the glycerine he worked with was perfectly colourless and very pure, except that it contained traces of arsenic and of sulphur compounds. It was quite fit for toilet purposes, and was certainly free from fatty acids. Glycerine containing such acids might easily dissolve iron, but the solvent action in that case would not be due to the glycerine but to the impurities. His own observations certainly led to the conclusion that pure glycerine had no such action.

The **President** asked Dr. Lewkowitsch if he should recommend that in the Pharmacopœia the specific gravity of 1·250 be adhered to, or whether it should be raised to 1·260, which was now the recognized specific gravity of commercial glycerine. The pharmaceutical standard was put very low some years ago, but he saw no reason now why the official glycerine should not be made to coincide with the glycerine of trade.

Dr. **Lewkowitsch** thought the trade—although he had not any great experience in it—could very well supply glycerine at 1·260 chemically pure for pharmaceutical purposes. Some of those samples he had examined were 1·263 and one 1·264, but one did not care to go beyond 1·260, because the glycerine generally got decolorized, and had to be refined and as in the filtering process and so on it would take up a little moisture from the air, and lose a figure or two, 1·260 would be a fair specific gravity to fix. He did not desire to go into manufacturing processes, partly because he was a manufacturer and partly because it would not interest the meeting. What they wished to obtain was a pure article. There were differences in different works and one did not know outside the particular works the details of the process. They could judge of the excellence of the product, but how it was being made nobody knew, and nobody ought to know. With regard to the solvent action on iron oxide it must be remembered that glycerine was one of the best solvent substances known, combining the solvent action of water and alcohol together; it dissolved almost everything, and that it dissolved iron pretty easily was hardly a thing to be astonished at. If pure glycerine were treated with charcoal which contained a little iron oxide it would extract the iron oxide out of it just as it removed arsenic from sulphuric acid or hydrochloric acid. How to free glycerine from arsenic was a question which he did not think worth considering, because however cheaply it might be done there were sources of pure glycerine to which they ought to adhere. The treatment with permanganate of potash was rather an exploded idea. It was recommended as a universal elixir, and treated as a secret six years ago; but one ought to expect glycerine to be free from manganese. He did not see that it was necessary for pharmacists to undertake the purification, as the trade could very well supply them with all they wanted. He hardly thought that the presence of iron in glycerine was owing to the action on the drums. When being filled into the drums it was in a cold state, and was such a viscous liquid that it would not dissolve iron. Years ago he made some experiments on this point, and did not believe it. It was glycerine in the hot state, partly diluted, which dissolved out from the flanges of the vessel, or even from charcoal the least trace of oxide of iron. He believed it would be impossible to find any glycerine absolutely without any trace of ash.

The **President**, in conveying the thanks of the Conference to the authors, said it was evident further examination was needed, and the charcoal seemed to be the next thing to watch.

A note was then read on—

ANTIDOTES TO STRYCHNINE.

BY LOUIS SIEBOLD.

A short time ago I became acquainted with the details of a case of accidental poisoning, in which a large dessert-spoonful (certainly not less than 2½ fluid drachms) of the official 1 per cent. solution of strychnine had been taken by mistake in place of a dose of medicine. The mistake being discovered at once, a large dose of tannin was administered without delay, and this was followed within a few minutes by the administration of about one ounce of charcoal, after various attempts to produce immediate vomiting had failed. Medical assistance was not available for another half-hour, by which time the tetanic spasms were fully developed. They became so violent as to justify the conclusion that the physiological action of the entire quantity of the poison taken was produced and that the antidotes had been without any effect. When medical assistance arrived, the severity of the spasms was such as to prevent the administration of chloral hydrate and potassium bromide, which was attempted; and it was not until a subcutaneous injection of morphine and the inhalation of chloroform had somewhat allayed the spasms, that these remedies could be administered. Under the combined influence of these narcotics the symptoms soon lessened, and in the course of a few hours they practically disappeared. I may add that the narcotics, though stopping the twitchings, were so far counteracted by the poison that they produced no sleep. The patient felt quite well the next day and had nothing to complain of but muscular soreness and pain—the after effect of the violent contractions.

The total failure of the chemical antidotes in this instance induced me to perform a number of experiments in order to further test their value, if any, as antidotes to strychnine. The employment of both animal charcoal and tannin as antidotes to poisonous alkaloids is based on their power of rendering these bodies insoluble. I found, however, that a solution of two grains of strychnine in six ounces of water forms no precipitate on the addition of tannin. Animal charcoal, if kept in intimate contact with a similarly weak solution of strychnine by frequent agitation for some time, was found to effect a nearly complete precipitation of the alkaloid; but its action was very imperfect indeed, when frequent agitation was not resorted to. The following physiological experiments were tried on myself under strictly equal conditions, and at intervals of one week. Having first ascertained in several trials that fifteen drops of a 1 per cent. solution of strychnine represented the smallest dose which could be depended upon in my case to produce slight but distinct symptoms, if taken on an empty stomach, that dose was adopted in my experiments with antidotes. The results were as follows:—

The administration of 10 grains of tannin immediately after the dose of strychnine did not interfere in the slightest degree with the action of the latter.

The administration of a large dose of animal charcoal (1 ounce) immediately after the strychnine seemed to have the effect of rendering the symptoms less distinct; but although slight they were still noticeable. A similar dose of charcoal administered twenty minutes after the strychnine appeared to have no effect whatever.

Thirty grains of chloral hydrate taken immediately after the strychnine prevented the effect of the latter entirely, but failed to produce its usual hypnotic action. In another experiment the same dose of chloral taken half-an-hour after the strychnine did not entirely prevent the symptoms; but they disappeared very soon afterwards. The chloral in this case had its usual effect in producing sleep.

Injections of morphine and the administration of potassium bromide were not tried.

It will not do, of course, to conclude too much from experiments such as these; but, taken in conjunction with the chemical experiments above described, and with the results in the poisoning case referred to, they appear to me to establish the uselessness of tannin and the doubtful value of charcoal as antidotes to strychnine in cases of actual poisoning. The latter, being perfectly harmless, even in very large doses, might still be attempted, if immediately at hand; but it is the physiological antidotes, and, pre-eminently, the narcotics on which medical men will have mainly to rely, in the treatment of cases of poisoning by strychnine. To produce vomiting will of course be the first thing to be attempted; but, unless this can be done within a very short time after the administration of the poison, it is useless, as the strychnine will be already absorbed.

Mr. **Linford** said in cases of poisoning by strychnine it might sometimes happen that no medical man was within reach, and probably no such thing as hydrate of chloral or morphia. Some years ago he saw a case of that kind in which a boy at a farmhouse had accidentally swallowed some strychnine. How much was not known, but it was some which had been procured for poisoning rats. He happened to be there a few minutes afterwards and was applied to directly as to what could possibly be done. Looking only at the extremely opposite effects of tobacco and strychnine he put a pinch of about 6 or 8 grains of tobacco in hot water and gave the boy an injection; he had no strychnine rigors, and in fact took no harm from it. He always said that should such a case occur again the first remedy he should fly to as an antidote to strychnine was tobacco. He had also seen the action of tobacco some time ago in a very bad case of pain from the passage of gallstone, where the limbs had become contracted with pain to a distressing extent. An injection of tobacco relieved the pain in less than ten minutes. He thought the medicinal use of tobacco was not sufficiently known.

Mr. **Groves** said some years ago he saved the life of a valuable dog by giving him chloral, and sent a short acoount of it at the time to the Journal. Of course with regard to chemical antidotes in the way of absorbents or precipitants it was no use to administer them after the poison had been absorbed; physiological remedies must then be adopted. It had occurred to him to suggest to Mr. Siebold as a precipitant of the alkaloid if taken in time, the iodobismuthates might be tried, as they were precipitants of all alkaloids. The best precipitant of alkaloids was the iodomercurate, but that, of course, was inadmissible.

Mr. **Gerrard** said there were occasionally cases of poisoning in the metropolitan hospitals, and he remembered one case which happened. The charwoman found out where the simple syrup was kept and on leaving one night took a dose of what she supposed to be simple syrup, but which turned out to be Easton's syrup, and the special symptoms of strychnine poisoning immediately set in. She had just strength enough to walk out into the corridor where she fell on her back with all the most marked symptoms of strychnine poisoning. In that case where the effects of the poisoning was somewhat advanced it was impossible to administer emetics, but she was treated physiologically by means of paralysing agents, and he should say it was always the practice to treat these cases with a physiological antidote, generally opium. It was very rare to administer tannic acid as a remedy. Occasionally animal or vegetable charcoal was used, but rarely tannic acid. An emetic might be administered with good effect if it could be done immediately. He knew an instance of a student who, when handling crystals of strychnine, picked one up and put it in his mouth. This was noticed by a fellow student, and a dose of sulphate of zinc was immediately given him, and there was not the slightest symptom of strychnine poisoning. Where the symptoms have developed themselves, however, recourse must be had to physiological antidotes, such as had been mentioned by Mr. Siebold, and this had often been done successfully.

(*To be continued.*)

Obituary.

Notice has been received of the death of the following:—

On the 23rd of August, Mr. John Irving George, Chemist and Druggist, formerly of Wigton, Cumberland. Aged 34 years.

On the 23rd of August, Mr. Henry Joshua Gratte, Pharmaceutical Chemist, Commercial Road, Newport, Mon. Aged 59 years. Mr. Gratte had been a member of the Pharmaceutical Society since 1870.

On the 24th of August, Mr. Robert Lee, Chemist and Druggist, Anlaby Road, Hull. Aged 69 years.

On the 28th of August, Mr. Walter Dutchman, Pharmaceutical Chemist, Edith Grove, King's Road, Chelsea.

On the 31st of August, Mr. Clement Buckland, Chemist and Druggist, Hucknall Torkard, Notts. Aged 48 years.

On the 1st of September, Mr. Charles Thomas Cooper, Chemist and Druggist, Cavendish House, Newmarket. Mr. Cooper was an Associate of the Pharmaceutical Society.

On the 4th of September, by drowning during a yachting excursion, Mr. Reginald Edward Macdonald, of Argyle Place, Edinburgh. Aged 21 years. Mr. Macdonald, who was a Registered Apprentice of the Pharmaceutical Society, had taken a distinguished place in the science classes at Heriot College during last session, and was a young man of considerable ability and promise. He was one of the prizemen of the Edinburgh Chemists' Association and a member of the Committee.

On the 4th of September, Mr. William John Hart, Chemist and Druggist, Cemetery Road, Doncaster. Aged 30 years.

On the 5th of September, at Liscard, Mr. Charles William Banister, Chemist and Druggist, of Liverpool. Aged 47 years.

On the 9th of September, at Great Malvern, Mr. Charles Corfield, Chemist and Druggist, formerly of Birmingham. Aged 71 years.

On the 13th of September, Mr. Thomas Jabez Nettleship, Chemist and Druggist, Harworth. Aged 64 years.

BOOKS RECEIVED.

TABELLARISCHE AUSZÜGE AUS DEM ARZNEIBUCH FUR DAS DEUTSCHE REICH. By THEODOR PUSCH. Berlin. Deutscher Apother-Verein. 1890.

DEFEKTEN-TASCHENBUCH enthaltend eine kurze Zusammenstellung aller in dem Arzneibuch für das Deutsche Reiche. By THEODOR PUSCH. Berlin. Deutscher Apotheker-Verein. 1890.

J. W. Douglas.—*Parietaria officinalis.*

A. N.—*Salix repens*, with a leaf gall attached,

E. F. Young.—(1) *Valeriana officinalis.* (2) *Geranium pyrenaicum.* (3) *Cryptogramme crispa.* (4) *Sedum Telephium.* (5) *Alchemilla vulgaris.* (6) Too imperfect to name correctly.

W. J. Shepperd.—(1) *Lysimachia vulgaris.* (2) *Stachys Betonica.* (3) *Senecio Jacobœa.* (4) *Pulicaria dysenterica.* (5) *Trifolium procumbens.* (6) *Silaus pratensis.*

J. J. Rainey.—*Epipactis latifolia.*

J. Austin.—(1) *Hieracium boreale.* (2) *Astrantia major.* (3) Not British; a liliaceous plant too fragmentary to name: possibly a *Chlorophytum.*

S. Phillips.—*Atriplex hastata.*

R. H. Rowell.—(1) We are not acquainted with an English work on the subject. (2) The last edition of the Codex was issued in 1884.

Kino.—Your questions should be submitted to a solicitor.

Miss Pike's Powders.—W. Catford asks for a recipe for "Miss Pike's Powders," said to be a remedy for epilepsy, hysteria, etc.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Stark, Smith, Kirkby, Maxwell, Bottle, Burroughs.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ETHEREAL TINCTURE OF CAPSICUM.

Sir,—Since Sir Jas. Sawyer, M.D., advised the employment of an ethereal tincture of capsicum in chronic gout, rheumatism, etc., it has been evident that the question would immediately arise whether the Board of Inland Revenue would consider this a fitting case in which to grant the privilege of the use of methylated ether.

We think that any presumption of what course the Board would take would have been rash, and having asked the direct question, we have pleasure in forwarding for the benefit of others interested, the reply now received from Somerset House. REYNOLDS AND BRANSON.

[*Reply.*]

"Inland Revenue Office, Somerset House, London, W.C.
September 4, 1890.

"Gentlemen,—In reply to your letter, dated 29th ult., I am directed by the Board of Inland Revenue to acquaint you that the preparation of an ethereal tincture of capsicum, in which methylated ether was substituted for ordinary alcohol would not be objected to by the Board.

"I am, gentlemen, your obedient Servant,
(Signed) "W. M. ROSSETTI, *Assistant-Secretary.*"
"Messrs. Reynolds and Branson."

SALES OF POISONS BY AUCTIONEERS.

Sir,—At a sale by auction of a chemist's stock, held under the ægis of the local Official Receiver in this town a few days since, among other lots dispersed without any restriction, in spite of the protests of chemists and medical men present, were bottles containing quantities of strychnine, prussic acid, white arsenic (this without a poison label), liq. ergotæ, ol. sabinæ, and other scheduled poisons, and, moreover, many of these were knocked down to persons totally unconnected with the trade, and possibly on the look out for physic "under store price." Surely, sir, this is a case, though no inquests have yet followed, in which the Society might, in the interests of the public, and without incurring the horrible suspicion of being concerned on behalf of trade interests, institute proceedings to prevent such distribution of death-dealing drugs, or else it would appear the possession of an auctioneer's licence is sufficient to drive the proverbial coach and six through the Pharmacy Acts.

Ipswich. JOHN C. WIGGIN.

[*** Sales of poison under similar conditions have been prevented in cases where the Secretary of the Society has had timely intimation that they were contemplated. The proper course in this case would be to communicate the facts to him.—ED. PH. J.]

BOTANICAL NOTES FROM IRELAND.

Sir,—It may interest some of your readers to hear of the occurrence of the following plants in Ireland:—

(1) *Cuscuta epithymum* (Lesser Dodder), at Tramore, Co. Waterford, growing on thyme, gorse, etc., in waste lands by the sea.

(2) *Vaccinium Oxycoccos* (Cranberry), in a bog near Waterford. This is, I believe, the only locality.

So far as I am aware, the presence of the above two species has not been noted from Ireland before, so I have thought it worth while to bring them before your notice, although I do not claim the merit of first discovering them.

I may also mention *Atropa Belladonna* (in fruit), found on the 10th inst. at Kells (Co. Tipperary), growing among the ruins of an ancient abbey there, and probably originally planted in old times by the monks, as was perhaps always the case where it is now found in these islands. It is not new to, but is rare in, Ireland.

Hyoscyamus niger I have also found on the Waterford coast. H. GARNETT.

"THE MONTH."

Rancidity of Fats.

The determining cause of the rancidity of fats has been a fertile source of conjecture, and water, air, albuminous matter, ferments and light have by different writers been credited with the sole or joint authorship of the mischief. Some fresh experiments, reported by Herr Ritsert (*Pharm. Zeit.*, Sept. 13, pp. 579, 586), seem to throw additional light upon the subject. The first experiments had for their object to determine the relation of micro-organisms to the rancification of fats and to ascertain under what conditions sterilized fat becomes rancid. It was found that notwithstanding the occurrence of most diverse micro-organisms in rancid fat, both aerobic and anaerobic germs die when added to fresh undecomposed fat, from which it was inferred that the change is not initiated by them. Indeed it was also found that under the influence of sunlight, which killed the germs, the rancidity was produced more rapidly. Experiments were therefore made with sterilized lard (1) protected from access of air, but exposed to sunlight, diffused light, and kept in the dark; (2) with access of air, exposed to sunlight and kept in the dark; (3) in atmospheres of moist and dry oxygen, carbonic acid, nitrogen and hydrogen. As a general result it may be stated that the condition favourable to the production of rancidity proved to be the action of light during contact with air, the change being induced more rapidly the more intense the light. Thus it was found that sterilized lard, either moist or dry, when kept from contact with air in sealed tubes, remained free from rancidity after two months, even though exposed to sunlight and warmth. When Erlenmeyer's flasks were filled with sterilized lard, stoppered with sterilized wadding, and exposed to sunlight, rancidity was evident at the end of a week; but if the contents of the flask were sheltered from light by a coating of black varnish, the lard remained sweet after two months, even when the flasks were only partly filled. In order to ascertain to which constituent of the atmosphere the change is due, the quantity of oxygen, nitrogen, hydrogen and carbonic acid absorbed by sterilized lard under similar conditions was noted and the effect produced upon the fat. Oxygen, both dry and moist, was absorbed freely in the light, the fat becoming strongly rancid in one month; but none was absorbed in the dark, the fat remaining quite fresh. Nitrogen and hydrogen both remained unabsorbed, whether exposed to the light or kept in the dark, and the lard did not become rancid. Carbonic acid, dry and moist, was absorbed in the light and to a less extent in the dark, but the lard only acquired a tallow-like taste and no odour.

Nature's Economy in Light Production.

It is now universally admitted that wherever there is light, there has been expenditure of heat in the production of radiation existing in and as the luminosity itself, since both are but forms of the same energy. In all industrial methods of producing light, however, enormous waste is involved, arising from the necessity of expending a great deal of heat in invisible forms before reaching even the slightest visible result, while each increase of the light represents not only the small amount of heat directly concerned in the making of the light itself, but a new indirect expenditure in production of invisible calorific rays. This waste is greatest in sources of low temperatures, like the candle, lamp, or gas-illumination, where it ordinarily exceeds 99 per cent., and least in sources of high temperature, like the incandescent light and electric arc, although even there it amounts under the most favourable conditions to very much the larger part. Messrs. Langley and Very, in a record of their studies at the Allegheny Observatory on the radiation of the fire-fly (*Phil. Mag.*, Sept., p. 260), very forcibly demonstrate how much more cheaply, *i.e.*, economically, nature works, producing a light without heat other than that in the light itself. It had already been assumed from spectrum observations that the fire-fly's light is produced without the invisible heat that accompanies ordinary processes, but the quantity and quality of the light had never previously been determined. In addition to the scientific interest of such a determination it was evident that it might turn out to have economic value, since as the insect's light has been proved not to be associated indissolubly with any so-called vital principle or vital process, but to be the result of certain chemical combinations, nothing forbids the supposition that the same result may be one day attained by some process of the laboratory or manufactory. Messrs. Langley and Very conducted their photometric and thermal observations on specimens of the Cuban fire-fly, *Pyrophorus noctilucus*, which possesses three light reservoirs, two in the thorax and one in the abdomen, the latter of comparatively great intrinsic brilliancy. Its spectrum compared with that of a solar ray of equal brightness is more intense in the green, but ends more abruptly on the violet side, and terminates both at an upper and a lower limit at which the solar light is still conspicuous. The conclusion therefore follows that the insect spectrum is lacking in the red and presumably infra-red rays, usually of relatively great heat. In the thermal experiments, such was the delicacy of the instruments used, Messrs. Langley and Very found, after eliminating any error arising from the radiation of "animal heat," that the total luminous radiation from the abdominal light-spot of the insect did not exceed 0·00007 calories in 10 seconds, an amount of heat only sufficient to raise the temperature of an ordinary mercurial thermometer one-four-hundred-thousandth of a degree centigrade in the same time. From these figures it may be calculated that nature produces this cheapest light at about one-four-hundredth part of the cost of the energy which is expended in the candle-flame, and at but an insignificant fraction of the cost of the electric light or of the most economic artificial light yet devised.

Manufacture of Chlorine.

A new process for the manufacture of chlorine has been recently patented by de Wilde and Reychler, which appears destined to replace the well-known Deacon's process, on account of the larger yield of chlorine it affords, whilst the consumption of fuel and labour is reduced (*Chem. Zeit.*, Rep., Aug. 30, p. 238). The technical process depends upon the alternate oxidation and chlorination of a mixture of manganese and magnesium chlorides. When a molecular mixture of these chlorides is heated to red-heat (about 525° C.) in a stream of dry air, all the chlorine escapes and a magnesium manganite $Mg_3Mn_3O_8$ results:—

$$3MgCl_2 + 3MnCl_2 + 4O_2 = Mg_3Mn_3O_8 + 6Cl_2.$$

If a stream of hydrochloric acid gas be then led over the manganite at somewhat lower temperature (about 425°), the chlorides are reformed and a further quantity of chlorine gas also passes over.

$$Mg_3Mn_3O_8 + 16HCl = 3MgCl_2 + 3MnCl_2 + 2Cl_2 + 8H_2O.$$

It may be seen from these equations that in the chlorination process one quarter of the chlorine from the hydrochloric acid is set free and three quarters fixed, but that the latter is eliminated in the oxidation process, so that theoretically all the chlorine is obtained in a free state. Technically the yield appears to be about 70 per cent. of the hydrochloric acid used. The addition of magnesium sulphate to the mixture is advantageous, as it renders the mass consistent, infusible and porous.

Preparation of Oxygen.

Owing to the many disadvantages accompanying the preparation of oxygen for laboratory purposes from chlorate of potash and black oxide of manganese, several methods have been suggested of late years for the production of a regular stream of pure gas at the least possible expense. Thus in 1885 Lindner introduced a method based upon the action of an acidulated solution of hydrogen peroxide upon a concentrated solution of potassium permanganate, and in 1888 Göhring suggested the employment of the same reagents in alkaline solution. Volherd modified Lindner's method by substituting the cheaper chloride of lime for potassium permanganate and using a Kipp's apparatus as generator, but this product frequently contains chlorine and carbonic acid gas as impurities. A new process (*Pharm. Zeit.*, Sept. 3, p. 554) has now been invented by Dr. Kassner, which appears to combine the advantages of cheapness, purity of product and easy manipulation. It had been observed that an energetic evolution of oxygen occurs when a solution of hydrogen peroxide reacts with red prussiate of potash and excess of potassic hydrate, the ferric salt being reduced to the yellow ferrocyanide, as the following equation shows:—

$$Fe_2(CN)_6,(KCN)_6 + 2KHO + H_2O_2 = 2Fe(CN)_2(KCN)_4 + 2H_2O + O_2$$

The ferrous salt can easily be reconverted into its ferric condition by plumbate of calcium. But instead of a peroxide solution, Dr. Kassner suggests the employment of peroxide of barium, which reacts with red prussiate of potash in presence of water, eliminating the whole of its oxygen and forming a ferrocyanide of potassium and barium. A dried mixture of red prussiate and barium peroxide in molecular proportions can be stored in air-tight bottles any length of time, and from such a powder a regular stream of pure oxygen gas is evolved upon the simple addition of water. The compound ferrocyanide, which results as bye-product, is nearly insoluble in water, and being still a valuable preparation, may be resold to the manufacturer.

Alkaloids of White Hellebore.

Great confusion has existed respecting the active principle or principles of the rhizomes of *Veratrum album*. Pelletier and Caventou, who first investigated the root, regarded its chief chemical constituent to be veratrine, the alkaloid of cevadilla seeds. The results of later investigations have not confirmed this, but as early as 1840 a toxic principle, jervine, was discovered and analysed by Simon and Will. Tobien (*Pharm. Journ.*, [3], viii., 808) ascribed the formula $C_{27}H_{47}N_2O_8$ to this body, and also observed the presence of an amorphous base, which he named veratroidine. Wright and Luff (*Pharm. Journ.*, [3], ix., 989) also obtained jervine, to which they gave the formula $C_{26}H_{37}NO_3$, and an amorphous base, veratralbine; further they succeeded in isolating two other crystalline alkaloids, rubijervine and pseudojervine. But since jervine alone possesses a toxic action, and that to a very slight degree, it appeared probable that the most active constituent had still been overlooked. According to Herr Salzberger (*Archiv*, ccxxviii., 462) this proves, indeed, to be the case, since he finds besides Wright and Luff's bodies, two new crystalline alkaloids, named by him protoveratrine and protoveratridine respectively, the former of which possesses extremely poisonous properties and occurs to the extent of about 0·03 per cent. of the dried drug. Two methods for the extraction and separation of the active principles of the root were employed by this investigator. By the first method, in which the powdered rhizomes were macerated with concentrated baryta water and then extracted with ether, only jervine, rubijervine, and protoveratridine were obtained, these being soluble in ether, whilst by further treatment of the alkaline mother liquors an amorphous product corresponding to Tobien's veratroidine and Wright and Luff's veratralbine resulted. This body Herr Salzberger considers to be a mixture of decomposition products of protoveratrine, standing in the same relation to this alkaloid as the commercial amorphous aconitine does to the pure crystalline base. To procure protoveratrine in a crystalline condition, another method of extraction was employed. After treatment of the drug with ether, or light petroleum, to remove fatty and resinous matter, it was extracted with 80 per cent. alcohol, and the alcoholic liquors evaporated in vacuum. This fluid extract was then triturated with dilute acetic acid and metaphosphoric acid added to the solution until nothing further was precipitated. In this way a quantity of amorphous matter, besides jervine and rubijervine, may be removed, and the acid solution is then made alkaline with excess of ammonia and extracted with ether. Upon evaporation of the ether the protoveratrine crystallises out and may be recrystallized out of strong alcohol. By extraction of the ammoniacal mother liquors with chloroform pseudojervine may be isolated, but as by this method no protoveratridine was observed, it is probable that the latter is a decomposition product of protoveratrine. Protoveratrine in the pure state is insoluble in water and dissolves with difficulty even in boiling alcohol and ether. It possesses a bitter taste, and produces a numbed sensation of the mouth and lips, whilst the introduction of the smallest particle into the nostrils occasions violent sneezing. Applied subcutaneously it is extremely poisonous, a dose of 0·0005 gram causing the death of a full grown rabbit. Its formula $C_{32}H_{51}NO_{11}$ suggests a near relationship to veratrine $C_{32}H_{49}NO_9$, but their identity is disproved by colour reactions and general characters. In acid solution it appears to rapidly decompose, the decomposition being accompanied by an odour of isobutyric acid, so that probably the new alkaloid, like veratrine, contains an ester group in the molecule. Herr Salzberger also describes the characters of the other four alkaloids and accompanies his paper with illustrations of their crystal forms.

Opium Alkaloids.

Few, except those who have carefully followed chemical literature of late years, are aware of the large number of bases that have been separated from opium. Besides the six alkaloids, morphine, codeine, narceine, thebaine, papaverine and narcotine, which occur in comparatively large quantities, a number of bases occurring only in minimal amounts have been isolated. In the mother liquors of the opium alkaloid manufacture T. and H. Smith discovered cryptopine and gnoscopine, whilst from the same source Hesse obtained no less than nine rare alkaloids, protopine, laudanine, codamine, pseudo-morphine, hydrocotarnine, rhœadine, meconidine, laudanosine and lanthopine. So little is known respecting many of these that Herr Kander undertook to prepare larger quantities from the industrial mother-liquors for the purpose of acquiring further knowledge of their properties. He reports that in doing so he effected the separation of still another new alkaloid, tritopine, which occurs in smaller quantity than even protopine and to which he assigns the formula $C_{42}H_{54}N_2O_7$ (*Archiv*, ccxxviii., p. 419). Like morphine and laudanine it is soluble in soda solution, but it is reprecipitated in an oily condition by excess of the reagent. Its melting-point, 182° C., is however 16° higher than that of laudanine, although the resemblance is again apparent in its behaviour towards sulphuric acid. Tritopine crystallizes without water of crystallization in characteristic transparent needlelike plates and appears to be a di-acid base.

Protopine.

Dr. R. v. Engel has made experiments in the Pharmacological Institute at Marburg on protopine, derived from chelidonium and from opium, with a view to determine its physiological action. This alkaloid has been shown to occur also in *Macleya cordata*, *Stylophorum diphyllum* and *Sanguinaria canadensis* (*Pharm. Journ.*, [3], xx., 342), and thus appears to be the most widely distributed of the opium alkaloids in the poppy family. The results of the experiments showed that in small doses protopine acts on the frog as a narcotic, and in stronger doses paralyses the muscle substance and the peripheral ends of the nerves. The reflex excitability is not sensibly interfered with by small or moderate doses, but is exalted by large doses. Upon mammals protopin has a poisonous action like that of camphor, but differs from it in paralysing the circulatory organs.

Atropine as an Antidote to Cyanide of Potassium.

A man in Hull took a considerable quantity of cyanide of potassium in solution, with the idea of committing suicide, and in addition swallowed a solution of atropine in order to be quite sure of the effect. The result was an attack of fainting fits, in consequence of which he was taken to a hospital. He recovered, however, next day without any other antidote being given (*Lancet*, Sept. 6, p. 542).

Toxic Effects of Exalgine.

Mr. Edmund E. Dyer reports in the *British Medical Journal* (August 30, p. 506) a case in which the administration of exalgine for the relief of muscular rheumatism was followed by symptoms resembling those due to carbolic acid poisoning. The exalgine was ordered in a mixture with tincture of orange and water, in gr. ijss. doses three times a day, the quantity being therefore somewhat larger than that given by Professor Fraser, of Edinburgh, but less than that given by Drs. Bardet and Dujardin-Beaumetz. Six doses in all were taken. The symptoms were sleep broken by starts and waking at short intervals; pain in the small of the back; urine olive-green, scanty, of high specific gravity, with large deposit of urates, but free from phosphates, albumen or blood; temperature 98, pulse 102, full and strong; thirst and hot and dry skin. The renal trouble disappeared upon stopping the exalgine and giving a diuretic and diaphoretic and the cerebral symptoms passed off.

Arsenite of Copper in Dysentery.

In the *Medical Bulletin* (August, p. 283), Dr. J. Swain confirms the recommendation, by Dr. J. Aulde, of arsenite of copper as a remedy in dysentery and allied intestinal disorders. He refers to twelve patients, varying in age from three weeks to sixty years, all of whom were cured. In the case of the youngest the dose given was a teaspoonful of a mixture of $\frac{1}{100}$ grain of the salt in 4 ounces of water, a dose being given every ten minutes for one hour and then hourly.

Elimination of Potassium Iodide in the Urine.

The results of analyses of the urine of a patient under potassium iodide treatment have led M. G. Doux to experiment upon himself with a view of obtaining trustworthy information as to the amount of iodide eliminated from the human system by the urine (*Journ. Pharm. Chim.*, August, p. 106). He submitted himself to an iodide treatment for twenty consecutive days on three distinct occasions, taking 6 grams of the salt daily and examining the urine passed every twenty-four hours for the amount of iodide and urea discharged. As in the patient's case, M. Doux found that after the second day the amount of iodide eliminated was a very constant quantity, and averaged about 90 per cent of the dose taken, whilst the normal amount of urea present in his own urine was decreased by about one-fifth. It was also observed that only about 60 per cent. of the iodide was eliminated in the twenty-four hours if a small quantity of absinthe had been taken on the previous day. The presence of iodide was first noticeable in the urine thirteen minutes after its ingestion, and the last traces had disappeared within seventy-five hours. The method employed by M. Doux to oxidise organic colouring matters in the urine before titration, by evaporation with potassium nitrate and subsequent deflagration of the residue, is not without objections, as a part of the iodide would no doubt be oxidized to iodate and a slight volatilization might also occur. But according to the author the error is a constant one and easily determined by control experiments with normal urine to which a given quantity of iodide has been added.

Volumetric Estimation of Chlorine in Urine.

The employment of chromate of potash as an indicator in the titration of chlorides with silver nitrate, necessitates the operation being carried out in neutral solution. Since this is frequently an unfavourable condition, Dr. A. Corvi has elaborated a method of procedure, applicable to all solutions acidified with nitric acid, which can therefore be employed with advantage in urine analysis (*L'Orosi*, Aug., p. 253). To

10 c.c. of urine, acidified with a few drops of nitric acid, a measured quantity of decinormal silver nitrate solution, more than sufficient to precipitate all the chlorine, is added and the solution then filtered. The excess of silver nitrate present in the filtrate is then determined by titration with a decinormal potassium ferrocyanide solution, using ferric sulphate as an indicator. The silver is precipitated as a ferrocyanide according to the equation, $K_4Fe(CN)_6 + 4AgNO_3 = Ag_4Fe(CN)_6 + 4KNO_3$. The end of the reaction is indicated by the appearance of the azure blue colour of ferric ferrocyanide, which does not disappear by continual stirring if all the silver nitrate be decomposed. From the quantity of ferrocyanide solution used, the amount of silver removed as chloride may be easily estimated. The author reports that the method gives very accurate results.

Tests for Albumen in Urine.

A new albumen test has been brought forward by Herr A. Jolles (*Zeit. analyt. Chem.*, xxix., 406). If 8 to 10 c.c. of urine be mixed with an equal volume of concentrated hydrochloric acid and then two or three drops of a saturated bleaching powder solution carefully added by means of a pipette, the presence of any albumen is indicated by a white turbidity at the contact surface of the two liquids. This test, by which 0·01 gram of albumen in 100 c.c. urine may be detected, is not so delicate as the well known nitric acid test, but the author suggests that by employment of both tests and suitable dilution of the urine, a quick and easy estimation for clinical purposes of the percentage of albumen is possible. The most searching test he considers, however, may be made with acetic acid and yellow prussiate of potash, by means of which 0·0008 of albumen in 100 c.c. urine may be detected. As the turbidity caused by this reagent may be masked in urine containing bacteria that cannot be removed by filtration, Herr Jolles recommends that the urine be first shaken with infusorial earth, when a clear filtrate can be obtained. Since by this treatment traces of albumen may also be removed, the precipitate should be washed with warm potash solution, and the test applied to the acidified filtrate in the usual way. Dr. Venturoli proposes (*L'Orosi*, Aug., p. 255) that the amount of albumen in urine should be determined by titration with a 1 per cent. solution of mercuric chloride; complete precipitation is indicated by the formation of a vermilion coloration with potassic iodide. Each cubic centimetre of mercuric solution required represents 0·0245 gram albumen.

Examination of Urine for Gall Constituents.

Of the various tests used for the detection of gall-pigments in urine, Herr A. Jolles (*Zeit. analyt. Chem.*, xxix., 402) recommends those of Rosenbach and Huppert on account of their delicacy and facility of application. The delicacy of the former test is further increased by the employment of nitric acid containing nitrous acid. If a drop of this reagent be allowed to fall upon a filter-paper saturated with the urine under examination, and the paper be then passed three or four times through a Bunsen flame, the presence of the slightest trace of biliverdin is indicated by the formation of a bright green ring around the nitric acid drop. The trustworthiness of Huppert's test depends largely upon the concentration of the milk of lime employed, a point to which no attention has been called. Herr Jolles finds that the best results are obtained by shaking 8 to 10 c.c. of urine with an equal volume of milk of lime containing 10 grams of CaO in the litre. Upon treatment of the precipitate with alcohol and hydrochloric acid and boiling the filtrate therefrom, the liquid assumes a green or blue coloration if gall-pigments be present. Herr Jolles also introduces a method for the determination of periodical variation in the amount of gall-constituents present, based upon the iodine absorption of the urine. The amount absorbed by urine free from pathological impurities depends principally upon its normal constituent, uric acid, and is fairly constant. Calculated from the formula

$$I = \frac{g}{s-1} \cdot 4 \cdot 292,$$

where g is the number of grams of iodine absorbed by 10 c.c. of filtered urine at ordinary temperatures, and s the specific gravity of the urine, the value of I for normal urine ranges from 6·5 to 8, but never exceeds the latter figure. On the other hand, the presence of traces of gall constituents in the urine causes its iodine absorption value to rise to 10 and upwards, according to the extent of the contamination. It would appear necessary, however, to bear in mind the possibility of these figures being affected by medicine which the patient might be taking.

Resin of Jalap.

A short time since Professor Flückiger called attention to the probability that in recent years there has been a falling off in the quantity of resin in jalap tubers as met with in commerce (*Pharm. Journ.*, [3], xx., 546), and similar statements have also been made in the United States. Mr. J. P. Suess was therefore induced to examine four samples of jalap tubers and two of the powdered drug, obtained from reliable dealers in different parts of the United States (*Amer. Journ. Pharm.*, Sept., p. 435). The drug finely powdered was exhausted by maceration and percolation with alcohol, sp. gr. 0·820, the tincture concentrated and treated with water and the resulting resinous precipitate washed repeatedly with water and then dried. Of the four samples of tubers one yielded only 7·285 per cent. of resin, of which 14 per cent. was soluble in ether; a second gave 9·285 per cent., with 10 per cent. soluble in ether; a third 15 per cent. with 9 per cent. soluble in ether; and the fourth, 14·5 per cent., with 8 per cent. soluble in ether. Of the powders one yielded 7·714 per cent. of resin, of which 12·5 per cent. was soluble in ether, and the other 11·771 per cent., of which 11 per cent. was soluble in ether. One notable feature was that, with one exception, the larger the yield of resin the smaller was the proportion of it soluble in ether. It follows from the results obtained that only one of these specimens came up to the standard of the United States Pharmacopœia, which requires that the tubers shall yield to spirit not less than 12 per cent. of resin, of which not over 10 per cent. may be soluble in ether, whilst only two of them would have satisfied the British Pharmacopœia requirements. Mr. Suess thinks that his results show that the time has come when the pharmacopœial requirement from the tubers should be about 8 per cent. of resin. The new German Pharmacopœia, it may be mentioned, only stipulates for 7 per cent.

M. Serullas, in a note published in *Comptes Rendus* (cxi., p. 423), states that although the gutta percha

Gutta Percha.

tree has been considered to be extinct in the island of Singapore since 1857, it is not actually so, since he met with it in 1887 on the Chasseriau estate, in the ravines of the ancient forest of Bouhett Timah. The trees were mostly adult plants which had arisen from stumps of trees previously felled. The tree does not reach its maturity, *i.e.*, it does not flower, until thirty years old. M. Serullas objects to the plant being placed in the genus *Dichopsis* or *Palaquium* and thinks that the definition of the genus *Isonandra* should be extended so as to include the species of *Dichopsis* or *Palaquium*. But he appears to overlook the fact that by Hooker and Bentham ('Genera Plantarum,' vol. ii., p. 658) *Isonandra Gutta* was referred to *Dichopsis*, although the fruit was unknown. M. Serullas, in his description, mentions the fruit and seed, but does not state that albumen is present. As *Dichopsis* has an exalbuminous seed and *Isonandra* an albuminous one, M. Serullas actually confirms Messrs. Hooker and Bentham's reference of the plant to *Dichopsis*, Concerning the word percha, M. Serullas does not accept it as a corruption of the word putih (white), but says, "Le mot *pertcha* or *perfia*, que se prononcé seulement *perka* par les Français, ne signifie nullement, comme l'ont cru jusqu'ici tous les explorateurs, Soumatra (Sumatra se dit *perxa*, qui signifie le monde, la partie terrestre habitée). *Pertcha* veut dire chiffon, lambeau d'étoffe, et caractérise fort exactement des gommes qui, avant tout traitement dans l'eau chaude, présentent l'aspect de chiffons à demi réduits en pâte et comprimés. Il n'est donc pas étonnant que cette qualification, qui n'appartient pas au malais vulgaire, ne soit pas employé par l'indigène dans les forêts." If, as M. Serullas observes, there are still fruiting trees in Singapore, it is time that efforts should be made, through the Botanic Gardens, at Singapore, to propagate so valuable a plant, or the Dutch, who have already begun to do so in Java, will, as in the case of cinchona, precede the English in the production of the best article in the market.

Madagascar Plants.

A list of some of the economic plants of Madagascar is contributed by the Rev. R. Baron to the September number of the Kew *Bulletin*, to which is appended an index of the native and botanical names of the plants. A few only of those mentioned appear likely to be of medicinal or pharmaceutical interest. There is a native species of Erythroxylon, *E. myrtoides*, Bojer, but it does not appear to be used like coca. *Cnestis polyphylla*, Lam., used as a dog poison, *Tetradenia fruticulosa*, Benth., the juice of which is said to produce violent vomiting, *Phytolacea abyssinica*, and *Drimia Cowanii*, used as a rat poison, seem the most likely to be worth examination. Arrowroot is obtained from *Tacca pinnatifida*, Forst., and *Weihea sessiliflora* (Rhizophoreæ) is said to yield a bark tasting like cinnamon.

Chlorophyllian Assimilation in Red-leaved Trees.

It is known that many species of trees which ordinarily bear green leaves present varieties that bear red leaves, such as the beech, elm, hornbeam, hazel, and birch. The question how far the admixture of a special pigment with the ordinary chlorophyll affects the chlorophyllian assimilation has been the subject of a recent investigation by M. Jumelle (*Compt. Rend.*, Sept. 1, p. 380). The conclusion arrived at, based upon the relative quantities of carbonic acid decomposed by the two varieties, is that in trees with red or "copper" leaves the assimilation is always less energetic than in similar trees with green leaves, falling in some cases, as in the copper beech and purple sycamore, as low as one-sixth. This is in accord with the fact, well known in horticulture, that the growth of trees with red leaves is much less rapid than that of the same trees with green leaves.

Jeffersonia diphylla.

At a recent meeting of the Royal Horticultural Society Mr. Wilson exhibited the *Jeffersonia diphylla* in fruit (*Gard. Chron.*, August 30, p. 253). The single carpel, instead of dehiscing by the ventral suture, as in aconite, bursts by a semi-circumsessile dehiscence, the lid remaining attached at the ventral side. In most cases in which a pyxis occurs the lid is quite free, as in henbane, pimpernel and plantain. In *Jeffersonia* the fruit is at right angles to the stalk, so that it presents a singular resemblance to a miniature tobacco pipe.

Double Cocoanut.

The germination of the seed in the double cocoanut palm is very slow, occupying two to three years after falling on the ground, before the first leaf is produced. At Kew there are several nuts now in an advanced state of germination, one of them having produced a leaf and a mass of healthy roots, and two others are bursting into leaf. The first leaf is 2½ feet long by 2 feet broad; it is folded double laterally, and is divided into about forty segments along the top, the texture being unusually stiff and leathery even for a palm (*Gard. Chron.*, Sept. 13, p. 304).

Cruciferous Seeds.

In a lengthy article on the mucilage cells of cruciferous seeds (*Ann. Sc. Nat.*, xi., 125), Mr. d'Arbaumont reports that the mucilage, contrary to the statements of Sachs, Van Tieghem and Olivier, gives the reactions of cellulose. It is not coloure blue by iodine, but yellow. On adding sulphuric acid it gives a fine blue coloration, which is very fugacious. The mucilage appears to be formed at the expense of the starch grains, a few of which are sometimes found diffused in the mucilage projected from a section of the seed. The form in which the mucilaginous contents swell up when moistened seems characteristic for many species, and the excellent illustrations on pl. ix. suggest that this fact might be turned to account in the examination of mustard, linseed meal or cake.

Rare British Plants.

Ranunculus ophioglossifolius, the rarest of British species, is reported in the *Journal of Botany* (Sept., p. 282) to have been detected in East Gloucestershire. *Arenaria gothica*, Tr., has also been discovered in a second locality in the Ribblehead district of Yorkshire. It is sad to find that "dozens of collectors have been there (Ribblehead) this year," and that the plant in that locality at least is in danger of extermination. It is much to be regretted that, instead of merely collecting, botanists will not acquaint themselves with the habits and requirements of our rarer plants in other countries and endeavour by the clue thus afforded them to ascertain their probable distribution in this country. The publication of the conditions of growth, rather than the exact locality, would be the more useful information.

In a note in the *Annals of Botany* (p. 378), Mr.

Spergula pentandra.

G. C. Druce throws a good deal of light on the history of *Spergula pentandra* as a native of Britain. In Babington's Manual only the name is given, with the following remark: "Said to have been found in Ireland by Sherard. It was probably *Lepigonum neglectum.*" Mr. Druce, who has examined Sherard's plant, which still exists in the Dillenian herbarium in Oxford University, shows that the plant really is correctly named and answers perfectly to Wilkomm and Lange's description in the 'Flora Hispanica,' which he quotes. The seeds serve to readily distinguish the species, as they are surrounded with a well-marked white membranous wing.

Hybrid Moss.

A hybrid between *Leptotrichum subulatum* and *Pleuridium subulatum* is described in the *Gardeners' Chronicle* (Aug. 30, p. 240). These two genera are usually placed wide apart in systematic works, but in Dr. Braithwaite's 'British Moss Flora,' the two genera, which closely resemble one another in natural habit, are placed in the same family, which renders the hybridism less unnatural than at first sight would appear.

Saccharomyces apiculatus.

Some new researches made by Dr. Hansen, with a view to determine how the life of *Saccharomyces apiculatus* is continued through the year in nature, show that this ferment lives in the soil during the winter and that if preserved in sterilized tubes through which air and water can pass, immersed in the surface soil, the ferment will live as long as three years (*Ann. Sc. Nat.*, xi., 185). He finds also that it thrives more vigorously in the wort of sterilized beer than in gelatine, especially after its vitality is lessened by remaining long in the earth. Young and vigorous cells will develop with facility in gelatine; but other things being equal he considers that wort is the best medium for obtaining a pure cultivation of the *Saccharomyces apiculatus.*

Tenacity of Life in Yucca.

A curious case has recently occurred in the museum of woods at Kew. A Yucca stem with the top sawn off and without any sign of roots, and which had been two years and a half in the museum, a week or two ago sent out two shoots, one of leaves and the other of flowers. On examination the whole of the trunk proved to be full of sap. It was removed to the temperate house, where it is now in flower (*Gard. Chron.*, Sept. 13, p. 300).

GLYCYRRHIZA LEPIDOTA (NUTTALL).*

BY MADISON L. MCCULLOUGH, PH.G.

In Gray's 'Manual,' 6th edition, and in Coulter's 'Rocky Mountain Botany,' the following habitat is given for this plant: Minnesota to Iowa, Missouri, Colorado and New Mexico, westward into Nevada and Northern California, and northward to Washington, and across the Continent to Hudson's Bay. A statement found in some works that it grows near St. Louis, Mo., could not be verified by a botanist of that vicinity. Good specimens of the plant were secured from Deerlodge City, Montana, in which locality it grows to a considerable extent; but it does not appear to be used medicinally there. The stem is herbaceous; the younger branches are purplish green and somewhat pubescent; the impari-pinnate leaves have about seventeen oblong lanceolate and acute leaflets; the whitish flowers are in pedunculate spikes; the compressed legume is beset with hooked prickles and contains from two to six seeds. The root was not sent, but the long and slender rhizome was received and examined. It is from ⅛ to ⅜ inch in diameter; the older portions are longitudinally wrinkled, of a dark brown colour, and closely resemble the rhizomes of the officinal species. The younger rhizomes are dull yellowish-brown and somewhat scaly. The fracture is short, the taste sweet, afterwards somewhat bitter. The bark is rather thick, and upon transverse section shows a light colour and a number of rather wavy bast fibres. The yellow wood is divided into many narrow wedges by narrow medullary rays, the wood-wedges being quite porous from numerous ducts, and internally terminate by one or two dark coloured cells forming a circle surrounding the pith.

The older and more fully developed portions of the rhizome were selected for preparing glycyrrhizin, and parallel experiments were made with officinal liquorice root. The powder of the American drug was the lighter in colour. The powder was exhausted with ammoniated water, the solution precipitated with sulphuric acid, the precipitate washed with cold water, dissolved in ammonia and again precipitated; this process was repeated for the third time, when the precipitate was dissolved in ammonia and the solution poured upon glass to scale. The ammoniated glycyrrhizin from the American plant had a somewhat bitter aftertaste. Equal weights of both products were then dissolved in ammonia, the glycyrrhizin precipitated by acid, and washed with cold water. By this operation the loss in weight of the product from the official drug was 21·87 per cent. and from the American plant 25 per cent. Comparing the results we have from

G. glabra, ammoniated glycyrrhizin 9·2 per cent., crude glycyrrhizin 7·18 per cent.

G. lepidota, ammoniated glycyrrhizin 8·53 per cent., crude glycyrrhizin 6·39 per cent.

Washing the crude glycyrrhizins with diluted alcohol caused a loss in the former of 43 per cent., and in the latter of 50 per cent. of the weight. The latter also lost some of its colour and sweet taste.

The result of this investigation of *G. lepidota* was unexpectedly large; judging by the taste not more than 1 or 2 per cent. of the crude ammoniated compound was expected to be obtainable. But the plant is sufficiently rich in the sweet principle to command notice.

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* From the *American Journal of Pharmacy.*

CARBOHYDRATES IN PEACH GUM.*

BY W. E. STONE.

The gum which exudes from the bark of the wild peach-tree when it is injured, or from the fruit when punctured by insects, was heated with dilute sulphuric acid for ten hours, the solution then neutralized with barium carbonate, filtered, and evaporated. The syrup thus obtained was boiled with alcohol, and the clear alcoholic solution decanted and evaporated. A white, crystalline substance was then obtained, which, by fractional crystallization, followed by repeated recrystallization of the fractions, was resolved into two compounds having specific rotatory powers equivalent respectively to those of arabinose and galactose. That one of these is arabinose was shown by the melting-point of its phenylhydrazine compound, and by its yielding furfuramide when it is distilled with sulphuric acid, and the distillate treated with ammonia. The other, from the melting-point of its phenylhydrazine compounds, and from its yielding mucic acid when oxidized with nitric acid, was identified as galactose. Peach gum, therefore, contains both arabinose and galactose, that is, a true glucose associated with a pentaglucose.

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* From the *American Chemical Journal*, xii., 435. Reprinted from the *Journal of the Chemical Society.*

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 27, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE SALE OF POISONS.

AN Exeter correspondent, whose letter appears in the present number of the Journal, intimates that the chemists of that town are considering the advisability of making their charges for poisons more adequate to the trouble and responsibility involved in their sale, and he seeks for the expression of opinion from his *confrères* as to the advisability of adopting such a course, and as to the methods by which it can be carried out. This is a matter that urgently requires consideration by chemists occupying the responsible position conferred upon them by the Pharmacy Act. They being the only recognized vendors of poison, and being compelled under pain of penalties to conduct sales of poison in accordance with specified regulations and formalities devised for the purpose of protecting the public, are entitled while conforming to those requirements of the law to fix the terms of remuneration for the services they render in this respect. It is unsuitable to the conditions of the case that the sale of poisons should be treated as a mere matter of trade, and that the price charged for a supply of poison should be regulated solely by regard to the intrinsic value of the article sold and to the rate of remuneration appertaining to an ordinary trade transaction which involves no special obligation or formality. This principle has hitherto been far too much neglected by chemists and they have lost sight of the fact that the restriction of the sale of poisons to registered persons not only imposes upon them the duty of protecting the public from danger, but also confers the privilege of protecting their own interests, as the persons responsible for giving effect to the provisions of the law.

The recent decisions in respect to the sale of poison by unregistered persons, and as to the sale of proprietary medicines containing poison, if carefully considered, cannot well be looked upon in any other light than as impressing upon chemists the indispensable necessity of a rigid observance of the law in regard to the sale of poisons. That is pretty well the only privilege conferred by the the Pharmacy Act; it is conferred upon registered persons only in consideration of the qualification they are presumed to possess in virtue of being registered and it is a privilege that should be jealously conserved. It seems, therefore, to be a suicidal disregard of their own interests to contend that a registered person is entitled to transmit his privilege as a seller of poison to anyone who has not the qualification. Moreover, it is only by the acceptance of this view of the matter that any ground can be obtained for the contention that the chemist is entitled to charge not only for the actual poison that he supplies, but also for the trouble he takes in observing the precautions which the Legislature has decided are requisite for the public safety. The complaints so often made as to the facility with which poisons are obtainable, are, as far as they are well founded, a reproach to the chemist for neglecting his own interests and failing to take reasonable advantage of the privilege conferred upon him by the Pharmacy Act. It is idle to complain that the legal protection accorded to chemists is insufficient, so long as they neglect to make the most of such protection and privilege as they already enjoy. It is, however, not infrequent to hear the provision of the Pharmacy Act in regard to the sale of poisons spoken of as an incubus on the chemist, because the trouble attending such sales in labelling, registering, etc., makes the transaction unprofitable. Such an opinion is only possible when the matter is regarded from a purely trade point of view, and when the true nature of the responsibility attaching to the sale of poison is ignored. The service rendered in such a sale is not a mere trade affair, but one of much greater importance, affecting not only the purchaser of the article sold, but possibly also the reputation of the seller, and that may be, for all he can tell, even when taking the utmost precautions, the means of causing incalculable mischief either by accident or design. For the trouble and responsibility involved in such sales the chemist is therefore entitled to remuneration, and there is every reason to believe that if this principle were more generally acted upon it would be attended with beneficial results, besides meeting with general approval from the medical profession, legal authorities and the great body of the public.

It may be inferred from Mr. Wiggin's letter published at page 264, that he is not satisfied with the statement made in reference to his letter in last week's Journal. But while giving his second letter the benefit of publicity as he desires, it must be pointed out that the assumption of a '*laisser faire* policy" having been "resolved upon," is entirely a creation of his own fancy, and one that is not in accord with the facts of the case. The auction referred to by Mr. Wiggin took place, according to the printed catalogue he has now sent up, on the 5th of this month, and it does not furnish any indication that poisons were to be among the articles sold. That fact does not appear to have been known until the moment of sale even by those upon the spot, and it was therefore impossible that any preventive action could have been taken on behalf of the Pharmaceutical Society, such as has been taken on former occasions, when previous information was given as to the nature of the articles intended to be sold. The protests made by chemists and medical men present at the sale were indeed the only possible steps that could so far have been taken under the circumstances. But that does not justify Mr. Wiggin's inference that "an auctioneer's license is sufficient to drive the proverbial coach and six through the Pharmacy Act," nor does it warrant the assumption that a "*laisser faire* policy" was resolved upon as the result of the information forwarded by Mr. Anness, the Local Secretary for Ipswich. That communication was received by the Society's officials the day after the sale had taken place. The reply to it distinctly stated that in the opinion of the Secretary the sale of poison was contrary to the law, and that if it had been known of beforehand steps would have been taken to prevent it similar to those which have been successful in former instances of a like nature. It will of course be understood that no attempt can be made to prevent infringements of the Pharmacy Acts unless the intention to infringe them be known beforehand, and as regards any measures for dealing with an actual infringement in the case referred to, it must be remembered that since the receipt of information from the local Secretary at Ipswich, there has not been any meeting of the Executive of the Society that is competent to deal with such matters. Therefore Mr. Wiggin's assumption that in this case a "*laisser faire* policy has been resolved upon" is altogether premature. And it may be hoped there is reason for believing that such an assumption, involving the imputation that the Society through its Executive is unable or indisposed to enforce the provisions of the Pharmacy Acts, would not command the approval of members of the Society generally.

* * *

The evening meeting of the Society, next Wednesday, will be the one to which especial interest attaches every year by reason of the fact that it celebrates the opening of a new session, also because it is the occasion on which the presentation of prizes is made to the successful competitors in the examinations of last year's students. This year it will also present the attraction of an Inaugural Address to be delivered by Sir E. H. Sieveking, and on that account will, no doubt, be well attended. The chair will be taken by the President precisely at half-past eight, and the Council invites students and their friends, ladies as well as gentlemen, to be present at the meeting.

* * *

The Council meeting on the 1st of next month will for the first time take place in the new Council chamber that has been provided in the Society's new buildings. The room that has hitherto been used for the purpose of Council meetings will be turned to account for the extension of the Society's Library, which is now much in need of further accommodation.

* * *

A very sad occurrence is reported to have taken place at Newcastle on Tuesday afternoon, which is described in the local papers as a fire on the premises of Messrs. Mawson and Swan. So far as can be gathered from the published reports, however, the mischief appears to have been the result of a breakage of a bottle of nitric acid in a package of goods in a cellar. The action of the acid upon the surroundings naturally gave rise to abundant development of nitrous fumes, and two of the fire brigade officers who were engaged in throwing water into the cellar were so much affected by the acid fumes that they died in the course of the evening. Superintendant Matthews and several other firemen were also seriously injured, and they are still in such a precarious condition that fears are entertained as to the result.

* * *

In most foreign armies the pharmacist instead of holding the subordinate position of a non-commissioned officer as in our own, has a rank and status of a much higher character, and of course men of a very superior class are found in military pharmacies. Brazil has recently been organizing its "sanitary" corps. The chief pharmacist will have the rank of lieutenant-colonel. He will have under him two second-class pharmacists, who rank as majors, eight third class pharmacists, who rank as captains, thirty-two fourth class pharmacists, who rank as lieutenants, and forty-four assistant pharmacists ranking as sub-lieutenants.

* * *

It is significant of the estimate of the chemical acquirements of British pharmacists formed by their *confrères* on the continent, that in commenting upon the paper read by Mr. Hodgkin at the recent Conference, the Vienna *Pharmaceutische Post* says, "The author gave the structural formulæ of all the synthetic remedies just as we are accustomed to see them stated in every German manual. In England, however, they meddle so little with the constitution of these chemicals that Hodgkin's paper was accepted as something new."

* * *

According to the *Chemiker Zeitung*, in 1889 the pharmacies in Italy numbered 9980, for which there were 10,482 matriculated pharmacists and 1,753 diplomate assistants. This would represent about one pharmacy to 2,900 individuals. In the larger cities of central and southern Italy the proportion is one pharmacy to 2000 inhabitants. In 3,625 villages there are no pharmacies, about 300 of them being in the island of Sardinia. The Minister of the Interior has, therefore, nominated a Commission to ascertain in what way the rural villages may be assisted to obtain the requisite pharmaceutical service.

* * *

Miss Marianne North, the lady to whose munificence Kew is indebted for the beautiful series of paintings of plants and for the building in which they are exhibited in Kew Garden, died at her residence at Alderley in Gloucestershire on the 30th of last month. It may be mentioned that the magnificent *Nepenthes* which now bears her name was first made known by one of her drawings, and that Messrs. Veitch sent a collector to Borneo on purpose to procure the plant.

* * *

Information has been received of the death on the 20th inst., at the age of eighty years, of Mrs. Jane Gason, who was elected an Annuitant on the Benevolent Fund in 1879.

British Pharmaceutical Conference.

MEETING AT LEEDS.

FIRST DAY'S PROCEEDINGS.

Tuesday, September 2.

(*Continued from page* 243.)

The next paper read was a—

NOTE ON A COMPOUND OF CAFFEINE WITH MERCURIC CHLORIDE.

BY ROBERT H. DAVIES.

Some time ago I observed that a solution of corrosive sublimate, added to a solution of caffeine in water, caused the production of a crystalline precipitate, and as I did not find the fact recorded in the text-books, it seemed desirable to investigate how far the reaction would serve as a test for the presence of caffeine. The existence of such a compound is mentioned in Watt's 'Dictionary of Chemistry,' 1st ed., vol. i., p. 709, where "chloro-mercurate of caffeine" is described as being "obtained by mixing an alcoholic solution of caffeine with excess of mercuric chloride."

I find that an aqueous solution containing 1 of alkaloid in 200 gives an abundant precipitate immediately with saturated solution of mercuric chloride.

With 1 of alkaloid in 1000 of solution some crystals appear a few minutes after adding an equal volume of mercury solution, and in an hour or so the crop of large acicular crystals is abundant.

With more dilute solutions a greater length of time is necessary; crystals are formed in a few days in solutions containing so little as 1 of alkaloid in 4000 of solution.

The compound formed is much more soluble in water than in excess of the mercurial salt; on this account it is desirable to use a saturated solution of the reagent, or nearly so, and to add about an equal volume to that of the caffeine solution to be tested. The solubility of the compound in water at 17° C. (63° Fah.) is 1 in 263, judging from two concordant experiments.

In hot water it is much more soluble, crystallizing out on cooling. It is also soluble in alcohol, and crystallizes from a hot, strong solution on cooling. In ether it is only slightly soluble.

The compound in aqueous solution is decomposed by sulphuretted hydrogen, alkalies and potassium iodide, with production of the corresponding mercurial salts.

0·5 gram, dissolved and treated with hydrogen sulphide, yielded 0·2487 gram mercury sulphide, and from the solution 0·203 gram caffeine was extracted. 0·5 gram treated with silver nitrate yielded 0·312 gram silver chloride. These figures correspond to the percentages—

Caffeine	40·60
Mercury	42·88
Chlorine	15·42
	98·90

whilst the formula $C_8H_{10}N_4O_2,HgCl_2$ requires—

Caffeine	41·72
Mercury	43·01
Chlorine	15·26
	99·99

If allowance be made for the fact that the older atomic weight (100) is employed for mercury, the formula $C_8H_{10}N_4O_2, 2HgCl$, as given in Watts, shows the identity of the chloro-mercurate there described with this compound.

When this compound is heated in a tube in the bunsen flame it rapidly melts, decomposing in great part. If the heating be carefully carried out in an oil bath, with a thermometer in the tube, it will be found that a sublimate commences to form in the cool part of the tube at about 200° C. (392° F.), and that the whole melts at 244° C. (471° F.).

An attempt was made to see if the reaction would serve as a means of estimating caffeine, but so far the results are not as satisfactory as could be wished.

(*a*) 0·4 gram of the recrystallized caffeine gave a precipitate weighing 0·82 gram, which corresponds to 0·3737 gram alkaloid or 93·42 per cent.

(*b*) 0·3 gram gave a precipitate corresponding to 93·26 per cent.

(*c*) 0·2 gram gave a precipitate corresponding to 92·5 per cent.

From these results it would appear that too much remains in solution, or becomes dissolved in the necessary washing, to permit the process usefully to be used as a quantitative one.

Some further experiments on this point are in progress.

The alkaloid can be precipitated from the citrate by this method as readily as from solution of the alkaloid itself.

I have much pleasure in acknowledging the services of Mr. Thos. Hunter and Mr. H. Pearmain in connection with this work.

The **PRESIDENT** said the salt produced was a very handsome one. He could not quite follow the latter part of the paper, which stated that mercuric chloride would precipitate the salt he referred to from citrate of caffeine as well as caffeine, because he believed they were pretty much agreed now that citrate of caffeine did not really exist as a chemical compound, and that most citrate of caffeine was nothing more than caffeine crystallized in a citrate solution. The Pharmacopœia described citrate of caffeine and directed it to be made in a certain way, but it was not a definite chemical compound.

Mr. **MARTINDALE** said mercuric chloride formed double salts with many alkaloids. Some years ago he published a note on a hypodermic injection made with mercuric chloride, which was ordered in combination with morphia to relieve the pain. It precipitated the morphia but a little glycerine held it in solution. The precipitation, therefore, would not identify caffeine more than a number of alkaloids.

Mr. J. C. **UMNEY** said that solution of iodide of potassium and mercuric chloride did not precipitate caffeine from solution. It was the only alkaloid he believed that it did not precipitate with that reagent.

Mr. R. H. **DAVIES** said he entirely agreed with the President that citrate of caffeine was not a definite chemical compound. He alluded to it merely to indicate that in respect to the different bodies, caffeine and citrate of caffeine, both well known to pharmacists, this particular reagent, mercuric chloride, acted as a test for caffeine as well in the one case as in the other. It was true that mercuric chloride was a very general reagent for alkaloids, but he was not aware that with any other alkaloid it would give a similar compound or anything which would be mistaken for that obtained with caffeine. If the crystals were examined in the way described, by putting some into hot water, and permitting them to recrystallize, the whole behaviour was so distinctive that he was not aware that any such compound was produced with any other alkaloid, although he knew that as a precipitant of alkaloids mercuric chloride had been known for a long time. It was true, as Mr. Umney said, caffeine was not precipitated by Mayer's reagent, and as far as he was aware, it was almost the only alkaloid which was not; but by many people caffeine was hardly regarded as an alkaloid, as it gave no alkaline reaction to ordinary litmus. A singular thing about this compound was, that if one added iodide of potassium to its aqueous solution the mercuric iodide at first produced, on dissolving in the excess of potassium iodide did not yield a clear solution; but one having a somewhat similar appearance to that usually caused by adding Mayer's reagent to other alkaloidal solutions. He had not been able to get a large quantity of that precipitate, or he should like to have ascertained whether its composition was at all analogous to that of the precipitate usually caused by Mayer's reagent.

The next paper was entitled—

A Comparative Examination of the Tests for Methylated Spirit.

BY E. J. MILLARD AND A. CAMPBELL STARK,

Pharmaceutical Chemists.

Some time ago, whilst trying a newly proposed test for methylated spirit, we were struck by the fact that no reliable data could be found as to the limits of the tests already in use, nor could we obtain any definite information as to which of the known tests had been found to be the most delicate and satisfactory. It seemed to us, therefore, that a comparative examination of the tests for methylated spirit, with a view to deciding, not only the relative reliability of the various methods, but also their respective suitability for pharmaceutical testing, would be useful.

Our inquiry was also extended to the conditions resulting from the use of methylated spirit in making certain pharmaceutical preparations; but the time at our disposal was insufficient to fully carry out the necessary work in this part of the subject, and we hope to communicate it on a future occasion.

Methylated spirit, as prepared under the supervision of the excise officers, consists of a mixture of 1 part of wood spirit and 9 parts of spirit of wine. At one time the excise used to supply the wood spirit for methylating purposes, but now they are satisfied with taking samples of the wood spirit to be used, and examining them to see if they meet the requirements of the regulations. This examination chiefly consists in ascertaining the boiling point (which should be near that of the spirit of wine used), acidity, specific gravity, miscibility with water, etc. The proportion of the chief ingredients always present in wood spirit is disregarded. If the sample of wood spirit is found to be too highly rectified, the methylator is warned that he uses it for methylating at his own risk. The tests in use may be divided into two groups, those depending on the presence of acetone, invariably present in wood spirit, and those depending on the presence of methyl alcohol.

The strength of the spirit we employed in the comparative experiments made were 0·5, 1, 2 and 5 per cent. of wood spirit. The wood spirit employed we used in the form of methylated spirit, and this we considered as containing 10 per cent. of wood spirit. The same spirit was of course used throughout the whole of the experiments. The spirit employed for the dilution of the methylated spirit (except in the case of Riche and Bardy's test) was of rectified spirit strength, and we ascertained that it contained no more than the trace of aldehyde and other reducing bodies permitted by the British Pharmacopœia.

The following are the tests examined by us with a summary of results:—

No. 1. This test, proposed by Professor J. Emerson Reynolds, depends upon the presence of acetone, and the formation with it, under the condition described, of the aceto-mercuric compound—$2\,((CH_3)_2CO)(HgO)_3$.[*]

The following is an outline of the process for applying the test.[†]

200 c.c. of the spirit are taken, and 50 c.c. rapidly distilled off. The distillate mixed with an equal bulk of water, a few c.c. of potassium hydrate solution added, and the mixture slightly warmed. Solution of mercuric chloride is now cautiously added, the mixture (still alkaline) agitated and filtered clear. Much of the alcohol is allowed to evaporate slowly off and the residue divided into two portions (*a* and *b*). (*a*) Violently boiled for a few minutes, when if acetone be present, a yellowish white, gelatinous precipitate suddenly makes its appearance. (*b*) Dilute acetic acid added in excess produces the same kind of precipitate.

The following were the experiments tried by us with this test on distillates containing the percentage of wood spirit stated.

(1) Distillate containing 0·5 per cent. wood spirit. (*a*) No distinct precipitate was produced. (*b*) Only faint opalescence on the addition of acetic acid.

(2) 1 per cent. of wood spirit. No precipitate was obtained on boiling (*a*). On the addition of dilute acetic acid a slight precipitate was produced with (*b*).

(3) 2 per cent. of wood spirit, A precipitate was obtained on boiling (*a*) and also on the addition of dilute acetic acid to (*b*).

(4) Blank experiment with rectified spirit gave a faint opalescence on the addition of dilute acetic acid to (*b*). No precipitate was formed on boiling (*a*).

We conclude that the working limit of this test is reached with the presence of 2 per cent. of wood spirit in the distillate, for in view of the opalescence obtained with rectified spirit alone, on the addition of acetic acid, the test can not be depended upon, unless the precipitate on boiling is also produced.

No. 2. Caseneuve's test.—This test depends upon the reducing action of acetone, and other bodies present in wood spirit on solution of permanganate of potassium.

Contrary to our expectations, we have found this test applied in the manner described below, to be both delicate and reliable.

The method we adopted, somewhat modified from that given by the author of the test, was as follows:—50 c.c. of the sample of methylated mixture were taken and distilled. The first 20 c.c. were collected separately, and the remainder in 5 portions of 5 c.c. each.

·5 c.c. of a solution of permanganate of potassium (of the strength of 5 grams to a litre of distilled water) was placed in each of 5 clean test tubes. To one of these was added each successive 5 c.c. of the distillate as it came over and the colour and appearance of a precipitate carefully noted.

The first distillate of 20 c.c. received 2 c.c. of permanganate solution.

By this method so small a quantity as ·5 per cent. of wood spirit, equal to 5 per cent. of methylated, can be easily detected in a suspected sample, the purple colour of the permanganate changing instantly to red. The effect of the same quantity of permanganate solution on rectified spirit, of known purity, should be observed at the same time for comparison.

The change of colour is followed, sooner or later by a precipitate, and we have endeavoured to render the test more exact, by observing the time required for the purple colour to change and for the precipitate to make its appearance. From these two data may be inferred approximately the proportion of wood spirit present.

The following table embodies the results of our experiments with Cazeneuve's test:—

The limits of the test appear to be reached with the presence of ·5 per cent. of wood spirit.

The vertical columns of the table given show that the time taken until the precipitate begins to appear, depends to a certain extent upon the proportion of wood spirit present in the sample tested. The precipitate is very fine, and is followed by turbidity, the whole solution turning a dark brown colour. If wood

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[*] Emerson Reynolds 'Experimental Chemistry,' part iv., p. 105.

[†] This and the following three tests are taken from Allen's 'Commercial Organic Analysis,' vol. i., p. 50.

Fractions.	1. (20 c.c.).	2. (5 c.c.).	3. (5 c.c.).	4. (5 c.c.).	5. (5 c.c.).	6. (5 c.c.).
Rectified spirit.	purple for 1 min. ppt. in 2 mins.	purple 1½ min. ppt. in 4 mins.	purple 1 min. ppt. in 4 mins.	purple 1 min. ppt. in 3 mins.	purple 1 min. ppt. in 2 mins.	as no. 5.
0·5 per cent. wood spirit.	red at once. ppt. in 2 mins.	purple ½ min. ppt. in 2 mins.	as no. 2.	purple ½ min. ppt. in 2 mins.	as no. 4.	red at once. ppt. in 3 mins.
1 per cent. wood spirit.	red at once. ppt. in 1½ min.	red at once. ppt. in 2 mins.	red at once. ppt. in 1½ min.	as no. 3.	red at once. ppt. in 2 mins.	as no. 5.
2 per cent. wood spirit.	red at once. ppt. in 1 min.	red at once. ppt. in 1½ min.	red at once. ppt. in 1 min.	as no. 3.	as no. 3.	red at once. ppt. in 2 mins.
5 per cent. wood spirit.	red at once. ppt. in 1 min.	red at once. ppt. in 1½ min.	red at once. ppt. in 1 min.	as no. 3.	as no. 3.	as no. 3.

spirit be present, the colour of the permanganate is, it will be seen, speedily changed by *all* the fractions. If aldehyde be the only contaminant, the first fraction of 20 c.c. will act upon the permanganate at once, and the succeeding fractions less and less in the order in which they are collected.

No. 3. The test proposed by MM. Riche and Bardy belongs to the second group of tests, it depends upon the presence of methyl alcohol, and the formation with it of methyl aniline violet.

It is applied in the following manner:—10 c.c. of the sample of spirit (rectified if necessary, over carbonate of potassium) are taken and mixed with 2 grams of amorphous phosphorus and 15 grams of iodine. The mixture is distilled, from a water bath, into 30 c.c. of water. Iodides of methyl and ethyl distil over, and settle to the bottom of the water, in an oily layer. This is separated and mixed with 5 c.c. of aniline. This mixture should be gently warmed; we have never found it necessary to moderate the action (as recommended by the authors) by placing the flask in water. After standing one hour, the aniline compound is boiled with water and solution of caustic soda added; an oily layer now rises to the top of the liquid (usually to the amount of 7 to 8 c.c.). One cubic centimetre of this is taken and intimately mixed with an oxidizing mixture of, sand 100, chloride of sodium 2 and cupric nitrate 3 parts. This mixture is placed in an open tube and heated at 90° C. for 8 or 10 hours. The dried product is then exhausted with 100 c.c. of warm alcohol (we have found methylated spirit to answer perfectly) and filtered.

If *no* methyl alcohol be present the resulting liquid is red, but if 1 per cent. of methyl alcohol be present the liquid has a distinct violet tinge. This test was tried upon all the strengths of spirit used by us, including pure alcohol, and we exhibit tubes containing the resulting liquid in each.

1. 0·5 per cent. wood spirit. This liquid is hardly distinguishable from that of pure alcohol, but on diluting largely with water a violet colour is perceptible.

2. 1 per cent. wood spirit. This liquid has a distinct violet colour.

3. 2 per cent. wood spirit. The violet colour is more pronounced.

4. 5 per cent. wood spirit. The violet colour, although not of a deeper tint than that with 2 per cent., is yet of a more brilliant hue.

The colours of the above are best seen comparatively by placing a drop of each liquid on a piece of white filter paper, the difference in hue is then very noticeable.

On diluting each liquid with 1600 times its volume of water and placing a piece of floss silk therein and boiling, the silk becomes dyed a more or less deep shade of violet, according to the amount of methyl alcohol present. We exhibit samples of silk dyed in this manner.

It will be seen that the difference between silk dyed with the liquid from ·5 per cent. wood spirit mixture and that dyed with the liquid from pure alcohol is recognizable.

It has been noticed by one of us* that aniline heated with the sand mixture produces a solution having a somewhat violet tint. The difference between this colour, however, and that produced by ·5 per cent. wood spirit mixture is too apparent to cause confusion.

We conclude that Riche and Bardy's test is both delicate and reliable, and that by it the presence of ·5 per cent. wood spirit can be satisfactorily proved. But the process for its application, requiring, as it does, twelve hours constant attention and some considerable outlay, is far from suited for the use of the ordinary pharmacist.

We were induced to devote especial attention to it, as it is stated to be the test applied by the Somerset House authorities to suspected preparations.

No. 4. Process devised by J. T. Miller.

The method depends on the presence of methyl alcohol and its oxidation to formic acid.

It is thus applied:—

Three grams of potassium bichromate and 2·5 c.c. of sulphuric acid are mixed with 25 c.c. of water and 3 to 4 c.c. of the suspected spirit added. The mixture is allowed to stand for fifteen minutes and distilled; 25 c.c. are collected, treated with a very slight excess of sodium carbonate, boiled down to 10 c.c., and rendered feebly acid with acetic acid; ·1 gram of nitrate of silver dissolved in 3 c.c. of water is now added, and the whole gently heated for two or three minutes. If methylic alcohol be present a copious precipitate of dark brown or black metallic silver is formed and a film of silver is produced on the side of the tube.

Applied to the following strengths of wood spirit mixtures:—

(*a*) ·5 per cent. wood spirit yielded a liquid which darkened somewhat on the addition of the silver solution, and after prolonged heating precipitated, no trace of a mirror reaction being formed.

Rectified spirit yielded an exactly similar result.

(*b*) 1 per cent. wood spirit gave also no mirror reaction, but the amount of precipitate of reduced silver was somewhat larger.

(*c*) 2 per cent. wood spirit gave a slight but distinct mirror reaction and a copious precipitate.

We conclude that the test is only satisfactory on methylated mixtures containing not less than 2 per cent. wood spirit, and that nothing short of a distinct mirror reaction can be regarded as conclusive.

It will sometimes be noticed that on the addition of the nitrate of silver solution a reddish precipitate is formed. This we believe to be due to chromic acid passing over with the acetic and formic acid formed. It is usually soluble on warming, and does not interfere with the working of the test.

In applying the test to tinctures or liquids containing fixed matter, the spirit is distilled off and the test applied to the distillate.

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* A. C. S.

No. 5. A test has been proposed by O. Hehner[*] depending upon the reduction of bichromate of potassium by the products of the oxidation of methyl alcohol present in wood spirit, and the subsequent estimation of the unreduced bichromate by iron solution.

We have not yet been able to try this upon a sufficient number of methylated mixtures to arrive at a comparative result of any value, but we hope to do so at a future date.

The main results of our experiments may be summed up by statements made in the remarks on Cazeneuve's test. Although, as stated, we consider this test upon the whole to be the most convenient and delicate for the pharmacist's purpose, we do not regard it as entirely satisfactory. It is obvious that a test depending upon the presence of a body or bodies present in wood spirit in varying proportions cannot be regarded as absolutely dependable. We trust that some reliable and convenient test, less tedious than Riche and Bardy's or Hehner's, and depending upon the presence of methyl alcohol, will before long be devised. Our object has been to summarize the present state of knowledge on the matter, and to assist the pharmacist in choosing from a multitude of councillors.

The use of methylated spirit in the manufacture of certain pharmaceutical preparations has, owing to the permissive action of the revenue authorities, increased of late years. From these preparations the spirit is finally removed by heat, and one of the conditions upon which permission to use it is granted, is, that no appreciable trace shall be left in the finished product.

In a recent issue of a trade journal,[†] Mr. F. W. Fletcher, F.C.S., advocated the removal of this permission on the ground that the finished products often contain sufficient methylated spirit to be recognized by merely physical tests. We have not found a preparation presenting this characteristic, but it could only be due to insufficient care in the manufacture.

In pursuance of the second part of our investigation (which is at present incomplete) we have prepared extracts from the same drug with methylated and with rectified spirits, and after careful distillation of solutions of them in rectified spirit, have examined them by all the foregoing tests. In no case did we find an appreciable difference between the two distillates.

By distilling *twice* alcoholic solutions of the two extracts we obtained with Cazeneuve's test, on applying it to the two distillates, a very slight difference between the two reactions. Thus the appearance of the red colour, and its succeeding precipitate, occurs in rather less time with the distillates from the methylated extract, than with that from the rectified. The difference however is so slight that a more extended examination is required before we can attribute it to the difference of the menstruum used in making the two extracts. Whatever it may be due to, it is less than that shown by the presence of ·5 per cent. of wood spirit, and this we consider to be the limit of Cazeneuve's test, moreover the distillates contained appreciable quantities of volatile oil. (An attempt was made to remove this, by the modification suggested by Habermann[‡] but the results were not satisfactory.)

Mr. Fletcher also makes the statement that the percentage of loss in making extracts is not greater than that in making tinctures; here we feel obliged to differ considerably. Our opinion is based upon the experience of one of us in the manufacture of both classes of preparations. We have found the loss in making extracts, under the most favourable conditions possible, to be rarely less than 10 per cent., whilst the loss in the manufacture of tinctures, by evaporation and the quantity left in the marc, after the application of hydraulic pressure, is never more than 5 or 6 per cent. and in some cases considerably less.

In confirmation of this, we may mention that the recent concession regarding the drawback upon medicinal tinctures for export made by the Inland Revenue has fixed the "loss in manufacture" of tinctures and fluid extracts at the uniform rate of 4 per cent.

These considerations are, we believe, convincing arguments in favour of continuing the permission, provided that the final product contains no trace of the objectionable features of the methylated spirit. That this can be insured, with adequate care, is known by every manufacturer; indeed, if it were not so, we are confident that the practice would be discontinued spontaneously. The preparations, when properly performed, are in all respects identical with those made with rectified spirit, and some slight advantage is derived from the fact that methylated spirit has alcoholic power 60 over proof, against the 56 over proof of rectified spirit.

In connection with this subject we would draw attention to the possibility of a complete, or partial, substitution for wood spirit for denaturing alcohol. An Act passed through Parliament this year confers power on the revenue authorities to alter the ingredients used for methylation. By 53 Vict. ch. 8, part 8, sec. 32. (1) "The substance mixed with spirits for the purpose of methylation may be *any combination of substances* approved for the purpose by the Commissioners, and the term "methylated spirit" in the Spirits Act, 1880, shall, in lieu of the meaning thereby assigned to it, mean spirits mixed with *any substance or combination of substances* approved for the purpose of methylation by the Commissioners."

The principal substance which has been recommended as a partial substitute for wood spirit in denaturing alcohol is pyridine. It has been extensively employed in Germany, where the method at present in force is the addition of 2 per cent. of wood spirit and ·5 per cent. of pyridine. The same method has been adopted in Austro-Hungary and Switzerland. We exhibit a sample of this mixture and of others in use at various times. The high boiling point of pyridine and its poisonous nature would, in our opinion, render methylated spirit containing it extremely unsuitable for the purposes it is legitimately applied to in English pharmacy.

The PRESIDENT then drew attention to the tubes upon the table representing the colours referred to, which showed the great delicacy of the test.

Mr. LINFORD said there was a test proposed in the new Dutch Pharmacopœia for methylated spirit used in making sweet spirit of nitre. He had made some sweet spirit of nitre from methylated spirit to try this test. The methylated spirit only contained 10 per cent. of wood naphtha, but he found, on distilling the spirit of nitre from that, 5 per cent. mixed with ordinary spirit of nitre, which would be equivalent to only ½ per cent. of wood naphtha, was easily detectable by this test. The Dutch used iodine and ammonia, and produced iodoform, and the curious thing was that this should be produced when methylated spirit was employed, but it was not when alcohol was used in the same way. He could not quite understand the reason, but it was a very reliable test. If there were not more than 5 per cent. of methylated spirit of nitre in the mixture, it had to be allowed to stand two hours before a visible precipitate of iodoform was obtained, but the smell could be detected the moment mixture was effected, and there was no sign of it when the pure spirit was used.

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[*] *Analyst*, xii., 23–29.

[†] *Chemist and Druggist*, vol. xxxvi., p. 742.

[‡] *Zeitschrift für Analyt. Chem.*, xxvii., 663.

The **President** said this was a fact well worth knowing, and he was quite sure the authorities at Somerset House would be glad to know it also. They were always on the look-out for anything which might prevent a loss to the Revenue, and no doubt this test would prove a greater weapon in their hands.

The Conference then adjourned.

Wednesday, September 3.

The **President** took the chair at 10 o'clock, and said the first business was to repair an omission which had been made on the previous day. The report of the Executive Committee and financial statement had been read, but had not been formally adopted.

Mr. **Ward** (Sheffield), moved—

> "That the Report and Financial Statement be received, adopted, and printed in the Transactions."

He said it was highly gratifying to find they were in such a satisfactory condition financially, and especially that the affairs were conducted so economically and yet so efficiently.

Mr. **West** (Bradford) had great pleasure in seconding the motion. He thought more applications ought to be made to the fund for the purposes of research, and hoped some members would apply for funds for this purpose.

The **President** in putting the motion said he was quite sure the Executive would agree with this remark. They were only anxious to apply the funds, if suitable applicants would make use of them.

The motion was then carried unanimously.

The following papers were then read:—

OROXYLUM INDICUM, VENT.

BY E. M. HOLMES, F.L.S.

About two years since, Dr. W. Dymock, of Bombay, sent me several Indian drugs in quantity, for the purpose of having them submitted to a chemical examination in this country. So little is known of the chemistry of many of the native remedies employed in India, and there are so few workers in this field in that country, that Dr. Dymock was desirous of obtaining as much information as possible concerning them for his forthcoming 'Pharmacographia Indica.'

Mr. W. A. H. Naylor having already so successfully investigated the active principle of *Hymenodictyon excelsum*, and having kindly consented to investigate others when opportunity offered, I handed to him the *Oroxylum indicum* as being one of the most likely to yield interesting results, inasmuch as it belongs to a natural order of plant, of which the chemical and physiological properties are but little known, viz., Bignoniaceæ. The other plants of this natural order that are employed in medicine in India are six in number, viz., *Heterophragma Roxburghii*, D.C.; *Stereocarpum xylocarpum*, Wight., of which the tar obtained by the destructive distillation of the wood is used in scaly skin diseases; *Stereospermum chelonioides*, D.C., the juice of which, mixed with lime juice, is employed in maniacal cases, and an infusion of the pleasant-tasted root and leaves as a cooling drink in fevers, the leaves of the allied species *S. suaveolens*, D.C., which is often confounded with it, being sometimes similarly used; and lastly, *Dolichandrone falcata*, Seem., which has the reputation of being used to procure abortion. Of all these the active chemical constituents are unknown. *Oroxylum indicum*, being a drug of considerable importance in Hindoo medicine, seemed the most likely to repay the trouble of a chemical investigation, more particularly since it has been found by Dr. Evers to possess a definite therapeutical action. He treated twenty-eight cases of acute rheumatism with the drug, employing the bark also externally in the form of a bath. The dose of the powder given was 5 to 15 grains, or an ounce of the infusion (one part to ten of boiling water) three times a day. Combined with opium it formed a much more powerful sudorific than the compound powder of ipecacuanha. He did not find it to possess any febrifuge property.

The bark is about two lines thick, the external portion consisting of a soft spongy cork of a fawn or light brown colour, easily indented by the nail and striated longitudinally. The internal layer or liber is fibrous and of a greenish yellow tint. It has no odour. According to Dr. Dymock the bark is faintly bitter and a little acrid. In the specimen sent the acridity is perceptible but the bitterness scarcely so. He remarks that on placing a section under the microscope in a little water, the whole field is seen to be filled with delicate needle-shaped crystals which have escaped from the cut cells of the parenchyma. These crystals can be seen *in situ* in the cells which remain entire. These crystals I have not been able to detect, and the warty character of the bark mentioned by Dr. Dymock is not evident in the specimens I received.

With the exception of the description of the bark given above the information given in these introductory remarks is derived from Dr. Dymock's 'Materia Medica of Western India.'

The bark is considered to be astringent and tonic and to be useful in diarrhœa and dysentery. It is much used in Bombay as an external remedy in veterinary practice as an application to the sore backs of bullocks. For this purpose it is usually mixed with turmeric. The juice expressed from the roasted bark is mixed with mucheras (the astringent exudation from the trunk of *Bombax malabaricum*) for diarrhœa and dysentery.

Dr. Evers states that the Gonds employ a decoction of the bark as a discutient application to rheumatic swellings. He himself has found the powder and infusion of the bark to be most powerfully diaphoretic, and to possess in addition slight anodyne properties.

CHEMICAL EXAMINATION OF THE BARK OF OROXYLUM INDICUM.

BY W. A. H. NAYLOR, F.I.C., F.C.S., AND E. M. CHAPLIN, F.C.S.

A. One pound of the bark reduced to fine powder was percolated to exhaustion with cold petroleum ether. The ether was distilled off, and the residue, which weighed about 1·8 gram, possessed the characters of a soft greenish-brown fat, having an acid reaction and a slightly acrid taste. It was treated successively with ether and proof spirit; the former removed vegetable wax, which was subsequently identified as such after re-solution in limited quantities of ether and separation therefrom. The latter on evaporation gave a brownish-yellow residue small in quantity and crystalline. When further purified by extraction with ether and the ethereal residue by benzol it was golden yellow, unctuous to the touch and pronouncedly acrid. Under the microscope it presented the appearance of long, wavy, branching crystals, which dissolved readily in alcohol, choroform ether, petroleum ether and benzol.

B. The marc was next percolated with cold ether. After distilling off the greater portion of the ether, and allowing the remainder to evaporate spontaneously a yellow mass studded with minute interlacing crystals was obtained, which when air-dried weighed about 4 grams. This product was treated with boiling proof spirit and filtered while hot; on cooling small yellow crystals fell out of solution. When quite cold the crop of crystals was collected and subjected to the action of boiling petroleum ether until freed from every trace of fat. It was then crystallized from boiling proof spirit until it had a constant melting point, and was no longer contaminated with uncrystallizable matter. The resulting crystals were dried under the receiver of an air-pump, and when constant weighed 0·9 gram. They were of a lemon yellow colour, about ⅛ inch in length, and melted at 228·5°—229° C. Alcohol, ether, glacial acetic acid and hot benzol dissolved them readily, but they were practically insoluble in water hot or cold. The following reactions in connection with this interesting body have been noted, of which the most striking is its behaviour with the caustic alkalies. A minute quantity brought into contact with one drop of a weak solution of sodium potassium or ammonium hydrates causes it to assume immediately a cherry-red colour, which quickly passes into brick-red and olive-green.

Owing to the insolubility of the crystals in water a proof spirit solution was used in applying the following tests.

1. A solution of silver nitrate in proof spirit produced a bluish-black colour immediately, and after the liquid had stood for a few minutes black particles of reduced silver were precipitated.

2. A solution of neutral acetate of lead in proof spirit gave a light-red bulky precipitate insoluble in boiling acetic acid.

3. Lime water imparted an orange colour, which quickly changed to olive green, followed by a precipitate of the same colour.

4. An aqueous solution of sulphate of copper gave a golden yellow colour, quickly followed by a dirty brown precipitate, the supernatant liquid being distinctly greenish.

5. Solution of ferric chloride (acid) produced a brownish-red colour, which, in a few minutes, turned smoke-colour.

6. Solution of subacetate of lead gave a golden-yellow precipitate.

7. An aqueous solution of mercuric chloride produced a white precipitate.

8. An aqueous solution of permanganate of potash, acidified with sulphuric acid, was *instantly* decolorized.

9. A solution of the crystals in proof spirit did not reduce Fehling.

We have attempted to hydrolyse this body, by subjecting a strong alcoholic solution to the prolonged action of 10 per cent. solution of sulphuric acid at a boiling temperature, but without success.

We have also inquired into its nature and centesimal composition, but the results so far obtained are not sufficiently conclusive to be incorporated in this paper. We hope to be able to publish shortly a supplementary note dealing with points in process of investigation. Meanwhile, we propose that this interesting principle be designated *Oroxylin*.

C. The marc left after exhaustion with petroleum spirit and ether was percolated with cold absolute alcohol. The residue resulting from the distillation of the spirit was treated with cold proof spirit, which took up the greater part of it. The insoluble portion dissolved readily in boiling proof spirit, and, on examination, proved to be largely composed of the yellow crystalline body oroxylin. The cold proof spirit solution of the alcoholic residue was evaporated to dryness and the extract treated with water and filtered. The filtrate was treated successively with neutral and basic acetate of lead, and the precipitates after washing were suspended in water, decomposed by a current of sulphuretted hydrogen and the resultant plumbic sulphide removed by filtration. Sulphuretted hydrogen was also passed through the filtrate from the basic or plumbic acetate and the precipitated lead sulphide removed by filtration.

The three liquids thus obtained, which for convenience may be denominated i., ii., iii., were then evaporated down and the respective residues examined.

(i.) It was dissolved in the smallest quantity possible of cold water and diluted with many times its volume of alcohol. After setting aside for twenty-four hours a precipitate fell, giving the general characters of parapectin. The supernatant liquid on evaporation left a scaly residue, astringent to the taste, and perfectly soluble in water. Its aqueous solution reduced Fehling and gave a copious bluish-black precipitate with ferric chloride. Lime-water produced a bright golden-yellow colour, followed by a reddish-brown precipitate. From the tannins proper it differed in that it was not precipitated by solution of gelatine.

(ii.) This residue apparently consisted of pectin intermixed with small portions of No. iii.

(iii.) This was a dark uncrystallizable treacly-looking residue, which imparted to the palate a feeble sensation of sweetness. It was very soluble in water and reduced Fehling's solution abundantly. A strong aqueous solution was precipitated by absolute alcohol.

D. The marc from the alcoholic extraction was finally percolated to exhaustion with cold water. The liquor was evaporated down and the extract obtained taken up with hot water. A considerable amount of albuminous matter, which remained insoluble, was removed by filtration. The filtrate was treated successively with neutral and subacetate of lead and the precipitates decomposed in the same manner as described under C. The three liquids obtained, i., ii., iii., were evaporated down.

(i.) This residue was the smallest of the three. After standing for a considerable time some crystals were deposited, which on examination proved to be citric acid.

(ii.) Nothing of a crystalline nature was found in this residue. It appeared to consist chiefly of extractive matter.

(iii.) This residue after treatment with alcohol had the same characters and possessed the same properties as C iii. It was not further examined.

The result of our examination of this bark may be summarized by stating the different principles which we have found—(1) crystalline fat; (2) wax; (3) acrid principle; (4) oroxylin; (5) chlorophyll; (6) pectinous substances; (7) Fehling-reducing principle; (8) astringent principle; (9) citric acid; (10) extractive matter.

The PRESIDENT said the Conference was much indebted to Mr. Holmes for bringing forward the materia medica portion of this subject, and also to Mr. Naylor and Mr. Chaplin for examining the drug chemically. The subject could hardly be discussed at present, but he would point out that the latter paper represented a great deal more work than appeared on the surface, and no doubt it would be carefully studied when it appeared in print.

Mr. GROVES said he did not understand to what class of bodies oroxylin belonged. Was it identified sufficiently to classify amongst a group of similar bodies?

Mr. NAYLOR said it appeared to have many of the characters of a quinone derivative. The authors had treated it with zinc dust, but were not altogether satisfied with their experiments, and therefore deferred stating the results until after a more complete examination. They were however inclined to think that it was the active principle.

Mr. MACEWAN said he understood that the bark had an acid as well as an acrid taste. Was the acidity attributed to the citric acid?

Mr. NAYLOR said he was scarcely able to answer the question. It did not appear to him to have a particularly acid taste. They found a small amount of citric acid certainly, but they did not lay much stress on the acidity.

Mr. MACEWAN said it might be more acid in the fresh condition than in the dry.

The next paper read was on—

Hydrargyri Iodidum Viride for Medicinal Use.

BY WILLIAM MARTINDALE AND W. A. SALTER.

Pharmaceutically, on account of its instability, this preparation has obtained a bad name. It has therefore been expunged from both the last British and German Pharmacopœias. As there is still a considerable demand for it for medicinal use our object has been to ascertain how far this stigma is deserved, and, if possible, to find a remedy for it. It will be remembered that the process of the B.P., 1867, yielded an uncertain product. The proportions of iodine and mercury ordered to be used are almost the exact combining proportions of the two elements to form (theoretically) mercurous iodide, there being only ·0067 per cent. excess of iodine ordered.

In the U.S. and late German Pharmacopœias the proportions are reversed, so that a slight excess (1·6 per cent.) of mercury is present. The French Codex employs still more mercury (5·93 per cent. excess). In all cases the two elements are simply directed to be moistened with spirit and triturated till they have combined. The U.S. and German Pharmacopœias and French Codex order the product to be washed with alcohol and dried with exclusion of light.

The B.P., 1867, describes it as a dull green powder, insoluble in water, which darkens upon exposure to light, and states that when shaken with ether nothing is dissolved. This indicates the absence of mercuric iodide, which, however, is seldom completely absent, and constitutes its danger, as it is much more irritating than mercurous iodide. On exposure to light the green iodide darkens on the surface, becoming reduced to metallic mercury, and red iodide is formed with probably traces of the two oxides. In place of being dull green, as officially described, in commerce it is more frequently met with as a dingy yellow powder, owing, it is said, to the partial formation of an intermediate compound, the mercuroso-mercuric iodide, HgI,HgI_2. Mr. C. H. Wood in a paper (*Pharm. Journ.*, 1868, p. 502) endeavoured to prove that in place of the mercurous iodide being a green preparation it should be, as described in the last London Pharmacopœia, a dingy yellow. Having weighed his evidence we hardly think he has proved his case, and as the *green* iodide is in request we think it should be supplied, and the colour of the chemically pure mercurous iodide left to be further investigated by chemists.

We have examined several samples with the following results:—

1. Physical characters—

A, B, B_1 } These are of a uniform dull yellowish-green colour, almost indistinguishable from each other; B_1 is slightly the darkest.

C Dull yellow, with slight tint of green.

D Greyish-green colour.

E Dull yellowish-green.

F Dull yellow, with slight tint of green, like C.

2. As to the amount of mercuric iodide contained in them. An equal quantity of each was placed on a filter and well washed with pure ether. The washings on evaporation yielded per cent. as shown in the table below.

3. As to the amount of mercurous iodide contained in the samples, after washing with ether, drying, allowing them to remain in contact with granulated zinc and diluted acetic acid, precipitating with nitrate of silver and washing, carefully drying and weighing the precipitate without exposure to light, they yielded iodide of silver equivalent to percentages of HgI, as follows:—

A	81·6 of HgI,	·1 of HgI_2
B	83·07 „	·24 „
C	91·62 „	·2 „
D	66·65 „	·26 „
E	85·78 „	·34 „

We endeavoured to estimate the amount of mercury (combined and free) in them by Mr. Wood's process of dissolving each sample in hydrochloric acid and chlorate of potassium, evaporating the solution nearly to dryness, diluting, precipitating with stannous chloride and collecting and weighing the precipitated metallic mercury. It was found, however, that discordant results were obtained, and we consider that without estimating the mercury by distillation accurate results are not to be obtained.

We found the samples A, B, B_1, D, and E all contained an excess of free mercury, D to the extent of over 30 per cent. In regard to A, B, B_1 and D we were, in fact, aware of this before we commenced our experiments. The sample D, although labelled *hydrargyri iodidum viride*, B.P., 1867, we had found in forming into a pill mass, say with extract of gentian as an excipient, that the free mercury separated from it in globules distinctly visible to the naked eye.

The samples A, B and B_1 were of our own manufacture; A was prepared on October 13, 1887, B on May 19, 1890, and B_1 on August 12, 1890. These have been prepared to somewhat approximate to the article obtained from the makers of the sample D, who had been in the habit of supplying us with a fairly stable preparation, although we discovered it contained a large excess of mercury.

C and D were also of English manufacture, and E German. F was prepared by ourselves by the B.P. 1867 process and proportions on August 12, 1890. It has decidedly a dingy yellow rather than a dull green colour.

We found none of these samples when heated with aniline to yield the magenta coloration which has been given as a test for the presence of mercuric iodide by W. Squire (Watts' 'Dictionary,' vol. iii., 904), notwithstanding that in each case traces were dissolved from them by ether.

M. Lefort (*L'Union Pharmaceutique*, xiv., p. 75, and *Pharm. Journ.*, 1873, p. 823) suggests a process of manufacturing mercurous iodide by the double decomposition of a mixed solution of mercurous acetate and pyrophosphate of sodium with a solution of iodide of potassium. We have not tried this process, because we have understood the product to be unstable; it is, we fear, too pure to be stable.

The samples A, B and B_1 have been prepared by using one-fourth or 25 per cent. more than the theoretical quantity of mercury required, and modifying the directions of the British Pharmacopœia, 1867, as follows:—

Take of—

Mercury, by weight	1¼ ounces.
Iodine	278 grains.
Rectified spirit . .	½ ounce, or a sufficiency.

Place the mercury in a porcelain mortar and pour over it 1 fluid drachm of the spirit. Add gradually the iodine and triturate constantly, adding occasionally a few drops more of the spirit to prevent overheating and the formation of red iodide of mercury. Continue the trituration until metallic globules are no longer visible, and the whole assumes an uniform green colour. The product should be dried in a dark room on filtering paper by simple exposure to the air, and preserved in an opaque bottle.

The trituration should be conducted without exposure to daylight, and in making the above quantity it should be continued for at least half an hour. During drying it is apt to become a little gritty; the preparation should therefore be lightly rubbed again to a fine powder. It is best prepared in small quantities, and it should, in fact, be a home-made preparation.

We see no advantage in the after-washing with alcohol, if an excess of mercury be present, and the preparation has been carefully made in the first instance. Theoretically, we consider that it is hardly possible for the red iodide to exist in the presence of such a definite excess of mercury as we recommend. The iodine should be very gradually added, as there is a greater tendency for the more stable mercuric, rather than the mercurous iodide to form; this may be noticed in the red colour the mixture is apt to assume while triturating it. In fact, if exactly equivalent quantities are manipulated, on account of the iodine offering more surface contact than the mercury, it is impossible to avoid the formation at first of a considerable quantity of the mercuric iodide, which has to be reduced to the mercurous state by continuous trituration. This imperfect formation of the green iodide rather than decomposition on keeping, will we think account for the appearance of particles of the red iodide sometimes visible in the commercial preparation when it is rubbed with a knife between a fold of paper.

In the preparation we suggest free mercury will exist to the extent of about 13·2 per. cent. in the finished product, which, after making allowance for the oxide contained in it fairly agrees with the experimental data resulting from the estimation of the combined iodine in the samples examined. No globules of free mercury can be seen in these samples, nor do they become visible even with a lens, when manipulated into pill masses. This is a definite excess of mercury, but not so much as exists in the commercial sample D, which contains an unwarrantable excess.

The samples are not pure. If the preparations were again made official this could be recognized, as is done in regard to several of the unstable preparations of iron. But we hold that a green iodide of mercury can be so prepared, and with reasonable care it can be kept sufficiently stable and uniform in appearance for use in medicine. It is green, and if kept excluded from light or in amber tinted bottles it is evergreen, and may be prepared free from all but a trace of mercuric iodide. Estimated as above, it should yield iodide of silver equal in amount to not less than 60 per cent. of the weight taken.

That the free mercury it contains is no detriment to the preparation, I give the opinion of two surgeons who treat diseases of the urinary organs, and who are in the habit of prescribing it. Mr. G. Buckston Browne says:—

"I have long found the green iodide of mercury very useful in the early treatment of syphilis, and, as you know, I have always been careful to have it *green*, not changed by exposure to light, simply because the red iodide is so irritating to the intestines. A little free mercury can do no harm."

Mr. Campbell Williams writes:—

"So far as I have used your preparation of the green iodide of mercury, with one exception, it seems to have been unirritating. I think it fair to state that in that instance the patient had partaken of fruit and beer. I have been in the habit of prescribing the old Hydrarg. Iod. Vir. (freshly made) whenever a rapid action was required. The free mercury in your preparation does not seem detrimental, and if stability can be thus guaranteed, you will have removed the great drawback to its use. You will see by prescriptions that I have used it in doses of ⅙, ¼, and ½ grain, combined with ¼ grain P. Opii. and grain i. Ext. Hæmatoxyli."

A few words about the dispensing of it. One prescriber orders it in pills containing ⅙ grain in each, and directs one, two or three to be taken three times a day, running up and down the scale as the patient requires the medicament. It is best massed into pills with sugar of milk, syrup and gum. The pills should be of a sap-green colour, which may be taken as a test of their quality. They may be coated with sandarach solution and should be sent out in amber tinted bottles.

The instability of this preparation, we think, has been overestimated, as the amount of mercuric or red iodide found in the worst sample examined is insignificant, and we therefore consider that it has been condemned without just cause, as the dose, 1 to 3 grains, in the last B.P. was misleading and much too large, ¼ to ½ grain being the dose usually given, and generally with good results. It is mild in action, and as a useful remedy we feel sure it will continue to be prescribed.

Mr. ABRAHAM (Liverpool) said the Conference was much indebted to Mr. Martindale for this paper. The green iodide of mercury was in regular demand, and it was rather difficult to comprehend why it was omitted from the Pharmacopœia. The fact that it had hitherto been somewhat varying in composition was the best reason for keeping it in, in order that a constant composition might be arrived at. If Mr. Martindale could show that by using an excess of mercury this constant composition could be obtained it would be a very valuable point. According to his recollection this preparation was originally introduced into the Dublin Pharmacopœia, where it was ordered to be made with absolute alcohol, not rectified spirit, and his father always considered it important to use absolute alcohol, which had at least this important advantage, that it was entirely dissipated during the trituration and no further drying was required.

Mr. GERRARD asked how long Mr. Martindale had kept this preparation. He understood him to speak of some having been prepared in August of the present year, which was but a short time to go by. Twelve months keeping must have a considerable influence upon it.

Mr. CRIPPS said the table indicated that the iodine was not so easily oxidized as they were apt to assume, but he would like to know if the authors had performed any experiments with a view of determining whether any oxidation took place after the pills were made, because the excipient introduced another factor, and possibly after a month some change might take place. A pill he had just broken was rather yellow in appearance, more so than he expected.

Dr. SYMES (Liverpool) supported the statement that mercurous iodide was very largely prescribed, and that those who prescribed it obtained very satisfactory results. It seemed to him that was a reason why it should not be omitted from the Pharmacopœia. If a more or less unstable or indefinite substance were in the Pharmacopœia its removal was not likely to make it more definite, and he was inclined to think this compound should again be replaced. He supported Mr. Martindale's statement that it should be made in small quantities, that it would not occupy a great length of time and they should not be too particular about absolute dryness. It should be excluded from air and light as quickly as possible. In trying to remove the mercuric iodide by washing, on one occasion he found that it was possible to go on washing it out continuously and that a little fresh mercuric iodide was formed in the mere washing and drying; therefore the attempt to remove every trace seemed hopeless. So long as a preparation could be obtained such as was described which, even if not very definite, like their old friend spirit of nitrous ether, was still a good thing, if the medical profession required it it was very desirable that it should be recognized, and a definite formula adopted for its preparation.

Mr. GROVES (Weymouth) had been surprised to hear such a small dose mentioned as one-sixth of a grain. He should have rather expected it to have some resemblance to calomel, which was usually given in a larger quantity. The question was what became of the mercurous iodide when it got into the stomach, and was exposed to the digestive ferments? was it converted into the per-iodide, or what became of it?

The **President** said the author had referred to the passage in his opening address with reference to the use of green iodide of mercury and grey powder, and he could only say that in his experience they were much less used than formerly, and it seemed to him that the green iodide was left out of the Pharmacopœia for the best of all reasons, namely, that it was an unstable preparation. What Mr. Martindale had stated pointed strongly to the conclusion that it was a very unstable preparation. Mr. Martindale said in one place "It was too pure to be stable." Again Mr. Symes said that even while the washing of the salt was going on mercuric iodide was being formed. Now surely if mercuric iodide was objectionable, and it was formed almost whilst you were looking at it, mercurous iodide could not be a reliable preparation to put into the hands of the physician, because although mercurous iodide was not a very potent preparation, mercuric iodide was both powerful and dangerous. He must therefore stand up for the former editor of the Pharmacopœia in saying he had very good reason for omitting from the last edition the green iodide of mercury, or as it was more properly described, the yellow iodide, which was the name formerly given to it in the German Pharmacopœia. Mr. Wood's experiments went to show that the preparation would sometimes contain as much as 28 per cent. of mercuric iodide, though he was bound to say he showed how it could be prepared to contain a very small quantity—5 per cent. or less. There was no doubt that in consequence of that paper, and the experiments which had been made, and the arguments used by Mr. Wood, and the result of the discussion, Professor Redwood, the reporter of the Pharmacopœia Committee, did leave out the green iodide from the next edition, and he thought a better case would have to be shown than had been shown yet to induce the present reporter, Professor Attfield, to recommend its re-adoption. At the same time he should be glad to hear any further remarks on the subject, and the Conference was exceedingly indebted to Mr. Martindale, because the fact remained that green iodide was still prescribed, and so was grey powder. But why had grey powder got into such bad repute? Simply because it was such an uncertain preparation. The amount of oxidation which might take place depended very much on the amount of trituration, the amount of moisture in the chalk, and so on. Sometimes a grey powder was produced of one strength, and sometimes of another. And this variation did not end with the production of the article, beyond which Mr. Martindale did not seem to have gone. Mr. Gerrard properly raised that point—what about the keeping properties of the powder? He had seen grey powder which contained such a large quantity of mercuric oxide as to be positively poisonous, and had heard of cases of grey powder being administered to children where it had proved poisonous. Grey powder was still prescribed for syphilis, but it was much less used than formerly as a medicine for children, solely on account of its variability and bad keeping power. The grey powder and green iodide of mercury were very much on all fours in these respects.

Dr. **Symes** asked if the President meant to suggest that pharmacists should dictate to the profession whether they should prescribe this remedy. His experience was limited to a certain area, but he dispensed the green iodide of mercury much more largely to-day than seven years ago, and, therefore, it might be assumed that the medical profession found it useful and got the desired results. Under these circumstances it was their duty to give the best preparation possible. He understood the President to say that it should be left out of the Pharmacopœia, and thus left less definite than it would be with a proper formula.

Mr. **Schacht** said the discussion led him to make a general remark which touched on extremely delicate ground, but still it was perhaps well that the observation should be made. There was no question in his mind that the aim of the pharmacist generally should be to produce the purest article he could, but he could not help thinking that now and then that principle might be stretched a trifle too far, so as to deprive themselves and others of valuable remedies, because they were not absolutely pure. He was encouraged to make this remark from the consideration that they very rarely in nature found a pure article. No one knew better than the chemist how extremely rare it was for nature to present them with an uncombined element, and that when two pure elements did occur together they would seldom react. He would take two familiar instances. Pure zinc was acted upon by dilute sulphuric acid with much less vigour than when less pure, and again it was said that phosphorus might be distilled in perfectly pure oxygen. He had never done that himself, but he believed it was a fact stated on excellent authority. If it were so—and there were special difficulties in the interaction of absolutely pure elements—why should it not be equally possible that even that remarkable chemistry which went on in the human body should not be at times a little more easily brought about by remedies which were not presented to it in the actual state of purity. This was no argument for careless manufacture, but it was as well to remember that they must not strain too far the notion that nothing could be useful, unless it were absolutely pure.

Mr. **Branson** said it was well to know that mercurous iodide in a state not fit to dispense could very soon be rendered so. It was the invariable practice in a firm with which he was formerly connected to test the mercurous iodide periodically. Mercuric iodide constantly reformed, although he could not confirm the statement that it formed during the process of washing, but it certainly did form if it were left for some little time.

Mr. **Kinninmont** desired to support Mr. Martindale in his idea of giving a formula for this preparation which should be definite, reliable and practicable. It did not much matter whether it was admitted into the Pharmacopœia or not, for he knew that many physicians had Mr. Martindale's book in their hands more frequently than the Pharmacopœia. He had been very much bothered for years back on the question whether green iodide of mercury should be green or yellow, and had gradually arrived at a process approaching that described, of always having an excess of mercury by which the colour was always greenish rather than yellow. It was no use telling medical men this was not a definite compound. He remembered once when he was a young man and rather critical pointing out to a medical man that a decomposition took place in certain powders which he ordered. His reply was—I dare say you are right chemically, but I always find that powder answer the purpose. That was unanswerable. It was not always a chemical compound the pharmacist wanted to produce, but something which would produce the therapeutic effect desired. That this article had kept its place for twenty-five years, and was invariably found reliable he could certify. He could also support Dr. Symes's experience about the mercuric iodide being formed in the process of washing, so much so that he found he could really bring the whole of it into the mercuric state, and after that he refrained from taking any definite quantity as the test for mercuric iodide. He was very glad that Mr. Martindale had brought forward this process, and he did not think it mattered much whether it was in the Pharmacopœia or not.

Mr. **Abraham** asked if the instability of a number of mercurial preparations, such as mercurical ointment and others, would induce the President to omit them from the Pharmacopœia. The argument that the green iodide, being so unstable, should be omitted applied equally to the ointment, the pill, and other preparations. The proper remedy was for the pharmacist to make these things himself in small quantities.

Mr. Conroy confirmed what had been said by Mr. Abraham, that the use of absolute alcohol gave a much better result; evaporation was much more rapid, and if the compound were put in a dark place directly it kept fairly well for some time. With regard to hydrargyrum cum cretâ, he thought that was injured if triturated for a long time, but the present mode of making it was by putting the two ingredients together in a closed bottle and shaking them by mechanical means, by which a much better result was produced.

Mr. Ward (Sheffield) said it was important to have some formula for this preparation, which in his own town was very extensively used. In canine treatment for cutaneous affections he had had as much as 4 ounces ordered in an ointment, and as that was made with lard it was very important that the colour should be stable. In one particular case a great dog fancier was most particular to have the ointment green. He said he had had it made up in other places where it had been yellow, and he often asked how it was that he got it green from him, whereas from other places it was yellow. He was glad that this preparation was likely to remain a stable colour, as it would at least prevent these sort of inquiries as to the different appearance of the same thing made up in different places.

Mr. Bottle said in his experience the green iodide of mercury had very much gone out of use, and he was glad of it, inasmuch as he thought it was one of the most unstable of preparations. Even with Mr. Martindale's care he ventured to say that the pill he had handed round contained mercuric iodide, judging by the colour. Dispensing was not all done at West End establishments, but sometimes in country places this green iodide of mercury had to be dispensed a few times a year, and was the chemist to be called upon to make the preparation each time in order to keep it in condition? If a man had a few grains of green iodide to dispense, must he make it afresh to get it in condition? Grey powder, again, was a most unstable preparation, and he rejoiced that it was falling into disuse. To have it in proper condition the only way was to shake it in the bottle, and get a small quantity prepared from time to time. A few years ago he was asked to examine a bottle of grey powder which had poisoned two children. It had been sent out to India in a medicine chest, and after being there a few years in a hot climate it had been completely transformed, and these two children had quite a narrow escape, from taking an ordinary and moderate dose of that preparation. They knew that spirit of nitrous ether, and mercurial ointment and pill, all deteriorated by keeping, but it was desirable to expel as much as possible from a Pharmacopœia preparations that notoriously deteriorated the moment they were prepared. He was quite clear that Mr. Martindale's pill had been deteriorated while he was converting the green iodide into the pill mass.

Mr. MacEwan said one point should not be overlooked in all discussions regarding mercury compounds, viz., that the days of heroic medication had passed, when mercury was given in half-pound doses, and salts of mercury in such quantities as to remain in the skeletons of persons treated therewith, so that mercury globules could actually be shaken out of the bones, at least so tradition stated. Grey powder had undoubtedly in many cases caused peculiar results on children, for the simple reason that they continued to give the doses that their forefathers did, 2, 3, 4, and 5 grain doses to children. But enlightened physicians now found that doses of one-twenty-fourth and one-twelfth of a grain produced much happier results than large doses. Specialists, such as those Mr. Martindale mentioned, even thought the old dose of green iodide of mercury, 2 to 3 grains, produced a great deal of harm, and for that reason they only gave one-sixth of a grain. Why should large doses be continued when small ones sufficed? He thought this point should be borne in mind by the Pharmacopœia compilers.

Mr. Martindale said he had not tried the use of absolute alcohol, but it was necessary to use alcohol in some form in order to prevent the action being too intense. He had a distinct remembrance as an apprentice being set to rub the two elements, iodine and mercury, together, when volatilization of iodine took place and his nasal organ suffered severely. The heat of combination was so great that great care was necessary, and some alcohol should always be put in at first. That was his deviation from the 1867 directions, and he had no doubt that absolute alcohol would be better than rectified spirit. With regard to the keeping properties sample A was prepared in October, 1887, and it was found to contain only ·1 per cent. of mercuric iodide on washing with ether. Sample B was prepared on May 19, 1890. B, had not been tested, but it had much the same colour. If it were carefully stored it might be kept of a uniform green colour without difficulty. Undoubtedly the least exposure to light did in the pills give a surface reduction of the iodide to the state of metallic mercury; it was impossible to prevent light acting upon it. But the preparation was evidently in large and constant demand, and although unstable it was useful. How it acted physiologically he could not offer any opinion, and Dr. Broadbent at the Birmingham meeting of the British Medical Association discussed the matter, and even he was somewhat in doubt how the iodide acted in the case of syphilis. This preparation was largely in use in France and in America. In France there was a special preparation of pills which had an enormous consumption, and they were also sold largely in England, and if this preparation were omitted from the Pharmacopœia, it only opened the door for these specialities being sold, which he thought would be a pity. With regard to what Mr. Bottle had said he would merely refer to the samples A, B, and C, and point out that if they contained such a small percentage of mercuric iodide after three years, it showed they were fairly good preparations. The percentage of mercuric and mercurous iodide was shown on the table, the remainder being principally free mercury which the authorities he had quoted said was no detriment. One of them for the last fifteen years had been very careful to have the pills of a green colour, and they would keep fairly well if placed in amber-tinted bottles. He had avoided the question whether mercurous iodide should be yellow or green, but they were asked for the green preparation, and therefore that should be sent out, though he was not certain that mercurous iodide might not still be yellow. He thought Mr. Wood had hardly made out his point, and that it was still doubtful whether there was such an intermediate preparation as mercuroso-mercuric iodide.

(*To be continued.*)

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual meeting of this Society took place on Wednesday, September 17, the President, Mr. A. R. Fox, occupied the chair. Messrs. F. Rose and W. Thorp were appointed scrutineers, and whilst the voting papers were being counted the Secretary read the annual report as follows:—

"Your Council, in presenting the report for another year, congratulates the members on the continued success of the Society. The number of members and associates is 48 and 30 respectively, and your Council sincerely hopes that the ensuing year may see a further addition to the strength of the Society.

"The following papers and lectures were given at the general monthly meetings:—

"'Botanical Rambles round Sheffield,' Mr. J. Austen; 'Pills and their Excipients,' Mr. A. S. Smith; 'Metric System of Weights and Measures,' Mr. J. H. Bradwall; 'Source, Origin and Adulteration of Peppers,' Mr. C. H. Twelves; 'A Chemist's view of the Sheffield Water Supply, with special reference to its Action on Lead,' Mr. A. H. Allen, Borough Analyst; 'Food, its Diseases and Adulterations,' Mr. H. Winder.

"The Council desires to express its hearty thanks to the above gentlemen for the able papers given to the Society at its meetings.

"Two special meetings of the registered chemists and druggists in Sheffield and district were held during the year, the first to consider 'Who is the seller of a poison under the Pharmacy Acts?' and the second, 'The Pharmacy Acts Amendment Bill, 1890,' and it affords your Council much pleasure to know that the discussion of the subjects has aroused a greater interest in pharmaceutical politics in the neighbourhood. The Inaugural Meeting of the Fifth Session of the School of Pharmacy was held in the Society's rooms on October 10, 1889, when the prizes were distributed and an address delivered by S. R. Atkins, Esq., J.P., of Salisbury.

"The past session of the School has been one of prosperity. The lecturers report well of their classes and the results of the examinations have been highly satisfactory.

"Your Council deeply acknowledges the services rendered by the lecturers to the Society during the past session.

"The Society has been the recipient of several valuable gifts during the year; viz., a microscope from the President, Mr. A. R. Fox; botanical plates from Messrs. Potter and Clark, London; botanical herbarium of 500 specimens from Dr. T. Collier; materia medica collection from Mr. J. Humphrey, and a gift from Mr. Newsholme of an annual prize for the best herbarium collected by any associate of the Society.

"The Council specially thanks the donors for the gifts and hopes that the students will take advantage of the increased opportunities for improvement thus afforded.

"In conclusion, your Council cannot allow this occasion to slip without acknowledging the services rendered to the Society by its President, Mr. A. R. Fox; his untiring energies and management of the business have largely contributed to the successful results of the year's work."

The financial statement shows a balance of £13, which, considering a considerable expense (nearly £30) entailed by the fitting up of the new premises, is highly satisfactory.

After considerable discussion the report as presented was adopted.

The scrutineers then presented their report, the following gentlemen comprising the new Council:—Messrs. Bradwall, Eardley, Ellinor, Fox, Grierson, Learoyd, Morrison, Newsholme, Preston, Rhoden, Ward and Watts.

On the motion of Mr. Newsholme, seconded by Mr. Preston, rule 5 was altered, so that instead of the whole of the Council retiring each year half only should do so.

The meeting closed with votes of thanks to all who had rendered services to the Society during the year.

The first meeting of the new Council was held on Monday, Sept. 22. Mr. J. H. Bradwall was elected President for the ensuing year, Messrs. G. A. Grierson and Robert Watts Vice-Presidents. Messrs. G. T. W. Newsholme, C. O. Morrison and C. D. Moffat were re-elected Treasurer, Secretary and Librarian respectively and Messrs. R. W. Watson and A. Wood auditors.

Arrangements were made for the ensuing session, after which the meeting terminated.

Review.

PRINCIPLES OF GENERAL ORGANIC CHEMISTRY. By Professor E. HJELT. Translated from the German edition by J. BISHOP TINGLE.*

In systematic textbooks on organic chemistry so much space must necessarily be allotted to the enumeration and description of separate compounds, that the student is frequently apt to overlook much that is of general importance. A work supplementing the ordinary text-book as a review of the more important points in general and theoretical organic chemistry might therefore be a valuable help to some students in systematising and extending knowledge already acquired. Since the present translation of Professor Hjelt's book attempts to meet this demand, a favourable reception probably awaits it in this country. It is to be regretted, however, that the author, who requires a good elementary knowledge of organic chemistry on the part of his readers, does not treat the subject more fully. Clearness is frequently sacrificed to brevity, and in some cases the information given is so meagre as to be of little practical value. Thus in Part I., wherein the composition, constitution and classification of organic compounds are discussed, only a half-page is allotted to the description of molecular weight determinations by either the vapour density or Raoult's methods. Again the subject of physical isomerism, one of the most important and intricate problems of modern chemistry, is condensed into five pages, the result to an ordinary student being a confused recollection of geometrical figures and half-comprehended statements, which may well give rise within him to a loathing for a most interesting chapter of science. In the second part, illustrating the connection between the constitution and chief physical properties of organic compounds, occur good articles on the melting and boiling points, and the relation between colour and constitution is especially clearly and concisely discussed. On the other hand thermal phenomena are represented by a two-page summary of Berthelot's and J. Thomsen's thermochemical researches, nor is the information on the subject by any means up to date. Here, as in other places, one cannot but deplore the marked avoidance of all controversial matter throughout the book, which leads the author at times either to record as accepted facts conclusions that are still the subject of animated discussion, or else to cursorily dismiss the subject. For instance, it is hardly satisfactory that the reader should be merely informed that the constitution of the benzol ring may be represented by one of two formulæ, advocated respectively by Kekulé and Baeyer, without any reasons being adduced, especially as he might infer from scattered remarks in the book that the weight of evidence is against the former.

In the section dealing with the chemical behaviour of organic compounds, the reactions described are arranged not as usually, according to the action of the reagent, but according to the result of the reaction. Without disputing the author's opinion that this classification is the best and a material assistance to students in acquiring a wide and thorough grasp of the

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[*] Longmans, Green and Co., 1890. Small 8vo. Pp. i.-x., 1-220. 6s. 6d.

subject, attention may be drawn to difficulties which the author has evidently had to contend with in the adoption of this system. Thus although the term oxidation is at the present day used in a very wide sense, yet the discussion of the formation of diazo compounds and the substitution action of halogens among oxidation processes appears somewhat misplaced. Further, whilst Hantzsch's pyridine and Knorr's pyrazolon syntheses are correctly described as dehydration processes, it is not very evident why Skraup's method for the synthetical production of chinolines should be relegated to another chapter on "union of carbon with carbon," unless the occurrence of an oxidation simultaneously with a dehydration process may be considered to exclude the method from observation under either of these processes. But in spite of some defects, Professor Hjelt's book will no doubt be welcomed in this country on account of his novel and suggestive treatment of the subject. A word of commendation is also due to the translator, for notwithstanding the liberal use of graphic formulæ typographical errors are extremely rare. Perhaps the two most misleading statements occur on p. 211, where diastase is said to convert "starch into *dextrose* and maltose," and in the following line emulsine is referred to as "the ferment of benzaldehyde."

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Patent Medicine Prices and the Rebate System.

Sir,—As perhaps you are aware, an inquiry has been going on for a number of months as to the possibility of an arrangement being come to between makers and vendors of proprietaries, with a view to improving the wholesale and retail remuneration obtainable in that class of business. It appears from the replies to the circular issued to retail chemists last autumn that some 80 per cent. of them would sign the "non-cutting" agreement therein described, rather than endure longer the present unfortunate condition of things. A few manufacturers in a fairly large way of business have also given their assent to the principle; though it is still uncertain if the movement will acquire sufficient impetus to clear the obstacles in the way. That still remains to be seen.

In the course of the inquiry amongst manufacturers, I came across a proposal by one of them, which seems to be very well worth consideration and adoption, and it is that more particularly which is the object of this communication. The gentleman referred to is one of the largest makers and advertisers in the country; and, not at present wishing his name to be known in connection with the matter, he has asked me to get his scheme published for him, so that it may be criticised by retail chemists. If the general opinion should be favourable, he appears to be very strongly inclined to do something for us in the way of assuring a reasonable profit on the sale of his goods. He would do so by the following modification of the rebate system:—He will charge all wholesale dealers full advertised retail price (2*s.* 6*d.*) for his essence; and they, in turn, will do the same to retailers. Along with each dozen bottles sent out will be given a numbered coupon or voucher, guaranteeing a rebate of, say 8*s.* per dozen, on condition that the wholesaler sells no essence at less than 30*s.* per dozen. The coupon will be so worded that it will be fraud (punishable by law) to claim the rebate if the dealer has not complied with the prescribed conditions. The wholesaler will, in turn, charge the retailer full retail price and the latter will get his profit (6*d.* on each bottle) in pretty much the same way. On each bottle will be partly gummed a double-numbered coupon, half of which the retailer will detach and retain until he has accumulated enough to send off. These coupons will count as cash in paying the wholesale accounts, if duly signed or stamped by the person claiming rebate; and the wholesaler will be recouped for the same by the maker.

The above is merely the outline of the plan: you and your readers will be easily able to fill in the details for yourselves.

Mr. Charles Umney, in his recent address at Leeds, made the statement that nearly one and a half million pounds' worth of patent medicines are annually consumed in Great Britain. More than half of these, I am informed on good authority, reach the public at the merest fraction over makers' prices, and the bulk of the other half pays little better. What a pity it is if part of this stream of gold cannot be diverted back again into its original channel. Assuredly, the man who succeeds in constructing a dam-dyke that will do it, will deserve from us no small thanks. Meantime, what the "engineer" wants for his "plans and specifications" is *criticism*.

Brixton. William Johnston.

Sales of Poisons by Auctioneers.

Sir,—In view of your footnote to my previous letter, will you allow me to add that the sale referred to was only advertised about three days before it took place, and that catalogues were distributed some half-hour after it had commenced?

Indeed, had they been accessible earlier, they would have afforded no clue to the poisons offered, these being included among various lots classified as "sundry drugs," or "bottles and contents." I enclose one of these curious documents for your perusal.

I understood before I wrote that the case had been brought under the notice of the Secretary of the Society, but I hardly think the policy of *luisser faire* resolved upon is likely to command the confidence of the members generally.

John C. Wiggin.

The Charge for Poisons.

Sir,—The chemists of Exeter are considering the advisability of making their charges for poisons more adequate to the trouble and responsibility involved in their sale.

Some of us consider the amount of business of this kind too trifling to warrant us in making a change which might be productive of annoyance and dissatisfaction on the part of our customers. Thinking the experience of those who have taken such a step, either individually or in conjunction with their neighbouring *confrères*, would be helpful to us in deciding the question, I venture to ask any of your readers who have tried the experiment to be kind enough to favour us, in your columns, with the methods they have adopted and the results.

Exeter. H. W. Harris.

The Alcoholic Strength of the Menstrua Employed in Making Pharmacopœial Tinctures.

Sir,—In view of the importance of the above subject to pharmacists generally, and in order to contribute towards a settlement of the question as to which is the most suitable menstruum to employ for each particular drug, we have arranged to continue the work already commenced by us, using the same menstrua and following the same processes, but working on several samples of drugs derived from different sources. The investigation will be limited at first to the alkaloidal tinctures, but will subsequently be continued so as to follow up the work already done upon those drugs, the active principles of which are of a non-alkaloidal nature.

In the opinion of many pharmacists the time has arrived when some of the tinctures made from drugs containing powerful alkaloids should be standardized, or at least reduced to greater uniformity than is the case at present, and it is proposed to endeavour to ascertain by experiment how far it may be possible to secure uniformity, both as regards the proportion of the crude drug to be used in making tinctures, and also as to how far it is desirable to go in fixing a definite standard for the alkaloidal tinctures.

E. H. Farr,
R. Wright.

R. E. D.—*Fumaria officinalis.*

Apprentice.—Write to the Dean of the School for a copy of the prospectus.

Communications, Letters, etc., have been received from Messrs. Broadbent, Leukowitsch, Fairley, Allen, Squire, Spurr, Hodgkin.

INTRODUCTORY SESSIONAL ADDRESS

DELIVERED AT THE

COMMENCEMENT OF THE FORTY-NINTH SESSION OF THE SCHOOL OF PHARMACY,

October 1, 1890,

BY SIR EDWARD H. SIEVEKING,

M.D., F.R.C.P.,

Physician in Ordinary to Her Majesty the Queen.

Mr. President, Ladies and Gentlemen,—There appears to be a tendency nowadays to adopt and act upon the opinion that some people understand the business of their neighbours better than these do themselves. I hope I shall not be open to such an imputation in the present instance, because the responsibility of placing me in this very honourable position is entirely due to the kindly feeling of you, Sir, and although I have not the distinction of being a member of your Society, I hold that every physician cannot but watch your work with the deepest interest, and with the feeling that it is indissolubly connected with our own. The account given in your Calendar of the rise and progress of the Pharmaceutical Society testifies strongly to the support the College of Physicians rendered to it in its early days; but even had that not been the case, we physicians must feel very grateful to the efforts, the successful efforts you have made, to raise the scientific status of your calling and to render to the nation at large services which no one can better appreciate than a physician. We depend upon one another, and the greater knowledge, accuracy and conscientiousness of the pharmaceutical chemist of the present day is of daily advantage to the practitioner of the healing art, who, even if he is an ex-professor of materia medica, finds it impossible to preserve and develop his clinical knowledge, as required by the new drugs and combinations daily being showered upon him. To allude only to the recent past, how often have physicians of the greatest eminence gone to the late Mr. Peter Squire for aid in the solution of questions which could be answered by him and his equals alone! Doubtless the leaders of the Pharmaceutical Society could give many instances in which they have done similar service to medical men. Our interests are essentially the same, though we walk in different, though parallel paths; we are bound to work together in brotherly concord towards the advancement of science and the suppression of quackery. The best illustration of the co-operation between pharmaceutists and physicians is that afforded by the manner in which the British Pharmacopœia has of late years been perfected; and it is to be hoped that so long as the Medical Council exists, it will continue to avail itself of your services, in conjunction with those of the medical colleges, in order to render that important work more and more useful, and to see that it remains on a level with the science of the day. Your Society, as specially represented by Professor Attfield, has shown in a brilliant way, how our joint work can be carried on for the benefit of the nation. The subject would be a tempting one to dwell upon more fully, but it would demand more time than is allowed me, and I may feel assured that you are fully acquainted with Professor Attfield's labours and results. May I therefore take it for granted that you will kindly accept the remarks I venture to offer to you as coming from one who, though by no means an expert in your calling, has your interests and the progress of your Society thoroughly at heart.

As my professional existence dates from the same year, 1841, as the foundation of your Society, I have necessarily seen and watched many important occurrences affecting the medical profession. The gradual separation of the practice of medicine from the composition and dispensing of remedies has become a more and more imperative necessity, for how could a busy practitioner, who went beyond the blue pill and black draught, possibly find time thoroughly to master and carry out the directions of the Pharmacopœia? It was inevitable that the general public more or less vigorously protested against the routine system that was in vogue fifty years ago, and the medical profession for various reasons have sought gradually to abandon, as is done in other civilized countries, the custom of providing medicines as well as advice. The British public have gained much by this separation; for however beneficial medicines, in the strict sense of the word, are, in the treatment of disease, no one will assert that therapeutics consist only in the *haustus mane*, or, *ter die sumendus*. The British public began to realize the great fact that dietetics and regiminal management deserved the attention of the medical adviser as much as the contents of the Pharmacopœia. From the moment that the Apothecaries' Society received their charter, in 1815, constituting them general practitioners, although they continued for a series of years the best source of drugs and preparations, this combination of two callings necessitated the formation of a Society like yours, which, under its charter may exercise legitimate control over the chemists and druggists throughout Great Britain Your founders said from the beginning that a scientific basis was essential to ensure its stability and its future development; their successors have successfully laboured to carry out their views, and your Society already numbers many of its members who take high rank in the world of science. The medals and scholarships bearing the names of Pereira, of Bell, of Redwood, of Hanbury, must prove a great incentive to the most persevering among your students, and remind them in after life of the halo that scientific labours have shed around those names, whilst such rewards will suggest to them the duty of seeking to add to the beneficial results of science by their own labour. Abroad—I speak chiefly of France and Germany—Governments have rarely so entirely dissociated themselves from science as our Governments have done; the consequence has been that in pharmacy, as in some other departments of science, the chief impulses have come from foreign schools and inquirers. Here everything has to be done by the individual or by such associations of individuals as can see the wants of the times, and eventually Government may graciously step in and give its sanction to what has been achieved. I will not tire you by a disquisition as to which system is the best in the long run. As in many other cases, there is much to be said on both sides. But I wish to point out, that individuals having done their best and the Government of the Queen having crowned their labours with more than one charter, and your having now an admirable school, museum, and research laboratory, there is no further excuse for British Pharmaceutists being so frequently behindhand in the discovery of new agents serviceable in the cure of disease. How many of the remedies that are now being daily prescribed have been originally discovered in this country? We doctors necessarily take the remedies likely to benefit our patients, wherever we can obtain them, without reference to their origin. With regard to vegetable productions, which depend so largely upon climate, we are compelled, with few exceptions, to trust to foreign supply. But I do not see the necessity of doing so with regard to the products of pharmaceutical chemistry, and I appeal to you as men of science to utilize the excellent opportunities which your training and your research laboratory offer, to prevent England from being in the rear rather than in the van of pharmaceutical progress. I need not here go into a history of modern pharmacy, or put on record all the advantages we have derived from our neighbours, but from the days of Courtois, the discoverer of iodine, to the most recent dates, a complete account would show that there is room for more energy and perseverance and research on our part than has hitherto been exhibited. Within the last few years we have been indebted to the continent for chloral, for antipyrin and its congeners, to sulphonal, all of which have been employed largely and beneficially in this country, but which have not been discovered here. Here there is a stimulus for laudable exertion and rivalry, and from what your Society has already done in advancing the interests of its members and associates, I have no hesitation in prognosticating a still greater future for it, if by the encouragement it gives to the earnest student it advances scientific research. We have not all of us the talent or the means of carrying out original investigations; the world could scarcely continue its present march if each of us were filled with the ambition of making discoveries, but we may all be imbued with a scientific spirit of sympathy and admiration for those who are able by their individual labour to cast a halo of science upon all with whom they are more directly associated, which must redound to the benefit and reputation of all their countrymen. In this country independent research does not meet with any encouragement from Government; and unfortunately there is a large body of our countrymen and country-women, ignorant of science and the laborious paths its cultivators have to tread, who cause impediments which compel some of our most illustrious students to go abroad in order that they may there cultivate their speciality, which here might subject them to disturbance and penalties. There are many who would bring all the ignominy of the law to bear upon you if you poisoned a few rabbits and dogs with a view to determining whether a new compound exercised beneficial or injurious effects, and whether it might with safety be applied to the treatment of human suffering. If you meet with people entertaining such views, repel above all things, I beseech you, the cruel imputation upon scientific men, that they are heartless and have no feeling for the brute creation. I know that this is unjust and that there is no class of men who have a greater affection for the brute creation and more general tenderness for suffering of all kinds, than the members of the medical profession, of which you are an integral part. But he who desires to benefit humanity is justified by all divine and rational human law in availing himself of the brute creation for the purpose of investigating the secrets of nature, and in our particular case of testing the character and uses of agents that may be either dangerous or useful to humanity. The ground is cut from under the feet of those who object to the use of animals for such purposes by a recent parliamentary inquiry as regards Great Britain, and owing to that tendency to which I alluded at the outset, they go abroad and pick holes in their neighbour's jacket, after having done all the mischief in their power at home. But where would have been the great discoveries of Pasteur that have conferred an inestimable boon upon man and brutes, had the French Government, yielding to ignorant clamour, been constantly threatening to bring him before a police magistrate and hampering his earlier researches, which necessitated the sacrifice of many animals, and which have issued in one of the grandest deductions known to experimental science? No *à priori* argument or hypothesis could have established, and no clinical observation could have led up to them. I hold that human health and life are infinitely more valuable than any other consideration, and when there is a legitimate scientific object the sacrifice of animal life ought not for an instant to weigh against the sentimentality of people who watch their pet dogs like babies and look on the *tir à pigeons* as a delightful recreation. We, too, with the Royal College of Surgeons, have established a school of research on the Thames Embankment, and if in the matter just alluded to you should have any difficulty, I am confident, although I do not speak with official authority, that the solidarity which binds all scientific bodies to one another will ensure to you all the aid that our Institution can afford, in the same manner as we should rely upon your co-operation in any question of common interest and importance.

Your own particular interests and those of pharmaceutical science and art, are in safe hands under the management of your governing body. You are specially to be congratulated on the foresight and liberality of Mr. Jacob Bell, shown in his founding at his own expense and subsequently transferring the property of the *Pharmaceutical Journal* to your Society. Here you have an excellent vehicle for the publication of discoveries, or researches leading to them; a medium of intercommunication among members and associates upon all matters connected with pharmacy and its practice; and a banner under which, if your peaceful realms are invaded, you may rally with confidence. There are few things that conduce more to uniting in bonds of co-operation and affection men who have the same training and the same general object in life than a well conducted periodical. The political world has long recognized this; and it is generally admitted that the tone of those whom a journal represents is much influenced by its sentiments; while they in their turn would speedily cause their influence to be felt in the editorial department, were this to fail in its scientific duties or to allow any lapse in regard to the ethics of your calling. We still occasionally see even in well conducted journals, acrimonious discussions, in which the general reader takes little or no interest and is apt to shrug his shoulders over the futile disputes of the assailants. Human nature will, I fear, always be liable to excesses of egotism or irritability, and even scientific journals may occasionally become the vehicles of ebullitions of that kind. Having formerly for some years held the post of editor myself, I know that, to use a peculiar phrase, his position, though deeply interesting, is "not all honey," and he necessarily finds it impossible to meet everybody's wishes. Still, I can say, from my own observation, that in all the better journals coarseness and personalities are now strictly avoided, and contentious matter, calculated only to bring into notoriety two or more combatants, is strictly controlled or avoided.

There is one feature in your Journal which I am sure you will all agree with me deserves your special and energetic support, as I believe it would be approved by the medical profession at large. I refer to the advocacy of a greater measure of power being conferred by the Legislature upon your governing body. Having implied in my previous observations that the higher the general education of your body, the greater will be your usefulness to the nation, and the more satisfactory will be your own progress and position in after life, I cannot but think that a compulsory curriculum should be equally enforced upon all who go through the examinations entitling you to be called associates or members of the Society. My confidence in mere examinations as a test of knowledge is by no means unlimited, and with the excellent curriculum suggested by your governing body I confess that I can see no just grounds for refusing to empower your Council to insist upon every pharmaceutist showing that he has attended all the courses, including of course the practical parts which they think necessary. No lectures or demonstrations can compel a young man to work; but I am quite certain that the great majority of us require the stimulus of example and companionships in early life to insure successful study. There is so much for you to see in order to appreciate; there is so much that you should handle and taste and smell in order to acquire a thorough knowledge of your calling, that I cannot conceive that private study can well take the place of an attendance upon the lectures and demonstrations of your profession, or a careful examination of the drugs and preparations in your excellent Museum. Botany, which has received much contemptuous treatment at the hands of the medical corporations, I rejoice to see among the subjects of which you are required to have some knowledge. Who can learn botany out of books alone? Who can duly appreciate the beauties of nature without some practical acquaintance with the laws that regulate the growth and development of our flora? And how can any one claim to be a pharmaceutist without such knowledge, seeing that there are so many therapeutic agents which in all ages have been derived from the vegetable kingdom?

Apropos of botany, I may be permitted to allude to a recent discussion about the 'Physik Garden' in Chelsea, which Sir Hans Sloane in 1753 bequeathed under certain conditions to the Apothecaries' Company. It seems a great pity that a plot of ground which is scarcely adequate to the study of botany at the present day, though it has done excellent service in former times, should not be sold at its present value, which would suffice to buy a much larger plot of ground beyond London smoke, to endow a professorship of botany and possibly even one or more travelling studentships. With the altered circumstances one can scarcely see why, as such an arrangement would carry out the spirit of Sir Hans Sloane's legacy, Parliament might not sanction a well considered scheme of the kind and even make the whole over to the Pharmaceutical Society, so long as it continues to foster the bountiful and attractive science of botany.

But to return to the more practical question regarding the details of your curriculum, from which I have diverged, and I would ask, how can a pharmaceutist pretend to exercise his calling without a practical knowledge of chemistry? Two courses of chemistry that I attended in my student days failed to do anything but bewilder me, until some years after I had taken my degree, my friend Professor Hofmann induced me to work at the College of Chemistry, and I then at least acquired an inkling of what was meant by chemical science. Since those days this branch of knowledge has made immense strides, but the fact remains that however useful books may be as guides and refreshers, no man can approximately understand even the elements of chemistry unless he avails himself of opportunities now offered on all sides of handling the test tube and reagent himself.

Seeing how much there is to learn in order to fit you for your calling, I confess that the shortness of your curriculum has somewhat surprised me; but if your authorities deem it sufficient, it is all the more imperative upon every student to avail himself to the utmost of the chances here given him of being imbued with the principles of science. Depend upon it that whatever you learn here will redound to your advantage in after life. The more you learn the greater respect will you enjoy, the more useful will you be to your fellow-men; the more calmly will you bear the disappointments and vexations which are the lot of every denizen of the world; the nearer will you approach to that higher life which alone ensures true happiness.

Your patience and the twenty minutes accorded to me by your esteemed President must be nearly exhausted; but I should not like to conclude the remarks I have ventured to offer to you without adverting to one question, to which I alluded at the outset, and upon which physicians and pharmaceutists may agree to co-operate. It is that of quackery. It is one of the *laches* of our Government, which nothing but the force of public opinion can eventually put an end to, that they do their utmost to foster and to benefit their exchequer, by giving anyone who choses to pay the necessary amount of coin, the right to flood the country with patent and secret medicines. I consider this as immoral as it is injurious to the community; for the ignorant multitude, captivated by the apparent guarantee of the Government stamp, and by the testimonials which are put forward as to the efficacy of the particular drug, are defrauded both of their health and of their money. Lotteries were put down in Great Britain in my youth because the British Government was supposed to patronise iniquity by deriving profit from such a source; I question whether the exchequer has a better excuse for selling patents for secret medicines and adding to its receipts by the halfpenny stamp on each, than it had for the promotion of lotteries. I do not accuse every proprietor of a patent medicine of intentionally committing a fraud on the public; in many cases doubtless he may have complete faith in his compound, and wishes by promulgating it to benefit the community as well as himself. He may act under the same plea as kind-hearted patients of mine have occasionally confessed to, viz., of having widely distributed a prescription of my own from which they had derived benefit. But such kind-heartedness nevertheless is apt to be fraught with mischief, and ought not to be encouraged, and although it is not a part of my function to tell you what exact rule you should adopt, and which had much better come from the able Editor of the *Pharmaceutical Journal*, I do hope that you will, as much as in you lies, discountenance the sale of secret remedies. In the majority of cases they are doubtless made up from prescriptions of medical men, and many may be perfectly harmless; but unless we know the ingredients and the proportions in which they are mixed, we physicians have no right to prescribe them, and I do not think that a Society like yours ought in any way to encourage their employment. I do not ask you individually to wage war against a system which is opposed to the ethics of the medical profession, but if you agree with my views in the matter I have no doubt that you can each of you aid in creating a better and more wholesome public opinion, so that eventually this bane of scientific medicine may be cast into the limbo of a forgotten past.

Having now briefly—still I fear too long for your patience—spoken to you on the subjects that struck me as being of mutual interest, allow me to thank you, Mr. President, for the honour you have done me to call me to this place, and you, ladies and gentlemen, for the kindness with which you have listened to my somewhat desultory remarks. Above all, let me congratulate the prize-winners of to-day, and allow me to express a hope that by the continued and increasing distinction gained by pharmaceutists throughout the country they may aid in that onward progress for which we all long and hope.

PRESENTATION OF A PORTRAIT OF MR. MICHAEL CARTEIGHE TO THE PHARMACEUTICAL SOCIETY.

A meeting was held at 2 o'clock on Wednesday in the Examination Hall of the Society's House, Mr. Bottle, Vice-President, in the chair, for the purpose of formally presenting to the Council the portrait of Mr. Michael Carteighe, by Mr. Foster, which was recently exhibited in the Royal Academy. The whole of the Council and a number of distinguished pharmacists and friends of Mr. Carteighe were present, and the portrait was displayed on an easel at one side of the room.

Mr. Hills being called on by the Chairman to open the proceedings said: Mr. Vice-President and gentlemen, by the kindness of my friends a very pleasant duty has devolved on me to-day, and I can assure you it is very gratifying to come from the heated atmosphere of the Council Chamber, where we are discussing a Pharmacy Bill, and find oneself in the midst of friends who (on this subject, at least) are all of one accord. I am deputed, as the mouthpiece of a few personal friends of Mr. Carteighe, to ask you, as representing the Pharmaceutical Society of Great Britain, to accept the portrait of our friend Michael Carteighe, our esteemed President, for the Council Chamber of the Society. As the steps which have been taken to secure this portrait have not been made public, I think perhaps I should meet with your approval if in a few words I tell you the history of the purchase. As most of you are probably aware, this picture was honoured with a place on the walls of the Royal Academy exhibition. It was in rather an exalted position certainly—rather too near the skylight, and therefore was not seen very advantageously; but many of Mr. Carteighe's friends who saw it thought it was a very characteristic portrait of him, and one which we should do well to obtain for the walls of our Council Chamber. On inquiry it transpired that the portrait was really intended for Mrs. Carteighe, but she, on being approached, very kindly consented to waive her claims to the picture if there were any generally expressed desire amongst Mr. Carteighe's friends to secure it for the Society. Upon this a meeting of a few London friends was held in the middle of July, and the unanimous opinion was expressed that the portrait should be secured. The small meeting resolved itself into a Committee, appointed a sub-committee to carry out the necessary details, and it was resolved that this sub-committee should take steps to procure the co-operation of Mr. Carteighe's personal friends throughout the country. It was our own feeling entirely in the matter, and it was thought it would best meet Mr. Carteighe's wishes, to make it a private subscription. Circulars were accordingly sent out to a number of men who had identified themselves more or less with pharmaceutical politics or progress, and as the amount required was a definite sum we only applied to a limited number of gentlemen. This must be our apology to many scores of Mr. Carteighe's friends throughout the country who did not receive an invitation, and who, I am sure would have liked to be included. I need hardly tell you, gentlemen, who are so well acquainted with our President and all his virtues, that there was no difficulty in getting the amount required. Not only did the remittances come in with alacrity, but they were almost invariably accompanied by good wishes for the success of the scheme, and even by promises of larger remittances if necessary, as well as by expressions of appreciation of Mr. Carteighe's services in the past. I think it is also right to say that certain letters were received from gentlemen who, owing to circumstances, did not see their way to subscribe; but I am sure it will be equally gratifying to Mr. Carteighe that those gentlemen wrote expressing their high appreciation of his services, and while regretting that they could not subscribe, send their best wishes for the success of the scheme. I have not much more to say about the portrait. There is the portrait which we have obtained, and we propose to ask Mrs. Carteighe to accept a replica, which is now being painted. I have nothing more to say about it than this, that I think on the whole we may congratulate the artist in having produced a very characteristic portrait of our President, and I think we shall with great pleasure see him included in our gallery upstairs, with Allen, with Bell, and with other pharmaceutical worthies. But now you must allow me just for a minute to say a word or two about the subject of the portrait. I know he is a very modest man. That is one of his virtues. But, joking apart, it would be out of place for me here in this room, and in his presence, and before you who know his worth so well, to say much about Michael Carteighe. At the same time, I feel I must just say something. You know he has many special qualifications for the office he has the honour of holding at the present time. I have not time, and it would be out of place altogether for me to speak of his unwearying devotion to the Society, of his unrivalled knowledge of the history of the Society in all its details, of his marvellous memory in recollecting those details—and he has seldom failed in that respect—of his unvarying good temper and tact, of his power of directing and leading those who are sometimes very wrongly called his "team" and others, of his scientific attainments, and of his great knowledge and experience of men and the world. I think it is unnecessary for me to speak of these, and it would be out of place altogether, because you gentlemen are conscious of them as much as I am; but there is one point I think it is well to speak of, one special characteristic of our President, and that is, his entire loyalty to pharmacy in general, and to the Pharmaceutical Society in particular. I think it is well that it should be known outside this little body that is gathered together here, that looking back at the calendar we find Michael Carteighe competed for some prizes about the year 1863. It is well known to you all that he obtained the Pereira medal. I believe on that occasion there was a very close contest; however, he gained the medal, and we find three years afterwards, in 1866, he was elected to a seat on the Council. I wish you to remember that twenty-four years ago, I believe in the same year, he was appointed examiner, for at that time it was possible to hold the two offices. He was an examiner and member of the Council till 1870, when he resigned his seat on the Council, but remained an examiner. He remained so till 1881, when we sadly wanted him on the

Council—that is, we thought we should like to have him at all events—and he resigned his position as examiner, and was again elected to the Council. He remained only one year as an ordinary member; in 1882 he was elected President, and has held that office until the present time. That is a pharmaceutical record, gentlemen, that none of us can show. We have not all the physique, we have not all had the opportunities Mr. Carteighe has had. At the same time I think it is a record of which he, and of which we may all be well proud. Then we know that he throws himself most thoroughly into his work. Those who are nearest to him know how much that is the case. I might mention that the other day I happened to meet him with a packet of papers which he told me were the remains of something like 200 letters he had found awaiting him respecting pharmaceutical matters on his return from Switzerland. He had got through most of them, he told me, but still there were a few of them left. That gives you some idea of the work he has to do for us as President. I may remind you also that in recent times he has undertaken another labour, that is to say, he has become a peripatetic President, and has been addressing members of our craft in various parts of the country. Well, Mr. Carteighe has not been content with doing good work for the Pharmaceutical Society directly, but wherever pharmaceutical interests are concerned or pharmaceutical matters are discussed Michael Carteighe is pretty sure to be about somewhere. I may just remind you that in the year 1874, I think it was, when the British Pharmaceutical Conference met in London. Michael Carteighe was the local secretary, and a very successful meeting I believe it was declared to be on all sides. When the International Pharmaceutical Congress met in the year 1881 Michael Carteighe was one of the secretaries, and distinguished himself greatly on that occasion. I believe that meeting was also admitted to be a great success. I may just mention also that he has been one of the members of the Committee of the Pharmacy Club for many years, and is generally present at the meetings. We all know when he is present; there is a sort of go about the thing, and no speeches, of course. He has been chairman of the Chemists' Ball almost from time immemorial. I only just mention these things to show you that whenever there is anything affecting pharmacy or any movement made wherein pharmaceutical interests are concerned, or whereby pharmacy may be helped forward in any way, Michael Carteighe lends a willing hand. He seems to be capable of doing any amount of work you can put upon him. That leads me to another point. He is getting rather grey in our service, and I think it was well we should get a portrait of him before he had lost all his characteristic warmth, and to preserve some record of the active militant spirit. Others could have said this much better than I have, but the duty has devolved upon me because I have acted as secretary. I have now simply to ask you, sir, formally to accept this portrait on behalf of the Society. I have heard, I do not know whether it is true, that our dear old friend Elias Bremridge, on one occasion took Mr. Carteighe by the hand and said, "You must come and do good work for us." I think it is a very good opportunity for me to give a word of advice to our present inestimable secretary. He must make it one of the objects of his life to find out and appropriate an embryo Michael Carteighe, and when he has found that individual he must say, "Son, go work today in the pharmaceutical vineyard." I take it you will accept the portrait. I take it you will have already had authority to do so. I have simply to be the mouth-piece of the subscribers in this matter, and we all wish not only to Mr. but to Mrs. Carteighe many years of health and happiness in the future. We feel very sure, knowing Mr. Carteighe's loyalty to the Society in the past, that if he has his health he will give some of his strength at least to the Society, and therefore, in wishing him good health I think we are asking for something for ourselves. I have said that a replica is being painted, and I would ask you to give to Mrs. Carteighe this little memento of the ceremony of to-day. It contains the names of the subscribers to the portrait, as a little earnest of the replica which is being painted, which we hope will soon be in her possession, and will give her pleasure to look upon.

The CHAIRMAN said: Mr. Hills and gentlemen, I consider it a very high honour to be asked on this occasion, as the representative of the Council of the Pharmaceutical Society, to occupy a position which the President could not possibly fill personally, although we know he is very energetic and leaves very little for his Vice to do. This is one of the duties which he could not do himself. It is a source of very great personal gratification to me to be present on this very interesting occasion. I feel it is historically a red letter day in pharmacy, and I will tell you presently why. The Council of the Pharmaceutical Society I have already consulted with reference to the acceptance of this picture, and I can convey to the meeting the knowledge that the Council will accept it with the greatest possible satisfaction, and that it will in future grace the walls of the Society, and, I hope, the new Council Chamber. But wherever it may be placed it will be associated with the portraits of the worthies who have gone before Michael Carteighe, and whom he has imitated and followed. I allude more especially to the men I remember in the flesh and have seen—Wm. Allen, Jacob Bell, Morson, Squire, Dean, Sandford; in fact, the whole list of presidents from the commencement of the Society down to the present. I remember very well being present in the adjoining lecture hall in October, 1863, when we had an extremely interesting evening. On that occasion Mr. Thomas Hyde Hills, as Vice-President of the Society, was in the chair and took the opportunity of presenting to the Society a bust of Jacob Bell. It was my privilege on that occasion to move the acceptance of that bust and the thanks of the Society to Mr. Hills for his presentation. Well, gentlemen, I have very much pleasure at the present moment in congratulating our friend Michael Carteighe, who has so well earned the recognition of his friends, on having his portrait purchased for placing in our hall. I know a little of the work which has been done in the Society from its commencement, and I venture to say that no man who has preceded Mr. Carteighe ever did the work that Michael Carteighe has done. It may be partly because there was not the work to do, because within my knowledge the work of this Society has grown and multiplied and quadrupled what it was in the earlier stages. Gentlemen, we have in Mr. Carteighe, as Mr. Hills has said, an all-round man. In the attitude as he is painted (which no doubt represents correctly his attitude when the artist took him), I can conceive, looking upon him, that he is looking very earnestly at a piece of elevated table land on which he would like to land the Pharmaceutical Society and his pharmaceutical brethren, and I hope, gentlemen, he may be successful in doing it, and that we may all reap the advantage of Michael Carteighe's good services in that direction. But, gentlemen, I must go back again to the interesting evening we had in 1863. Having accepted the bust of Jacob Bell, there was a distribution of the prizes, and among the prize-men of that evening, in fact, the leading prize man, the man who held the blue ribbon of the Society, was Michael Carteighe. He had received two or three medals previously, but the Pereira Medal was then presented to him, and when he came forward for that medal I have in my recollection a very kind observation which was made by Michael Carteighe's master, the gentleman to whom he was apprenticed, who spoke of him as an admirable apprentice, a man who was always anxious and desirous of utilising his time, and I commend that to all our students in the future. If we had all Michael Carteighes as students we should not want to go in for what we are now doing, that is the curriculum classes, because men would work without our having to compel them to do so. But Michael Carteighe was not only a good all-round man, but he was a good Square man. He came here as a student, he took the prizes, took them honourably, scoring, I believe, pretty nearly the highest number of marks which it was possible for him to score, and he took away from that room a commendation, not as my friend has said, from the hand of Elias Bremridge, that he was to come here and do good work, but from his teachers, Professors Redwood and Bentley. Those were the gentlemen who indicated to Michael Carteighe that it was desirable that he should come and do more good work in the Society. Probably Mr. Bremridge might have supplemented that; I would not like to say he did not; but the gentlemen who indicated to Michael Carteighe his line of conduct were his teachers, Redwood and Bentley, and it is recorded, I believe, in the annals of the Society at that time. I must not detain you longer with these rambling recollections of olden times, but I do accept that portrait on the part of the Society with very great gratification. I assure you the Council will be pleased and gratified beyond measure by the course you have adopted on this occasion. The portrait will be placed amongst those of other worthies of the Society, and I am sure that no preceding President will be more respected than Michael Carteighe. I have much pleasure in thanking you all for your attendance here to-day, and I shall be very pleased to hand over the portrait to the Society.

Mr. CARTEIGHE said: Mr. Vice-President and gentlemen, I thank you most heartily for the complimentary expressions that you have made, and for the amount of good feeling which has characterized all that Mr. Walter Hills has said. It is a little difficult in dealing with subjects of this kind to avoid some reference to the past, but I propose not to say anything about the past, but simply to express to you briefly, but I hope not the less thoroughly and heartily, how highly I appreciate the compliment you have paid me. I thank you for the personal present to my wife, and for the replica which is to come, which after the honour you have paid to me I shall value more than any other, because in work which has to be done for the Society by those who have their daily bread to get, it is necessary to appeal sometimes to the goodwill and consideration of one's female partner. I am sure she will very much appreciate your present.

Mr. ATKINS said he claimed to be a very warm friend and admirer of the gentleman whose portrait was before the meeting. He deemed that friendship and an appreciation of the work which had been so elaborately recounted one of the honours of his life, and he was delighted that the idea had been suggested to appropriate to the Society this lasting memento of Mr. Carteighe's work and character. When he first saw it in the academy with his friend, Richard Reynolds, he was hardly so strongly enamoured of it as he was at present, and having previously expressed the opinion that it scarcely did justice to the subject he was bound now to qualify, if not to retract that statement, and to say that he was perfectly contented with it. He believed it would improve, and that as time went on they would like it more and more. But quite apart from its merits as a work of art, the important matter was the recognition of good work done for the Society. He had no wish to make comparisons, and had not enjoyed the privilege and honour which Mr. Bottle had of knowing intimately the previous Presidents of the Society, but he ventured to say that in the future no man would occupy a higher position in the esteem of the whole body than Michael Carteighe. With all strong men, whether Cromwells, Bismarcks, or anyone else, where there were strong convictions, strong powers of expression, strong administrative ability, there must be of necessity, where there were differences and divergencies of policy, at times be some collision. But when he felt convinced that a man was true, real, and had a deep insight into the questions that lay before him, although he might differ from him, he was bound to give him a loyal admiration. He begged to move most heartily a vote of thanks to Mr. Hills and the Committee. Mr. Hills, with the great tact and the modesty which characterized all his public and private work (and one day he would be the President of that Society), had undertaken this work, and brought it to completion, and had given them a model speech, which in the best possible taste sketched Mr. Carteighe's career, which simply required to be delineated to be appreciated. They were deeply indebted to Mr. Hills and those associated with him for summarizing and thus expressing what was in all their hearts, not simply those there present, for they merely represented a far larger body. Whatever might be the differences of opinion with regard to Mr. Carteighe's policy as President, there was but one feeling towards him as a man, and that was one of the warmest esteem.

Mr. SCHACHT had much pleasure in seconding the motion. As an old member of the Council and an old friend of Mr. Carteighe, he sympathized deeply with all that had taken place.

The motion having been carried by acclamation,

Mr. HILLS in reply said he wished that only one name should be prominent to-day, that of Michael Carteighe. He desired to be effaced completely; the little work he had done had been entirely a labour of love, and all the members of the Committee who had assisted him wished their names not to be published. He had only to add that he had received many letters from gentlemen expressing their regret at being unable to be present.

DRAFT PHARMACY ACT AMENDMENT BILL.

1. In this Act—

The term Pharmacy Acts shall mean the Pharmacy Acts, 1852 and 1868, and the Pharmacy Act (1868) Amendment Act, 1869; the terms "Pharmaceutical Chemist" and "Chemist and Druggist," shall have the same meanings respectively as in the Pharmacy Acts; and "The Society" shall mean the Pharmaceutical Society of Great Britain.

2. *Power to divide the qualifying examination into parts, and to require intervals of time and courses of study between such parts. Also to require evidence of having attended such courses of study, and having served for not less than three years as a pupil to a Chemist.*—The powers of the Pharmacy Acts with respect to examinations required for obtaining certificates of qualification under the said Acts, or either of them, shall be extended so as to allow of the division of the said examinations into preliminary and other parts of the same: also to allow of or require periods of time and courses of instruction between any of the said parts; and to require that persons before presenting themselves for the final part of an examination shall deposit with the registrar under the said Acts certificates of their having duly attended courses of instruction in chemistry, botany, and materia medica, and of their having for not less than three years in the whole served in the open shops of Pharmaceutical Chemists or Chemists and Druggists, or in public hospitals or public dispensaries, as apprentices or pupils of persons qualified in accordance with the law of the country in which they are carrying on business to practise pharmacy in that country.

3. *Power to make bye-laws for carrying out the provisions of Clause 2.*—It shall be lawful for the Society from time to time, by bye-laws duly confirmed by the Privy Council, to regulate the said division of examinations and also the said periods of time and study between any of the said parts; also to allow and provide for and to regulate the reception of certificates issued by other examining bodies in lieu of or so as to satisfy the Examiners in lieu of the preliminary part of any examination; also to provide for and to regulate the courses of instruction in Chemistry, Botany and Materia Medica, to be duly attended as aforesaid; also to provide for and to regulate the forms of certificates to be for any purpose of this Act deposited with the said Registrar; and also to provide for and to regulate the notices to be given and fees to be paid by persons intending to present themselves for examination in any part of an examination or desiring any registration under the said Acts or either of them.

4. Sections 18, 19 and 20 of the Pharmacy Act, 1868, are hereby repealed.

Section 18 *provides that Chemists and Druggists in business prior to the passing of the Act are eligible for election as members of the Society.*

Section 19 *provides that all members shall be eligible for election to the Council, but that the Council shall not contain more than seven persons who are not Pharmaceutical Chemists.*

Section 20 *establishes the class of Associates in Business.*

5. *Persons who pass the Preliminary examination eligible for election as Student Associates.*—Every person who at the time of the passing of this Act shall have been elected an Apprentice or Student of the Society under the provisions set forth in Section X. of the Pharmacy Act, 1852, shall be registered as a "Student Associate" of the Society; and every person who thereafter shall become entitled to be so elected shall be eligible for election as a "Student Associate" of the Society, and shall contribute to the funds of the said Society the same annual subscription as an Associate.

6. *All persons who have passed the qualifying examination eligible for election as Associates; and all registered Chemists and Druggists who are in business on their own account, or who have attained the age of 25 years to be eligible for election to membership and to the Council.*—Every person who shall have been registered as a chemist and druggist under the Pharmacy Act, 1868, by reason of having obtained a certificate of qualification from the Board of Examiners shall be eligible to be elected an Associate of the Society according to the bye-laws thereof, and every person who has obtained or who shall obtain registration as a Chemist and Druggist, and is in business on his own account, or has attained the age of twenty-five years, shall be eligible to be elected a member of the Society according to the bye-laws thereof, and shall thereafter be eligible for election to the Council of the Society, but the said Council shall not at any time contain more than ten members who are not on the Register of Pharmaceutical Chemists; and no person shall in right of membership acquired pursuant to this clause be placed on the Register of Pharmaceutical Chemists.

7. *Unqualified persons not permitted to compound medical prescriptions or to keep open shop for compounding medical prescriptions.*—It shall be unlawful for any person to keep open shop for compounding medical prescriptions, unless he be a pharmaceutical chemist or chemist and druggist, or a medical practitioner entitled to and acting within the exemptions concerning certain medical practitioners made by the Pharmacy Acts, or a person entitled to and acting within the exemption concerning certain executors, administrators, and trustees, made by section 16 of the Pharmacy Act, 1868. And it shall be unlawful for any person to compound medical prescriptions, unless he be a person holding one or other of the qualifications set forth in the foregoing portion of this section or be acting under the immediate supervision of such qualified person. Provided nevertheless that nothing in this section contained shall prevent any person registered under the Veterinary Surgeons Act, 1881, or holding a certificate in veterinary surgery from the Highland and Agricultural Society in Scotland, from dispensing medicines for animals under his care.

8. *Penalties for infringements of provisions in Clause 7. All penalties to be retained by the Society.*—Every person acting in contravention of the preceding section numbered 7, shall for each contravention be liable to pay a penalty of £5, and the said penalties of £5 may be sued for, recovered and dealt with the manner provided by the Pharmacy Act, 1852, for the recovery of penalties under that Act, and all and every sum and sums of money which shall arise from any penalties for offences incurred under section 7 of this Act or under the Pharmacy Acts shall be paid to the Treasurer of the Society and shall by him be applied to the purposes of the said Acts and this Act or either of them.

9. *Exemption of all registered chemists from Jury Service.*—Every person registered as a chemist and druggist shall be exempt if he so desires from serving on all juries and inquests whatsoever, and the name of any such registered person shall not be returned in the list of persons liable to serve in such office as aforesaid.

Insert a new clause providing for election of the Council of the Society. Seven members to go out of office every year in rotation.

11. This Act shall not extend to Ireland.

12. *Short title of Act.*—This Act may be cited for all purposes as the Pharmacy Acts Amendment Act, 1891, and shall be construed as one with the Pharmacy Acts, and shall come into operation on the first day of January, one thousand eight hundred and ninety-one, but no bye-law for the purposes authorized by sections 2 and 3 of this Act shall come into operation prior to the first day of January, one thousand eight hundred and ninety-five.

The Pharmaceutical Journal.

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SATURDAY, OCTOBER 4, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE COUNCIL MEETING.

AT the Council meeting last Wednesday there was a full attendance, with one exception all the members of Council having been present. The one exception was due to a domestic bereavement that was not altogether an unexpected contingency, but has long been, in that respect, a cause of great distress to a zealous and highly esteemed member of the Council, who received from his colleagues an expression of profound sympathy, which will be shared by an even wider circle than that of the readers of this Journal.

The elections to the roll of the Society comprised nine associates and seventeen apprentices or students. The report of the Finance Committee stated that, as is usually the case at this time of the year, the receipts have been comparatively small. Power was asked for the payment of a further sum on account of the fittings of the Society's new buildings, but it has not been found necessary to sell stock though such sale had been authorized. Besides the ordinary payments there was a sum of £55 to the Research Committee as the remainder of the amount originally granted. After the report and recommendations had been adopted, the report of the Benevolent Fund Committee recommended five grants of ten pounds each to applicants for relief, and it was stated that during the past twelve months ten annuitants have died. Information has since been received of the death of Mr. CATTERNS, one of the nine candidates who had been recommended for the election of six new annuitants in December next. One of the applicants, Mr. How, who is not on the list, seeks to be elected an annuitant on the Freemason's Charity, and no doubt many pharmaceutical brethren throughout the country will be able to support his candidature. It was pointed out that the limitation of the number of recommended candidates to nine—or, as it now stands, to eight—was decided upon mainly with the view of saving expense to candidates and their friends in endeavouring to obtain votes, and in connection with this point, Mr. RICHARDSON drew attention to the fact that there are many deserving cases which the Committee is unable to deal with as it would desire. After some discussion on the subject of candidates soliciting for votes, the report was adopted.

The report of the Law and Parliamentary Committee stated that in the consideration of a new Pharmacy Acts Amendment Bill suggestions from Mr. RICHARDS and from the chemists of Carmarthen had been read and discussed, and that full attention had been paid to these and other suggestions as to the limitation of the sale of poisons to registered men; but as the President pointed out it is necessary as a matter of business that in its recommendations the Committee should also bear in mind the forces that will have to be dealt with when the Bill comes before Parliament. The position taken up by members of the trade outside the Society, that Parliament must be induced to grant certain concessions before they will join the Society, was shown to be unreasonable, because the Council would be unable to command attention to such claims unless the whole of the trade were united in supporting the Council. Until that is the case the Council must of necessity be careful not to seek for too much. The main features of the first two clauses of the Bill that had been drafted and recommended for adoption by the Council relate to the internal organization of the educational system. From the point of view of the Pharmaceutical Society it is held to be essential that the system of education should be improved. In view of the necessity that youths should pass the Preliminary examination before commencing the period of pupilage it is proposed that the Council shall have power to require that there shall be an interval of at least two or three years between the passing of that examination and the Minor. In order to provide for a continuous course of study going on during the whole time of apprenticeship it is also proposed that the Council shall have power to divide the Minor examination into two parts, so as to allow of the apprentice passing one stage during his pupilage and finally to come up at the age of twenty-one to pass the remainder. By such means it would at the outset become known to apprentices and their parents what is necessary for ultimate qualification: that the chance of getting a living as a chemist and druggist would depend first of all upon having a sufficient preliminary education at an early age, and secondly upon obtaining the requisite technical training. The effect of these regulations would be for the good not only of apprentices but also of the trade generally, and they would be the means of doing away with many of the worst evils the trade now has to contend with. The next clauses of the Bill relate to the constitution of the Society, which it is proposed to alter, so that associates should have extended to them the privilege of becoming members, without interfering with the inducements held out for passing the Major examination and taking the rank of pharmaceutical chemist. Another clause relates to the restriction to registered men of the dispensing and compounding of physician's prescriptions. If passed it would have the effect of extending the right chemists and druggists now possess in regard to the sale and dispensing of poisons in a manner consistent with the demand for their qualification, and with that regard for public safety which is the chief object of the Pharmacy Acts. The provision, in another clause of the Bill, for exemption of chemists and druggists from jury service, is one which all sympathize with, and there is now a greater prospect of obtaining this privilege than there has been, since the recent decision which makes the personal qualification of the seller of poisons indispensably necessary involves a greater necessity that from the point of view of the public safety the chemist and druggist should not be taken away from his business to attend as a juryman.

The provisions of all these clauses are calculated to be of material service to the trade, and, as the President remarked, it is inconceivable that any portion of the body should object to such a Bill because it does not contain other provisions they would like to see included in it, or that the trade should fail to perceive that the prospect of obtaining any desired legislation must be proportionate to the support given to the Council. Under present conditions it is necessary to proceed tentatively without risk of losing the goodwill of those associated with the Society in Parliament and in the Government, and those who think the Bill too timid and inadequate are not justified in objecting to it so long as they withhold their support from the Society and its Council.

In proposing an amendment to the President's motion for the adoption of the Bill, Mr. Harrison stated his intention of supporting all the provisions contained in the Bill, but he held that since the Act had been found defective it became the duty of the Council to supply the omission by asking Parliament to limit the power of joint stock companies in the future, and he therefore moved the addition of a clause to that effect, which was seconded by Mr. Watt, but after long discussion was negatived by a large majority, the draft Bill being finally adopted in accordance with the recommendation of the Committee.

The classes for pharmaceutical students in connection with the Leicester and Leicestershire Chemists' Association will commence next week. The Practical Pharmaceutical Chemistry class, conducted by Mr. H. Evans, will meet on Wednesday evenings in the Laboratory of the Leicester Technical School. At the Society's Rooms, St. George's Chambers, lectures on Theoretical Chemistry will be delivered by Mr. B. Lewitt, on Tuesday evenings, and on Materia Medica and Pharmacy, by Mr. F. O. Beale, on Friday evenings.

PRESENTATION OF MR. CARTEIGHE'S PORTRAIT.

It would be unfitting to omit calling the attention of our readers to the proceedings of the meeting reported at page 269. Apart from their merely complimentary aspect, they are of importance as giving evidence of the high appreciation of the services that have been rendered to the Society by Mr. Michael Carteighe, in the capacity of President, during the past eight years. This is not the place to enlarge upon the claims that he has established to the gratitude, not only of members of the Society, but also of all connected with the trade, nor would it be possible to add to the simple statement so gracefully made by Mr. Walter Hills in explaining the motives which led to the presentation, which was at once an honour conferred as well as the expression of well-earned esteem on the part of the donors. There will be little fear for the future of the Pharmaceutical Society if it be always so fortunate as to have a President as zealous and energetic in the furtherance of its interests as the one who now fills and for the last eight years has held that position with such high distinction.

The first meeting of the fourteenth session of the Chemists' Assistants' Association will be held at 9 p.m. on Thursday evening next, October 9, at 103, Great Russell Street, W.C., when the inaugural address will be delivered by the President, Mr. A. Campbell Stark.

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The Syllabus of the Sixth Session of the Sheffield School of Pharmacy has now been issued. The arrangements include a course of lectures on Botany, by Mr. John Humphrey, on Monday evenings; a course of lectures and demonstrations on Materia Medica, by Mr. Robert Watts, on Tuesday evenings; a course of lectures on Pharmacy, by Mr. G. A. Grierson, on Thursday evenings; and a course of lectures on Chemistry and Physics and instruction in Practical Chemistry, by Mr. J. H. Worrall, on Thursday evenings. On Thursday evening next the distribution of School Prizes will take place in the Society's rooms, New Surrey Street, when an Address to the Students will be delivered by Mr. William Martindale. Information as to the classes can be obtained from Mr. O. Morrison, Honorary Secretary, 137, West Street, Sheffield.

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The Session of the Glasgow Chemists and Druggists' Assistants' Association will be opened on Wednesday evening, the 15th inst., when Dr. J. McGregor Robertson, M.A., Assistant Professor of the Institutes of Medicine in the University of Glasgow, will deliver the opening address. The meeting will be held as usual in the Waterloo Rooms, Wellington Street.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 1, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Evans, Gostling, Greenish, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Schacht, Southall, Storrar and Watt.

The minutes of the August meeting were read and confirmed.

The PRESIDENT, alluding to the absence of Mr. Hampson, the Treasurer, said it was his painful duty to announce, although most present were aware of the fact, that their esteemed colleague had suffered a severe domestic bereavement, in the loss of his wife, which, though not altogether unexpected, had considerably affected his physical health for the moment, and he was therefore unable to be with them that day. He was sure that every member of the Council would deeply sympathize with him in his loss.

ELECTIONS.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Hayton, Thomas Irwin	Wigton.
Hill, Joseph Harrison	Birmingham.
Hodson, Ernest Albert	Bromsgrove.
Holgate, Herbert	Catterick.
Sanderson, Joseph	Glasgow.
Style, John William	London.
Taunton, Edgar	Sittingbourne.
West, Cecil Maxe	Retford.
Williams, William	St. Clears.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Alcock, James Elsworth	Sheffield.
Allen, Herbert Llewellyn	Basingstoke.
Bonner, Clifford Goodwin	Berechurch.
Brooke, Benjamin	Scarborough.
Clark, Wm. G. Johnson	Leicester.
Dangerfield, Walter John	Leamington.
Davies, Richard Lewelyn	Pontardawe.
Jones, Geoffrey Stuart	Monmouth.
Kenion, Walter	Yeadon.
Keys, Sydney Hudson	Boston.
Roberts, William	Denton.
Rugg, Arthur Vivian	Crewkerne.
Sikes, Alfred Walter	Cork.
Sturton, Frederick	Peterborough.
Sturton, Samuel Amsworth	Framlingham.
Swinney, William Paulin	Morpeth.
Turner, George Pain	Taunton.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

RESTORATION TO THE REGISTER.

The name of the following person, who has made the required declaration and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

John Pye, 68, Paulet Road, Camberwell, London, S.E.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee was of the usual character.

The PRESIDENT (Chairman of the Committee) in moving its adoption said the receipts were rather small, as was always the case at this time of year, and in regard to the Benevolent Fund account were chiefly from ground rents. The donation account remained the same as in August. With regard to the payments, they were of the usual character, excepting £55 to the Research Committee, being the portion now due of the amount originally granted. The Committee also asked power to pay an additional £400 on account of fittings, etc., for the new building, on the certificate of the architect. It had not yet been found necessary to sell out any stock, although a sale had been authorized.

The report and recommendations were unanimously adopted.

REPORT OF THE BENEVOLENT FUND COMMITTEE.

The report of this Committee included a recommendation of the following grants:—

£10 to a pharmaceutical chemist from 1853 to 1889 (aged 62) who failed in business, and is in ill-health and unable to earn his living. (Norfolk).

£10 to a registered chemist and druggist (aged 66) who had a similar grant in October last. (Hants).

£10 to the widow (aged 37) of a registered chemist and druggist, having two children, aged 3 and 5, to support. Applicant has been assisted on a former occasion. (London).

£10 to a former associate and member (aged 67), formerly in business, but now dependent on his relatives, who are in poor circumstances. (London).

£10 to the widow (aged 60) of a pharmaceutical chemist member (1853-1880) and subscriber, who died in August, 1889. Applicant was unable to continue her late husband's business, and suffers from rheumatism and defective sight. (Liverpool).

Four cases the Committee had declined to entertain; one had been deferred for further inquiries, and in one case the Committee recommended that the name be placed on the list of candidates for an annuity. The deaths of two annuitants had been reported.

The Secretary had reported that in October last there were forty-eight annuitants on the list, four were elected last December, and ten had died during the past twelvemonths, leaving forty-two. The Committee recommended that six annuitants be elected in December next.

The following is a list of approved candidates as recommended by the Committee:—

Bensley, Harriet M.
Brown, Eliza.
* Catterns, Heneage P.
Davis, Samuel F.
Hills, Henry.
Rowan, Mary B.
Skoulding, William.
Spendelow, Mary E.
Suggate, Henry E.

The VICE-PRESIDENT (as Chairman of the Committee), in moving the adoption of the report, said the list of applications was rather long, but not exceptionally so considering that it covered two months. The cases were of the average kind, most of the persons applying being advanced in life, and he hoped the grants made would prove of substantial service to them. He would call particular attention to one case, that of Mr. How, who was a Freemason, and was seeking to be elected an annuitant on the Freemasons' Charity. He mentioned the case in the hope that some of their friends might be able to assist him in that direction. With reference to the election of annuitants in December the Council possibly might have seen its way to extend the list beyond six, seeing that ten annuitants had died during the past twelve months. But it was felt desirable, as far as practicable, to observe a certain amount of uniformity in this matter, and for the same reason as it was determined last year to elect only four, lest an undue strain should be put upon the resources of the Society, it was decided this year to recommend the election of six. Nine candidates had been selected for approval, all of whom were thoroughly deserving of assistance.

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* Information has since been received of the death of Mr. Catterns.

Mr. Atkins having seconded the motion,

Mr. Richardson said he thought it was a pity that the Committee had not put more than nine approved candidates on the list, as there were others who were thoroughly deserving.

The President said Mr. Richardson would no doubt appreciate the fact that the Committee exercised discretion in this matter, mainly with the view of saving expense to candidates. It was not desirable that the number of candidates should be much in excess of the number to be elected, because the candidates or their friends sometimes went to considerable expense in endeavouring to obtain votes. It was quite possible also that the persons to whom Mr. Richardson alluded might not, in the opinion of the Committee, have so good a claim as those selected.

Mr. Richardson said his main object in mentioning the subject was to draw attention to the fact that there were many deserving cases which the Committee was unable to deal with. He would have liked it to recommend the election of eight annuitants or more.

Mr. Watt thought it would be well for the Council to give a very decided opinion as to the undesirability of candidates going to needless expense in soliciting votes. He thought it should be stated that the Council did not approve of the issue of cards for canvassing purposes.

The President said the question was discussed very carefully some three years ago, when there seemed to be only two courses open, one to allow candidates or their friends to adopt what methods they chose, either to solicit votes or leave their case in the hands of the members, and the other, which some thought would be better, would be for the Council to itself elect the annuitants. But the custom was so universal now, although there were some notable exceptions, and it appeared that the feeling of the subscribers and members were so much against the latter course, that it was feared the subscriptions would fall off very much if the present plan were departed from. Mr. Watt, if he attended one of the elections, would be surprised to see the very large numbers of persons who took an interest in the candidates; therefore, from a financial point of view, it was not desirable to interfere.

The Vice-President said the Council might perhaps do something to restrict the period during which canvassing went on. It was within his knowledge that cards were being sent some weeks ago on behalf of one of the candidates, indicating, though not in exact terms, that it was in view of the election in December. These were not sent by the candidate, but by energetic friends, and he replied, informing the person who sent the cards that until the Council met there was no certainty of an election being held in December, and that it was very undesirable for any canvassing to take place until the determination of the Council was made known. He thought if that were widely known it might save undue expense on the part of friends of candidates.

The report was then unanimously adopted.

It was also resolved unanimously that six annuitants be elected to the Benevolent Fund, and that the election take place on Thursday, December 4.

Report of the Law and Parliamentary Committee.

Draft of the Pharmacy Acts Amendment Bill.

Three meetings of this Committee had been held, at which letters from Mr. Richards, of Treherbert, on the subject of the new Pharmacy Acts Amendment Bill, and also resolutions passed at a meeting of chemists and druggists at Carmarthen, were read. The latter were to the effect that no poisons should be sold except by registered men, whether contained in patent medicines or not; and also that all chemists and druggists on the register should be eligible for membership of the Society on the same terms as pharmaceutical chemists and should be exempt from jury service.

The Draft Bill had been further considered, amended, approved and recommended for adoption by the Council. The Bill is printed on p. 271.

The President, in moving that the report and recommendations of the Committee be received and adopted, said there had been three meetings of the Committee attended by all the members, except on the last occasion, when the Treasurer was absent. The greatest consideration had been given to the various suggestions made outside the Council, at meetings and elsewhere, and to private correspondence with regard to embodying anything which was practicable in the new Bill, but he must say at the outset that the Committee in making this recommendation did so as men of business, who were dealing with a serious measure of business, and who calculated the forces with which they would have to deal when the Bill came before Parliament. As he had said before, it was very easy for twenty-one gentlemen sitting there to draft a Bill which would please the whole of the drug trade, and it was a very popular thing to make promises of what one would do if he were elected to the Council and of the various improvements he would recommend in pharmaceutical laws which would benefit the trade at large. But he thought he was interpreting the sentiments of the members and associates at large when he said that they returned members to the Council to do in their collective capacity what individual members were unable to do, and that on the Council rested the responsibility of making proposals which were reasonable and practicable. He also thought it would be highly impolitic to bring forward proposals that would only be scouted by the Government or laughed at by members of Parliament and even by their own friends. Accordingly this Bill did not contain various provisions which probably some members of the trade, and their friends, would like to see incorporated; but he did not propose to do more in the first place than recapitulate the clauses in the Bill, reserving any observations he might have to make on the omissions until the close of the discussion. The first two clauses had reference to the powers which had been sought for before, for making bye-laws which would provide for a curriculum, and for the division of the examinations. He wished it to be borne in mind that this power of dividing the examinations was very important, even apart from the curriculum. A good deal had been said about the curriculum Bill, which was a short name for the previous draft, and not quite a correct one, for that Bill if passed, and the present one if passed, would give power not only to impose a certain course of study, but also to separate by a certain length of time the Preliminary from the qualifying examination (which all who took an interest in education felt to be of paramount importance), and also to divide the Minor in such a way as to allow an apprentice to pass one stage during his pupilage, probably in writing at his own home, and then finally to come up when he was twenty-one, and pass the remainder. It was believed that if the Council had such power the examinations could be made better, safer, and easier tests for the candidate. When he said easier, he did not mean that there would be less knowledge required, but there would be a continuous course of study going on during the whole time of the apprenticeship. He considered it of the utmost consequence to the future of pharmacy that the Council should have power to divide the examination into parts, and be able to place an interval of two or three years at least, if not more, between the Preliminary and the Minor. They all knew that the tendency of examination processes, as now carried on, was for the apprentice in the country especially, as well as in London, to spend a large part of his time during his apprenticeship in acquiring the knowledge necessary for the Preliminary. In this statement he would be borne out by the Vice-President and others who had had experience in the examination room. At present there was no power to impose a longer period than three months between the Preliminary and the Minor, and therefore instead of the Preliminary being, as it should be, a test of fitness to enter the calling, it was comparatively worthless, except where masters insisted that it should be passed before the period of pupilage. Unfortunately, very many masters did not insist on that. It has sometimes been said that such a Bill as this was no good to the trade; but those who had fathered such a Bill from time to time thought that it was good for the trade as well as for candidates. A large part of the evils the trade was now suffering from was due to the want of capacity of the men who presented themselves for examination, and were driven back like sheep from the examination boards, some never to return, some to return and again fail, and then never more to return. What became of them? They were the outcasts of pharmacy, and, like the outcasts of the medical profession, they became the pirates of the calling that they had desired to enter. They were scattered broadcast over the country, doing an amount of injury to legitimate pharmacy, which was very much greater than could easily be calculated. Those who had to do with prosecutions, especially the President, who had to go into very minute details on such matters, found repeatedly that the man who had failed in his examination two or three times gave up, and became as hostile to legitimate pharmacy as a convict did to the ordinary laws of the country under which he had been convicted. It was desirable therefore that the course of instruction should be regulated to suit the examination; that the apprentice of the future should know that his chance of getting a living as a chemist and druggist would depend first of all on his having sufficient preliminary knowledge at an early age, and that he should also know what he would have to do in order to become qualified. He could refer to cases in which apprentices had not been told until they were twenty-one that they had any examination at all to pass. Of course the result to such unfortunate young men was terrible in the extreme. It was now proposed to give to the Council facilities for dividing the examination, by bye-laws which must have the approval of the Privy Council, in such a way as not to cause an undue strain on the candidate, and that he should not be compelled, as he now is, to be examined on one day in six subjects, five of them *vivâ voce*, one practical and *vivâ voce*, and one entirely practical. It was doubtful whether under the present powers anything could be done to ameliorate this condition of things. He thought he had said enough to show that this portion of the Bill would be a good thing for the trade. The next clause referred to the repeal of certain sections which were printed in italics. It was proposed to alter the constitution of the Society with regard to the grades of associates in business, associates and apprentices, and the first thing was to repeal the existing sections. Then came two clauses which had for their object the formation of the new constitution with regard to titles. It was proposed, with regard to the first grade, that the apprentice of the Society should be termed a "student associate," but that was not a very serious thing, and the name was not chosen because it looked tall or was intended to mean anything elaborate; but the apprentices, practically, would have the privileges of ordinary associates, and the great mass of apprentices registered under the statute were so constantly confusing their status in that respect with that of an apprentice or student of the Society, that it would be a great convenience to have a different name. When a youth passed the Preliminary he was put on the register as an apprentice, and he then thought he was a registered apprentice of the Society, whereas in order to become such he had to be proposed and seconded like an associate or member and pay a subscription of half-a-guinea a year. The next clause proposed that in future every person on the register of chemists and druggists, whether by examination or not, should be eligible to be made a member of the Society. Of course it would be understood that the word eligible was used to indicate the meaning of the clause, but the actual form could only be definitely settled when bye-laws were framed based upon this Bill. The meaning was that in future every chemist and druggist should be eligible to be proposed as a member of the Society and have all the privileges of a pharmaceutical chemist as regarded Society matters. It was proposed, however, that in the case of an examined chemist and druggist he should be allowed to be an associate until he went into business or was twenty-five years of age. This might be considered in one sense a restriction of the political privilege and had caused a little comment from time to time and the Council would have been glad to see its way to allow a Minor man to be admitted immediately after passing his examination as a member; but the officers of the Society who came in contact with all these young men were clearly of opinion that, although a few would like this privilege, a great majority would prefer to have a year or two in which to remain associates, and therefore it had provided that whenever a man went into business, whether he were 21, 22, 23, 24, or 25, he should become at once eligible for membership, that is to say the future associate in business must be a member. On the other hand, every man at the age of 25 must give up his associateship and become a full-fledged member if he desired to retain his connection with the Society. It was thought that this arrangement would meet the various conditions under which the young Minor men were placed in various districts of the country, and it was reasonable to suppose that Minor men who might hereafter contemplate becoming Majors, but had not quite so much money to spare as those who had finished their education would appreciate this change and take advantage of it. He had had an opportunity of addressing a few meetings where this question had arisen, and in each case the feeling had generally been in favour of it. There was a provision at the end of the clause, however, which distinctly stated that no chemist and druggist on the register who had become a member should, by virtue of that membership, become a pharmaceutical chemist. It was necessary to include that, because in the 1852 Act pharmaceutical chemists were created by being elected members of the Society, and the Act of 1868 confirmed that arrangement. The clause also provided that the Council should not contain at one time more than ten chemist and druggist members; but it must be remembered that the other members of the Council, who were also members of the Society, would be pharmaceutical chemists, and would also be chemists and druggists, and it was thought that if at any time there were a question on which the interests of pharmaceutical chemists were considered to differ from those of chemists and druggists, the presence of ten chemists and druggists on the Council would be quite sufficient to give their views full consideration. At the same time having regard to the fact that the Bill would practically take away nearly all the privileges of the Major men, he thought they had some claim to consideration. When the Act of 1868 was being drafted it was proposed that men who passed the Minor should become members, but that had to be abandoned on account of the opposition of the Major men. As far as he knew, the majority of the present pharmaceutical chemists were disposed to be loyal to the Society as a whole, and were quite willing to be associated with their brethren who had only passed the Minor. Considering, however, the traditions of the Society, and the fact that it had educational and examining work to do, it was desirable that there should be some little stimulus left to encourage young men to pass the Major examination, and this possibly might help in that direction. The next clause was also included in the draft Bill of last year, and proposed to ask the Legislature to restrict the compounding of medical prescriptions to registered persons, with the usual exceptions. He need not say much about that clause, though he thought a great many of their friends in the country last year were some time before they realized what it meant. If it were passed it would be a direct gain to the trade, which many hardly realized. It had been pointed out from time to time that there was no restriction on the compounding of medical prescriptions, and that chemists and druggists could in fact only claim the right to sell and dispense poisons. It was only right that as they were qualified they should receive from the Legislature the sole right to sell and dispense medicines, but, unfortunately, at present their rights were limited to certain statutory poisons. If this clause were passed he believed that in the future much more dispensing would be done by chemists and druggists, especially in country places, and that it would tend very largely to the decrease of dispensing by medical men, at any rate in the larger towns. The next clause had reference to the penalties, and needed no special comment, and the following was one in which all were interested and with which he believed all were in sympathy, and he hoped it would be passed into law. It provided that every person registered as a chemist and druggist should be exempt from jury service if he so desired. This proposition had been often put forward and impressed upon the Council, very frequently without a full knowledge of the circumstances under which pharmaceutical chemists were exempt. It was very often supposed that there was a clause in one of the Pharmacy Acts which exempted pharmaceutical chemists, whereas the fact was that this exemption was obtained in a Juries Act which was passed before there was any register of chemists and druggists whatever, and the Council at that time was able, through the active exertions of Mr. Elias Bremridge, to get Parliament to insert in committee in the Juries Bill the two words "pharmaceutical chemists." There might perhaps be some objection on the part of the Government or Parliament to include in a Bill amending the Pharmacy Act anything affecting jury service, but he hoped if any difficulty arose it might be successfully overcome. It was only fair to say, as had been repeatedly mentioned lately, that under the recent decision which made the seller directly responsible there was a greater necessity from the public point of view that the chemist and druggist should not be taken away from his business. At the same time it was only right for him to say that he had reasons to believe and to know that if a chemist and druggist put his case before a judge he could in most cases get exemption; but he must come to the court to do so. That knowledge might perhaps be of some use to those who were without assistants in their business. He was thoroughly in sympathy with this clause, and would add that those connected with the Society did not want to claim any exclusive privilege to themselves. When it was given there were no other registered classes existing. The pharmaceutical chemist class was registered, but the chemists and druggists at that time had declined to join, and unfortunately as a consequence had for some year been liable to do the same service as those engaged in ordinary businesses. It was proposed further that a clause should be inserted, altering the numerical relationship of those who went out of office each year. The present course was for fourteen to retire, seven being selected by lot, and the new Council consisted of those who had been in the previous year, and fourteen who had been elected during the current year. It was proposed to adopt the suggestion which had been often referred to there, and follow the course ordinarily adopted in corporations, of dividing the Council into three parts and letting one-third retire each year. The present system was devised in 1843; it was founded on the Charter, not on any Act of Parliament, and was adopted rather more on the notion that the Society was a sort of voluntary scientific society than the body which it had gradually become, with the various responsibilities thrown upon it by law. Those were the clauses included in the Bill, and for the present he would not say anything about what was not in it; but he hoped his colleagues would after that day's discussion be of one mind as to what they would go for. He could never understand how any portion of the trade could object to a Bill because it did not contain all they would like to see, or how they failed to see that their means of obtaining more legislation was directly proportional to the number of people they could influence. They were told by the trade who did not belong to the Society that the Council must go to Parliament and get certain things before they would join, whereas all the members of Council knew that they could not get what they wanted unless and until the whole of the trade was united. They wanted the same power that miners, working engineers, and almost every class in the community possibly had of going to Parliament and saying that they represented, not the Pharmaceutical Society, but the whole of the registered persons who were qualified to sell and dispense poisons. He wanted those in the trade who cavilled at the weakness of this Bill, the want of force in it, the want of backbone, the want of pluck on the part of those at the head of affairs and so on, to lend their aid to the Council. Let them have ten thousand people ready to follow the Council, and they might ask for a Bill with reasonable hope of being listened to. But as long as the Council was in the position it was in at present it must proceed tentatively, and above all things not lose the goodwill of those with whom it was associated in Parliament and in the Government. The Council must, therefore, be careful not to ask for too much lest they got nothing but ridicule. He concluded by moving the resolution.

Mr. MARTINDALE in seconding the motion said the President had reviewed the Bill so fairly that he need not go over the ground again. It was very much the old Bill, but it embodied a great deal more. There was the curriculum, and there was the attempt to consolidate the Society by giving to all associates the opportunity of becoming members when they attained the age of 25 or went into business. Then there was the compounding clause, which was very important, and the jury clause, which he hoped might be passed, as he thought there was a right to exemption, in order to relieve those who carried on business from the intolerable hardship of having to serve on juries in small towns where the sale of poisons by unqualified persons might be dangerous, and it was all the more necessary in view of the case lately decided on this point. The alteration with regard to the Council was not of very great importance, but he thought the change would tend to strengthen the Council and keep it in a stable condition. It would not be liable to any sudden fluctuation, such as might happen if fourteen new members were elected in one year; but at the same time, if occasion arose in which the action of the Council had been unpopular, seven new men might be elected, and this would certainly have great weight when the new Council met. He thought the alteration of only allowing seven to retire instead of fourteen would give sufficient change to allow new opinions to be fully represented and discussed. The provision for a slight majority of pharmaceutical chemists on the Council would at first hardly be felt; it would be only probably after some years that ten chemists and druggists might get on the Council, and as far as he had thought the matter over he thought that would give them a full representation of their views. It might be a debatable point whether the representation should be thrown fully open, but he thought the slight preponderating majority of pharmaceutical chemists of 11 against 10 was only right. He should give his hearty support to the Bill as now proposed and hoped that it would be received by the country with better grace than the last one. It was brought forward at an earlier period, and he trusted it would receive that attention and mutual support which he thought it deserved.

Mr. **Harrison** said he heartily concurred in what had fallen from the President, and supported all the provisions which the Bill contained, but at the same time reserved to himself the freedom of criticizing what it did not contain and of commenting on the principle enunciated by the President upon that point. It was a distinct advantage that a measure was now undertaken which would result in the consolidation of the Society, and he very fully supported the President's closing appeal, as to the great advantage which would accrue to the trade if only the Council could induce a large number who now stood aloof to become one with the Society. In that way pharmacists would acquire an amount of political power and influence which at present admittedly they did not possess. The ten thousand to whom the appeal was addressed would, he trusted, be more willing to listen to it now than they had been in the past, and if one effect of the Bill becoming law should be to draw a large portion of that ten thousand into the Society it would be a decided gain. He also agreed with the remarks that had fallen from Mr. Martindale as to the advantage of an alteration in the retirement of a certain number of the Council. It had been plain to everyone who had watched the proceedings that it was a somewhat clumsy method that one-third should go out, not on account of anything they had done, or had not done, but simply as the result of a ballot. It was an unseemly and improper thing, and it would be far wiser to adopt what was done in town councils, and let one-third retire annually, so that it was always known beforehand who had to be re-elected. It gave a degree of continuity to the policy of the Society, and the fact that no man was safe for more than three years would also give a wholesome sense of responsibility. Something of this kind would probably happen, as happened in many town councils; for the first two years a man felt a certain degree of freedom, and for the third year he had a wholesome sense of what might happen to him. He also agreed with what had fallen from the President with reference to the exemption from jury service. He had taken great interest in this subject, but he had never yet dared to put it forward that the Pharmaceutical Society had taken an unfair advantage of chemists and druggists, as he was perfectly well aware that it was simply through the accident that pharmaceutical chemists were a registered and compact body which could be easily recognized, that they obtained an exemption, whereas the chemists and druggists were at that time not so compact, and were not registered, and therefore they were left out in the cold. But his contention had been that as that state of things was now altered so the exemption ought to be extended; and he trusted that Parliament would see that this was a perfectly reasonable proposition and grant what was asked. Having said so much in support of what was in the Bill, and expressed his concurrence with what had fallen from the President as to the way in which the subject should be approached, he must now take exception to what he had said as to the method of procedure in general. He said as men of business it was their duty and policy to ask for that which they believed would be granted. There he differed from him. What was their position? They were taking up the position of amending an Act of Parliament in which certain conditions were laid down as to the qualifications of the men who should discharge certain duties. They had found whilst that Act of Parliament had been in operation there was a very serious omission in it, and that contrary to the intention of those who framed it a number of people were practicing pharmacy who were not entitled to do so. Therefore in asking for an amendment of the Act their first bounden duty was to supply that omission, and to ask for that which would put the Act right, and for that which they believed to be right in principle, and it was the duty of Parliament to grant that which it might think expedient. It was not for pharmacists to ask for what they thought was expedient or they could get, but for that which they believed was right, and what the circumstances of the case demanded, and it was for Parliament to say how far it was prepared to grant this, and how far it was expedient to do so. When the President put it to them as business men, he did not deny the President's claim to be a business man, but as a business man himself, his experience had been that it was better to ask for all you wanted, and a little more if you intended to get what you did want, while very likely the man who asked for less than he required did not get even that. The more you asked the more likely you were to obtain that which you believed you were right in asking for. That was simply on the ground of business; but on the ground of principle, when an Act was going to be amended it ought to be amended in the fullest possible sense. On this account he thought they were bound to take notice of the serious omission in the Act of 1868, which allowed unregistered and unqualified men to carry on business as chemists and druggists by simply forming themselves into a joint stock company. The President had asked what became of the men who came up time after time for examination, and were rejected. But did not the very fact that these men were allowed to combine with others to carry on trade provide them with a refuge? What did the man do who came up and twice failed, and was twice convinced that he was unable to carry on business in a legal manner? He took to himself six or seven spirits more ignorant than himself and carried on business in spite of all the Society could say or do. That was an anomalous state of things which ought to be rectified. He was fully sensible of the great difficulties that attached to the question, but the fact that it was difficult should not deter them from making some attempt to deal with it. His own impression was that they ought to ask Parliament to put a limit on the power exercised by joint stock companies. Of course it would be worse than useless to ask that all joint stock companies now trading in pharmacy should be at once stopped, but he thought they might do what he was about to propose with perfectly good grace. If they could point out that the Act was regularly evaded by men taking advantage of the Joint Stock Companies Acts they could show a good case why it should be enacted that for the future no persons should be allowed to register themselves as a joint stock company for the purpose of carrying on a chemist's business, and that after the passing of the Act it should be illegal so to do. In the case of an individual who had undergone examination and training and had satisfied the legal authority that he was competent to carry on his business, it was required not only that the man who kept the open shop, but the man who conducted all the operations in that shop, so far as the Act was concerned, should also be registered, so that there was a double safeguard; but in the case of a company it was only required that the man who actually carried on the sales should be registered. In the case of the individual there was a double check, and why should it not be so in the case of the company? The registered man was personally, morally, and pecuniarily responsible for his acts. A registered company could have no moral responsibility, for a corporation had neither a soul to be saved nor a body to be burned; it was only pecuniarily responsible to a limited extent, and personal responsibility there was none; so that in their case the first line of defence of the public safety was done away with, and only the second one was left, namely, that the person who carried on the sale should be registered. He proposed, therefore, that a clause providing that after the passing of the Act, the business of a chemist and druggist, and keeping an open shop for selling poisons and dispensing medical prescriptions should only be carried on by a pharmaceutical chemist or chemist and druggist, or joint stock companies (other than *bonâ fide* co-operative societies) who were registered before the passing of the Act. In the case of those joint stock companies which now carried on business, he would propose that they should be compelled to supply the registrar from time to time with the name of the registered chemist who was in their employ acting as manager, and conducting sales under the Pharmacy Act. That would meet the objection which was felt by the trade. No one could say that injustice was done to any person who had embarked capital in the business, because he would be allowed to go on; but it would put a stop to a system which was nothing else than an evasion of the law. He begged to move as an amendment the addition of the following clause:—

> It shall be unlawful for any person or association of persons other than pharmaceutical chemists, or chemists and druggists, or joint stock companies registered before the passing of the Act, to sell or keep open shop for the selling of any poison within the meaning of the Pharmacy Act, 1868, or to compound any medical prescription, or to use, or assume, or exhibit the title of pharmaceutical chemist, or chemist and druggist, or chemist, or druggist, or pharmacist, or pharmaceutist. And whereas it is expedient for the safety of the public that joint stock companies already in existence, and registered as aforesaid, before the passing of this Act, shall be *bonâ fide* conducted by and be under the personal supervision of a duly qualified chemist registered under the provisions of the Pharmacy Act, and that the names of such qualified chemist be disclosed, it is hereby enacted that on and after the passing of this Act:—
>
> I. That every joint stock company at present keeping open shop and registered as aforesaid shall supply the registrar with full information as set forth in Schedule (A) to this Act, and shall immediately intimate to the registrar any change in the managership or in the locality of the open shop.
>
> II. That the duly qualified chemist as aforesaid shall be responsible for the due observance of the provisions of the Pharmacy Acts, except clause 17 of the *Pharmacy Act* of 1868.

Schedule A.

Name of Company.	Address.	Name of Qualified Manager.	Locality of open shop.
British Drug Company.	60, Princes-st., Dunedin, N.B.	Jas. Smith.	60, Princes-st., Dunedin.
		John Brown.	40, North Bridge, Edinburgh.

Mr. WATT seconded the amendment. He said after the elaborate analysis given by the President and the exhaustive speech of Mr. Harrison he would not occupy much time in speaking to it, especially as he had repeatedly in Committee expressed his opinion already. But he thought this opportunity should not be allowed to pass over, and he must frankly say that although he agreed generally with what the President had said about the Bill, still so far as the just wants and aspirations of the trade were concerned he considered it an absolute failure, and the probability was that it would meet the fate of former Bills. He quite agreed with all that had been said about it. The omissions were so serious and the evils under which the trade laboured were left so untouched that he did not think the Bill would excite the sympathy and enthusiasm of the trade sufficiently to carry it through Parliament. The President had asked whether as business men they could go to Parliament to ask for more than they thought they could get, but it was as a business man that he went to Parliament on this question. The present Act, under which severe restrictions were imposed, was now constantly violated, and they were bound to go to Parliament and see whether it endorsed this violation of the Act. It appeared to him that if the Council were unanimous on the subject, and if the trade backed it up in this matter, it could even force a reluctant House of Commons to do justice. There was no doubt that the present House of Commons (and it would be the same with any House likely to be elected) was much imbued with what was called the principle of free trade, and would be very chary in granting any privileges to chemists to which they were not entitled; but if it was to be perfect free trade the Act of 1868 should be abolished and there should be no restriction at all. If unqualified men in the shape of a company could keep an open shop and carry on the business of a chemist, why should not every other person be able to do the same? Some people thought this was dying out, but his opinion was that it was only beginning, and the result would be, after a very short time, that the Society would have to take the subject up very seriously if it did not do so at present. He was very much taken with two clauses in the new Irish Pharmacy Act, and as he understood this motion was not for the final adoption of the Bill, but that it was to be sent to their constituents for consideration, and that amendments might hereafter be considered, he would suggest that before it was finally adopted by that Council, to be brought before Parliament, that both the 17th and 18th clauses of the Irish Pharmacy Act should be embodied in it. He did not read that 17th clause in the same light in which he did at first, when he thought it legalized limited companies, for on careful consideration—though he should like to be fortified in his opinion by more competent authorities—he thought the words "shall personally manage" showed that it could not apply to a corporation. Then the 18th clause was one which gave power to the registrar to compel the proprietors to disclose the name of the person who conducted the business, and that he thought was very important. If those two additions and the proposal made by Mr. Harrison were adopted it would be a Bill which would ensure the sympathy and the support of the trade generally; but as it was he did not believe it would be of any use.

Mr. Richardson asked if Mr. Watt meant to say that if the Society could not put down the stores it should abandon examinations altogether?

The President said that Mr. Watt had not said so. He hoped the Council would not be led away by Mr. Watt's last proposal, for if it were adopted he was much afraid it would legalize the bodies they did not want to legalize. For the purpose of the present discussion it would be well to leave that point.

Mr. Atkins said he understood the President to say that this Bill was the definite result of very prolonged and careful consideration by the Committee, but not that it was of the nature of a Medo-Persian decision which was not to be reversed or amended. The Bill was presented with the idea that it should be most fully and freely discussed and therefore it was susceptible of comment as well as consideration. He would point out that it was an enabling Bill and it was important that that should be considered. It was of great importance for the power it would give of passing bye-laws by which definite regulations could be established. The great advantage of the curriculum or educational clauses appeared to him to be this, that they would tend to promote steady and continuous education. He felt very strongly that there was a great responsibility resting on masters, which many of them did not realize, and consequently did not fulfil, and this division of the examination would bring home to them the fact of this responsibility, not simply to give mere technical or manual training to their apprentices, but to give them also some amount of educational assistance. With regard to the "student associate" clause he had only one remark to make, and it was not made in a hostile spirit, for he feared it was impracticable, but still he should be very glad if it were found possible to enable a young man passing his examination to at once become a member of the Society, and not to have to wait until one of two conditions were fulfilled, either his attaining twenty-five or going into business. It was within his knowledge that some young men would be glad directly they have passed the Minor, having the means, and having also a certain historic connection, through their fathers and forefathers, with the calling, to at once become members of the Society; but he understood there were some difficulties in the way, and therefore he only made the suggestion. With regard to the question which might be raised further on, that the representation on the Council should be thrown open to the whole body of members, he wished to say at once that he did not think it would be desirable to go beyond the number of ten for the chemist and druggist section. He was not aware that it was desired, but if it were he should argue very strenuously that the retention of the majority of 11 to 10 was only just and fair. With regard to Clause 7, he could only say with all his heart that he should be glad to see a clause of that kind carried. Pharmacists fought over poisons, but most of them would be heartily glad to get rid of them; they were an intense annoyance and worry in the shape of the restrictions the sellers were compelled to comply with—most properly so—and they would be delighted to get rid of them; but they could not ask for that, as the duty of dealing with them was wisely thrown upon them by their education. Still they ought to claim, as they fairly could, the dispensing of prescriptions. Of course there was a clause exempting medical men dispensing their own medicines. He would urge with all his heart the necessity of union on this matter, and he was profoundly sorry that Mr. Watt, whom he had recently been visiting, and who he knew was immensely respected in his own neighbourhood, should say that this Bill was an absolute failure. He hoped he did not mean it, because what chance of success was there if it were admitted at that table that the Bill was an absolute failure. Even Mr. Harrison did not go so far as that. He blessed the Bill so far as it went and only banned it because it did not contain all he would like to see there. As he understood Mr. Harrison, his view was that the Council should go to Parliament asking for all that could possibly be demanded, with a hope that it might get something less.

Mr. Harrison said that was scarcely what he had said. He would go to Parliament for everything necessary to make the Bill complete, in accordance with the principles already recognized and laid down. He had afterwards said, taking up the argument as addressed to business men, that they frequently asked for more than they desired with a view of getting what they did desire; but he went on the principle of making the Bill complete.

Mr. Atkins said he did not quite appreciate the distinction. It was evident Mr. Harrison would ask for a great deal, with the natural expectation that he would get very much less than he asked for, and in that he could not agree with him. He thought the Council would stand a very much better chance by going to Parliament with a reasonable Bill, which contained conditions likely to be complied with. He had listened with attention to hear what Mr. Harrison would add to the Bill, and there he was at complete issue with him, and if he stood in the complete minority of one he would not be a party to the recognition of that which he deemed to be unjust. It had been forced upon them by the discussion in the great case in the House of Lords, and by the actual condition of trade in the country, but it was always felt to be unrighteous, and he was not going to be a party to recognizing it. Mr. Harrison would recognize the past, but would distinctly render illegal any future action on the same lines. It seemed to him that he must at once see that if he went to Parliament with that argument he would be asked, Where is your logic and consistency? The only safe line to take up, which had been forced upon them, was to go in for the personal qualification of the actual distributor of the poisons. Of course he should like to go for further powers; but Parliament would simply say that chemists and druggists were arguing for trade unionism for their own personal interest and not for the public safety, and would pay no attention to them. The only chance of success was to go on the broad ground of public interest. He would close by a personal appeal for union. It was perfectly true, as Mr. Harrison had put it, that if they went to Parliament with a divided Council, and the President in the lobby of the House, or anywhere else, had to admit the fact, it would be the old story over again that those who were divided were conquered.

Mr. Schacht said he could not refrain from making one comment on the appeal made by the mover of the amendment. Mr. Harrison had argued from expediency to principle. That word had been so often laughed at in his mouth that he could not help feeling rejoiced to hear another gentleman using arguments based, as he had sometimes done, on what he thought was likely to be a guiding motive in forming one's judgment. But he would remind him that the principle which lay at the basis of the Act of Parliament and the proceedings of many councillors in early days had been put behind them, not merely by the high legal authorities to whom appeal was made in the courts of law, not merely by those outside, but by the Council itself, which a few months ago endorsed a new principle, that the responsibility in the management of things pharmaceutical lay with the individual whose hand distributed the dangerous article. The Council itself had done that; it had not been put upon them by legislation or by anybody else, and there was only one person on the whole Council who thought it was doing wrong.

Mr. **Watt** desired to say, in reply to Mr. Atkins, that he quite endorsed all he had said about the Bill. He did not wish to be misunderstood. The failure of the Bill was that it did not satisfy the just aspirations and wants of the trade.

At this point the **President** said it would be convenient to adjourn for luncheon.

The **President** having left the room,

The **Vice-President** said it would be within the knowledge of most of the members that after luncheon he was to be asked to take the chair in the examination room, where some of the President's friends would assemble with the intention of presenting to the Society his portrait, and that he should be asked to accept it on behalf of the Council. Before doing so, he thought it would be more in order if he had the authority of the Council to accept the portrait, otherwise it would be necessary to accept it provisionally and come to the Council for a ratification. He should assume, if no objection were raised, that he had the authority of the Council to accept the portrait.

On resuming the sitting,

Mr. **Evans** said he was very pleased to have been present at the ceremony just concluded (the presentation of the portrait) and heartily endorsed every word which had been said by Mr. Hills. With regard to the question now before the Council he did not know that it affected those in the part of the country in which he lived, as it was their intention to go for legislative powers of their own, and when they had the management of their own affairs no doubt they would deal with these matters. But in the meantime they would be prepared to render every assistance they could to the Society. Seriously he believed Welshmen would have their own Board of Examiners and their own Society. They were a nation and had a right to look after their own affairs, and he believed the day would come, though perhaps it would be longer than he expected, and with the facilities they now had for education he believed they would be quite competent to assist materially in the work of the Society. With regard to this Bill he did not see much difference between it and its predecessor, with the exception that some points which the intelligent minority failed to get inserted in the last Bill was included in the present. For instance, a jury clause had been inserted, which would give great satisfaction to the chemists of the country. The President had told them that at present if chemists went before the judge and stated their case, as a rule they would be excused; but that only applied practically to large towns. A man in the country who had to go early in the morning, or perhaps on the previous day, to attend a jury, might as well remain the rest of the day and do his duty to his country. He trusted that if this Bill were accepted at all that clause would be retained. He should be glad to have some explanation with regard to the fees in Clause 3. Power was given to regulate these fees, and he wished to know if it was the intention to alter or raise the total amount.

The **President** said there was power already to alter the fees, it was simply repeated. There was no intention to raise the fees, but if the Minor examination were divided into two parts the three guineas would have to be split up accordingly. The power rested entirely with the Council and the members by bye-law to regulate the fees, and this Bill would make no alteration whatever.

Mr. **Evans** hoped the time would come when no indentures would be signed until the boy had passed the Preliminary. They had heard a good deal from time to time as to the duty of employers to their apprentices, but he knew that apprentices were very much neglected. He had the same objection as he had before to the number of chemist and druggist members on the Council being limited. He believed in the survival of the fittest. If they were educating the chemists of the country, and assisting them to pass a higher examination, surely the chemists would know their own interests well enough to select twenty-one good and true men to represent them on the Council without having this narrow limitation introduced. It appeared that pharmaceutical chemists were afraid that men not possessing the same qualifications were going to outrun them in their own race. It showed great want of confidence, not only in the chemists of the country, but in their own ability, and he could not recognize the force of the consideration suggested by the President, that this majority of eleven pharmaceutical chemists to ten chemists and druggists being on the Council would be an inducement to young men to pass the Major. After all it was only a majority of one, and he did not think that would be an inducement for members to go in for the higher examination.

The **President** said that was not what he intended to convey.

Mr. **Evans** said with regard to Clause 7 in the old Bill it was provided that any action or proceeding might be brought in the name of the Society, and that it should not be necessary to prove the authority of the Council to the Registrar. Why was that omitted from the present Bill?

The **President** said that it was purely a legal matter.

Mr. **Evans** said he had no objection to only seven members of the Council retiring each year, but he did not support that clause on the ground suggested by Mr. Harrison, that in the third year men would be afraid of not being re-elected. He hoped every man there would do his duty quite apart from any consideration of the sort. The last time he felt it his duty to oppose the Bill; now he was prepared to do what he could to assist the Council to pass it. But he had much pleasure in supporting Mr. Harrison's amendment. He thought the bogus companies should be dealt with, and that if the registrar would make a list for the last five years of all these companies which had been started, and if this were printed and the case placed fairly before members of Parliament, and their attention called to the condition of things now existing, the subject might be so brought before the minds of legislators that they would be ready to assist the Council.

Mr. **Leigh** said he felt a great deal of sympathy with Mr. Harrison's suggestion, for no doubt these bogus companies were being increasingly formed in the country, and the trade would probably suffer more from them in the future than it had in the past; but still, for all that, looking at the whole of this Bill, he felt that it would weaken the chances of its passing if anything were incorporated with it affecting joint stock companies. At the best there was only a remote chance of passing the Bill, for from what he knew of Parliamentary work, it was extremely difficult to pass a private Bill of this kind, and therefore if it could be relieved of any contentious matter it would be wise to do so. One or two things he was very enthusiastic about. Clause 7, for instance, would increase the value of qualification. Many people said to them "You make us come up to London, spend money and time in study, and then what do we get for it?" This clause would increase the value of the qualification, and students would be getting something for their money and time. Another thing he liked very much was the division of the Minor examination. In his own dealings with apprentices he had felt very strongly that they were left without anything to work for during their apprenticeship. Those who passed the Preliminary before they were apprenticed had five or six years before they need to commence work for the Minor, and that was a very bad thing. He should like the examination so divided that a youth could go in for a portion of it during his apprenticeship. That would give him something to work for, and to keep him studying steadily and improving himself.

Mr. **Storrar** said he should have preferred to give a silent vote in support of the amendment, but could scarcely do so, inasmuch as this was the first opportunity he had had of expressing his opinion in Council on the subject and might be the last. In answer to the appeal of the President that there should be as little opposition as possible he could say quite honestly for himself that the Bill should receive his hearty support, if for no other reason than this, that it would meet the approval of the majority of the Council. There was nothing in it which he objected to; all he objected to was that it did not contain more. Again, after the very interesting proceeding which had just taken place, it would be very ungenerous on the part of anyone to oppose anything which Mr. Carteighe had set his mind very much upon, and they all knew that there was nothing on which he had set his heart on more than the amendment of the Pharmacy Act. But still he thought with Mr. Harrison that although he would give the Bill in its present state, if it could not be amended, his hearty support, still it was the duty of those who thought additions should be made to bring them forward. It was entitled the Pharmacy Act Amendment Bill, which meant that the Council believed that the Pharmacy Act required amendment. Now looking back to the doings of the Council for the past twenty years, it would be found that there was no matter to which more attention had been paid than to the fact that chemists were opposed by joint stock companies which did not fulfil the requirements of the Pharmacy Act. The Society had not only spent a great deal of time and money in trying to prove that these companies could be brought under the operations of the Act, but the Council believed up to the latest decision of the law courts that it had the power of stopping these joint stock companies because they were keeping open shop illegally. The decision given was to his mind that the Act did not prevent these joint stock companies trading, but that it ought to have done so. That was his reading of the decision of the House of Lords, and it was plainly the intention of those who framed the Act to prevent joint stock companies trading unless composed of persons who were qualified. That being the case, surely the very first thing they should try to do would be to amend the original mistake in the Act of 1868, and that was what Mr. Harrison's amendment meant. Existing interests could not be touched, but for the future such joint stock companies should not be allowed to be formed. In putting forward this proposition the Council would be only asking Parliament to do justice, and it was perfectly entitled to ask that whether successfully or not. Mr. Atkins had said the privilege of selling poisons was an intense annoyance to chemists and druggists, but he forgot that with the privilege of selling poisons these joint stock companies had the privilege of dispensing, and therefore they were practically walking away with the business which should legitimately come to the qualified chemist and druggist. He had only heard three reasons advanced against Mr. Harrison's proposal. The first was that by adopting his clause a monopoly would be created in existing companies. No doubt that was so; but, on the other hand, if the Bill were passed as it stood, according to the President's own showing, there would be a great many more rejected candidates in the future than in the past, and certainly there would be a great many country associates who could not afford to go up for the examinations, and who must accept the situation of the hewers of wood and drawers of water to the chemists, or else have to become pirates of the trade; and it seemed to him that the tendency of this Bill would be to increase the number of those pirates. The second objection was that it would be so strongly objected to by interested parties in Parliament, that there would be no chance of passing it. But he did not see how there could be any parties interested in companies not yet formed. The last objection, and the only one with which he had any sympathy, was that it recognized existing companies. No doubt it was a pity that as a Council they should recognize these companies at all; but had they not tacitly recognized them when they refused to deal with them? Practically the Society had recognized them by its action or inaction during the last seven years. It was forced to recognize them, and it was rather stretching the principle to say that the addition of Mr. Harrison's clause would recognize them further.

Mr. **Allen** said the amendment touched a vital point, in which every member of the trade was interested, and everyone round that table admitted the desirability of adopting it; but the question was whether it was possible. He had listened with curiosity for anything which would give him a ground for believing that there was any sympathy whatever with the chemist and druggist in his desires in that direction, and he said fearlessly that there was not one atom of sympathy for the chemist in that particular cry either on the part of the general public or in Parliament. Over and over again, in the course of ordinary trade, people would come to a pharmacy almost against their will and protesting that they had to pay so much more—three or four times as much as they could get the article for elsewhere—but at the same time coming to the chemist for it. They came to him drawn by their belief in education. There was only one thing for the pharmacist in the future, and that was to advance education. Had there been anything in the last twenty years to lead Mr. Harrison to suppose that the House of Commons was not altogether content with the way that the chemists and druggists business was carried on at the present time? It seemed to him that the decision given in the House of Lords so long ago framed pharmacy for the next generation, and that so far as regarded limiting the trade to the individual who took the profit that decision destroyed all hope of that kind for the future. If you spoke to a member of Parliament on this subject he would ask who compounded the medicines and sold the poisons at these establishments, and when you told him that it was a qualified man, that the Society had at any rate power to enforce that, he would ask where was the injustice? What did it matter who took the profit? As far as he could see an amendment of that character would not have the slightest possible chance of being accepted. They knew the result of the communications of the President, and others, with members of Parliament, and they would be simply shutting their eyes to facts if they allowed such a clause to be included in the Bill. He agreed entirely with the Bill as it stood, including the exemption from juries clause, which he had formerly opposed, because the decision recently given had placed matters on a somewhat different footing. It was decided now that the qualified chemist had to do certain things himself and if he could not delegate that duty to other persons he should not be required to attend on juries. As to the election of the Council it would be much more dignified for seven to retire by rotation than to have a ballot as at present, and it would be much better for the members of the Council themselves. To invite men to stand for election on the Council and give them an uncertain tenure was not quite so dignified as the mode now suggested.

Mr. **Hills** said it was hardly necessary to say anything about this Bill, and he should not have spoken if an amendment had not been proposed. He heartily agreed with almost every word of the Bill and should give it his hearty support. He could not agree with Mr. Harrison or those who supported him on the matter of joint stock trading. They were appealed to both by Mr. Harrison and by the President as men of business, and as a man of business he was in favour of asking the House of Commons to pass what he thought he had a chance of getting, and what he could support by legitimate argument. He could only ask for what he thought public opinion, as represented by the House of Commons for the time being, would allow. He had as much sympathy as anyone for those who were injured by the competition of the stores, which he quite agreed was contrary to the spirit of the Act; but still it was distinctly the public opinion at the present time that it did not matter who supplied the capital or who took the profit, provided the person who handed over the poison or dispensed the prescription was a qualified man. That had been laid down by the courts, and though he was sorry for it that was the case and it was more and more evident that was the line public opinion would take. He for one, if he had anything to do with taking this Bill to the House of Commons, should hesitate to take any Bill with such an amendment as that proposed. He also objected, as Mr. Atkins did, to the recognition of these co-operative societies, and if the amendment were carried and those in existence were recognized, their importance would be immediately increased. On all grounds, therefore, he must oppose the amendment.

Mr. **Newsholme** said after the eloquent speech made by Mr. Harrison he had felt he should like to support him; but having considered every point he had mentioned, and thought the matter over, he felt he could not do so. This question had come before the Committee over and over again, and though Mr. Harrison and those who supported him were perfectly honest in their attempt to benefit the members of the Society and the trade, he certainly thought that a Bill with such a clause would hardly get into the House of Commons, let alone make any progress. He would, therefore, ask them to be good enough to withdraw the amendment and to support Clause 7, and do their utmost to get that passed, believing that it would do more good to the whole body than any clause which could be devised in dealing with the limited liability companies.

Mr. **Gostling** said he should not like to give a silent vote on this subject. He cordially supported the Bill as it stood, and though there was a great deal in what Mr. Harrison had said which would arouse a great deal of sympathy amongst the members of the trade, because the existence of these stores was a great hardship, when he looked at the principle of the thing he felt that he could not support the amendment. The spirit of the age was in favour of co-operative stores. He was also of opinion with Mr. Allen that education was the only thing which would advance the chemist and druggist. A gentleman came into his own place the other day and complained of being charged too much, saying he could get the article at the stores for such a price, and asked him why there was such a difference. He told him that there he had the personal attendance of the principal of the business. To this he replied that he did not choose to pay such a price as that for personal attendance, but nevertheless he continued to send his prescriptions; therefore, notwithstanding his protest he still had some little confidence in personal attendance. It seemed to him palpably inconsistent to inquire who took the profits of the transaction. If a qualified man were employed in any place of business to dispense medicines and sell poisons, it did not matter to anybody who took the profit, and it was inconsistent to say that the qualified man should not work for whomsoever he pleased. He had great pleasure in supporting the Bill, which he believed would benefit the trade indirectly, and although they themselves might not receive so much benefit as they might wish, the future pharmacists would.

Mr. **Cross** said if he liked the Bill less than he did he should vote for the amendment, but as he loved the Bill and the principal contents of it, he must refrain. At the same time he did not envy the President the task of replying logically to the case Mr. Harrison had put with regard to the formation of joint stock companies. They knew perfectly well that the framers of the Act never contemplated that such a flagrant breach of the law should be committed; if they had he was sure the Council in its wisdom would never have prosecuted the London and Provincial Supply Association. But some of them forget that the Act of 1868 was not an Act for the protection of chemists, it was merely a Poisons Act, and as a Poisons Act, it had to be accepted simply for the sake of the public, which was the only thing referred to in the preamble. It was very unfair that these men should filch the title of chemists and druggists; but there was one title they could not filch, and that was the title of pharmaceutical chemist. That was theirs by an earlier Act, and he trusted this Bill would enable the future generation of pharmacists to become pharmaceutical chemists, and by so doing they might laugh the stores to scorn.

The **President** said he had made no observations on the amendment up to now, because he had sometimes been told that he had undue influence with his colleagues, and therefore he had waited until the end without bringing forward stock arguments, as they were called, in reference to it. Mr. Cross was perfectly right in saying that the Act of 1868 was a Poisons Act. It was a Poisons Act, accepted by the Council of the Pharmaceutical Society, not promoted by it, and, unfortunately, it was not foreseen that corporations would go into trade. The judges were perfectly right in saying that it was not foreseen, as they said, "It appears to us not to have been contemplated." He knew it was not contemplated in his own mind, and he did not think it was by Mr. Sandford. The then Council proposed a Pharmacy Bill pure and simple, and it was the traders outside who would not support the policy of the Society, who induced Parliament to get frightened of poisons and to lose sight of pharmacy. Thus the Council had to carry out a Bill which was forced upon it by the outside trade. Reference had been made to the illegality of corporations trading, but there was no breach of confidence in saying that from the very commencement of the 1868 Act, as soon as it was in operation, in 1869 or 1870, when certain associations of individuals began to dispense poisons, attention was called to it. It had often been said that the Council did nothing at that early stage, and it certainly did nothing in the sense of bringing a case before the law courts. But it did that which all wise men would have done, it took the highest advice in the country as to the possibility of succeeding in an action against a corporation. The Council knew it would be dangerous, if not almost fatal, if it failed, and so, before it moved at all, it took the opinion of the highest men of the land, the then Attorney-General, the Solicitor-General, and several other leading men. Every now and then a new member came on the Council who expressed himself very strongly as to the danger in this direction, and a fresh opinion was taken, and the opinion of these gentlemen from beginning to end was "You cannot succeed." These opinions were all in the archives of the Society. Then the time came when, in the Tottenham Court Road case there seemed to be a more distinct conversion of an individual into a corporation, and the Council thought it was the best case that could be got to fight, and it did fight it, and they all knew the result. Mr. Harrison had said this sort of thing was unlawful and ought to be prevented; but could Mr. Harrison go to the House of Commons in the face of what had been said by Lord Selborne, a man recognized as one of the justest men all over the land, and one of the highest authorities on all points as well as being a lawyer: "I see no danger to the public in these cases so long as the sale is made by a qualified man." That was the keynote all through, and what he was met with in the lobby of the House of Commons when he spoke about these bogus companies. He had shown to members of Parliament a list of moral frauds they committed—he must not call them legal frauds because they were within the law—and they admitted them; but they said, "You have power to see that the person who dispenses poisons is qualified, and you have no right to go further. The Pharmacy Act of 1868 was not passed to benefit historic houses or men who were gloating over the immense profits made for them by assistants and others" (an expression which had been used more than once). There was nothing in the Pharmacy Act which said that the Society was not to take care of the interest of every person on the Register, and one of the most intelligent members of the House of Commons had repeatedly told him that he thought it was a very right thing that a registered and qualified man should be able to get his living in this way if he could not go into business for himself, and he would if he could, allow every individual man to come into the business provided he put a qualified person in to do the work. This was actually stated to him. He was constantly being told that these were his views. They were not his views, they were statements made to him by other people, and if he objected to certain amendments to the Bill or to certain forms of legislation, it was not because he objected in the slightest degree to the proposal or had not the completest sympathy with the views of the members; but he had to be a man of business, and he had simply to ask where was the member who would bring in such a Bill or who would take up a clause of this sort? He would show presently that the clause itself would be dangerous; but in the first place where was the man who would introduce such a Bill, or the member of the Society or the trade who had ever taken the slightest trouble to influence the House of Commons or to exercise political influence on the matter? who had ever interviewed his member either before he was elected or after, or had done anything more than simply send a letter occasionally asking him to support a Bill? Had any of them written to any member asking him would he support such and such legislation? Where were the members of the trade who had done this? He did not know of one. It was very easy to sit round that table and discuss the matter from an academic point of view; but it was no use living in a fools' paradise, and he objected to holding out prospects to members of the trade which he knew were hopeless of realization. It was much better to face the actual danger and endeavour to meet it than to hold out something which he knew could not be attained. He would not sit on the Council a day if he had to hold out to the members a prospect of getting that which he felt there was no prospect of getting. It was false consideration for their so-called constituents and for the trade at large to excite groundless hopes. The whole business of the chemist and druggist was not confined to dealing in articles with which the Council had to deal. The great majority of their brethren must suffer and continue to suffer and had suffered in their general trade. He admitted that they also suffered in the dispensing and sale of poisons, but the actual suffering had been very largely in that class of trade which no legislation could touch. The majority of members did not understand that, but seemed to have the idea that they could be protected in the whole of their trade, whether packed goods or anything else, and it was important that it should be recognized that even if they could stop bogus companies to-morrow, they could only do it on the question of dispensing potent poisons or prescriptions. Where could they find any support in the House of Commons for any such measure?

Mr. **Evans** said they had not yet had an opportunity of trying to find support for such a Bill. If the Bill were amended they would try to get it introduced.

The **President** said the draft had been before the members and they had had an opportunity of raising the question. His friend Mr. Watt had said that he knew a distinguished member—whom he recognized at once from his description—who would introduce a a Bill; but had he consulted him as to backing a Bill of this kind? He had stated in the Committee that he would find a distinguished man, who would be a future Lord Chancellor, who he believed would take up the Bill. Let him find that man and he would give way at once and would say by all means go in for it. If Mr. Watt could find a gentleman willing to introduce the Bill he would thank him most loyally. The first thing a private member asked when the principles of a Bill had been explained to him was, "Does the Government object to it?" and his objection to every clause of this sort when proposed before had been based on this one fact that he knew from experience—his own and that of Mr. Sandford—in getting the Act of 1868 passed, when they went round and canvassed members, every member asked, Does the Government approve of the Bill? When they said "Yes," the members promised to take care to be present. They did not understand these questions, but if the Government had gone into the matter and approved of a Bill they would support it. The Government had been asked to introduce or to support a Bill containing a provision of this sort in 1883, and had met it by a blank refusal and by the introduction of a Bill which was to legalize these bogus companies for all time with a provision that the name of the manager should be put over the dispensing department of such company, and that the person should pay fines and penalties which the proprietor of a shop, in the ordinary way, was liable to. Then it was said that the Government was changed; that was said in newspaper articles, but it was well known that the advisers of a minister of the Crown were the men in permanent positions who considered the arguments brought forward; cold blooded persons who were not prejudiced against the Society in any way; why should they be? These reports were sent in to the secretary of the department connected with legislation and were laid before the chief, and whether that chief were a Conservative or a Liberal was of no consequence. It had been declared by the Government of the day, and it would be declared until there was a complete change in the *personel* of the department, that Lord Selborne's statement was sound with regard to a corporation carrying on business, that the safety of the public did not require more than the presence of a qualified person to hand over the poison. It was therefore illogical and suicidal to go to Parliament with a Bill which the Government had distinctly declared it would not approve. If he wanted to gratify a number of their own brethren who were suffering, it was an easy thing to do, but he held it was not desirable to do it. If they wished a Bill drafted which should gratify the whole of the trade he could do it quite readily; he need only take the Bill of 1883, of which he was the godfather, which cut at everything, root and branch, and went on some definite principles; but he knew what happened with regard to that, and he could not help recalling his experience of between eight and nine years whilst President. He was not to be upbraided because he was always saying *non possumus;* it was simply stating the fact. How could Mr. Harrison logically ask the House to pass such a clause while he left the business to be carried on for the benefit of executors who were only a company after all, and who were unqualified persons?

Mr. **Harrison** said that was another principle.

The **President** said he could not see it. The principle was that the proprietor of the shop should be qualified, and the proprietor of the shop in the case of a widow was not qualified. Sentiment came in, but that was the principle, and Mr. Harrison knew that it was the widow or trustees' clause which had been the cause of all this difficulty. If that had not existed in the original Act, it would never have come about, but he knew also that their members would be horror-stricken if it were proposed to prevent them leaving their business in trust for their wives and children. And yet they wanted to present a clause of this sort to the House of Commons saying, seven persons shall not carry on business with a qualified man in future, but trustees, who may be anybody, or widows without any trustees at all, if administrators, shall. But there was another serious objection to this clause; it was a distinct invitation to the committee of the House of Commons to allow any business to be carried on by anybody by means of a qualified person, without reference to any individual qualification at all. The best way of amending this clause by a person who did not agree to it would be to strike it out *in toto*. It said the existing companies should disclose the names of the persons who managed the establishment, and that was an invitation to those who took broad views to say that it did not matter to the public who got the profit so long as the seller was qualified. Why not let everybody, Mr. Whitely, Shoolbred, Lewis, of Manchester, and other people, individual men who dealt in all sorts of things, carry on the business, and put up the name of John Jones, who was registered, to conduct it? That was what he feared would happen if the question were touched at all. Some of their friends would approach Parliament with light hearts, but he had a lively recollection of what happened in the case of the 1866 Bill. They began with a Pharmacy Bill, and ended with that poor, wretched Poisons Bill, and some of them thought they were giants in those days. The Irish had introduced a Bill the other day, every one of the clauses of which was completely transformed and made something else before it passed. Did they think they were strong enough, if they got the Bill read a second time, when a subject of this kind was introduced, to prevent it being turned into a sword to slay them with in committee? It seemed to him that this amendment was one which would lend itself to that process. Mr. Harrison would rather have in the Bill a clause which prohibited, from the passing of the Act, the carrying on of the business by bogus companies, leaving out co-operative societies. Did Mr. Harrison think that preventing the formation of companies in the future would prevent the indefinite multiplication of the companies that existed when the Act was passed? Why one company could carry on all the business required in Great Britain; it would be the very field for them when Parliament had assented to the clause preventing the formation of any more. They would say we are meeting an obvious want, we are increasing the supply, and there would be nothing to prevent existing companies carrying on any branch stores throughout the country and doing the same mischief. He wished he could see it as Mr. Harrison did, and that the clause if passed would be of any use, but in his judgment the clause would be absolutely useless for the purpose demanded, and beyond that it would be dangerous. It held out the promise of something which they not only would not get, but if they did they would be worse off, in his judgment, than they now were. For these reasons he asked the Council to reject the amendment. He candidly admitted the force of many of the objections raised to the omission and recognized them, but they were there to carry out and amend a very imperfect measure. That measure had been altered by judgments of the law courts in such a way that to carry out any definite principle was exceedingly difficult, and for that very reason he preferred to leave bogus companies in the hands of the Law and Parliamentary Committee in the future, to see that they had *bonâ fide* qualified men in their employment to sell. He believed if they looked after that matter they would be doing as much as they could, and more than any fresh legal power would give them to prevent the damage which this sort of trading did to their calling. He would only add that if this amendment were passed there would be time for any number of fresh bogus companies to be registered at Somerset House before the Act became law.

The amendment was then put and negatived by a large majority.

Mr. **Evans** then moved as an amendment in clause 6,—

> To omit the words, "But the said Council shall not at any time contain more than ten members who were not on the Register of Pharmaceutical Chemists."

There would be no difficulty in passing the Bill in consequence of accepting this amendment, and he hoped they would show that pharmaceutical chemists had sufficient confidence in themselves and in those who elected them to the Council to leave the matter perfectly open.

The amendment was not seconded.

Mr. **Harrison** said, having failed to obtain what he wanted he would now endeavour to take something less. If they could not protect the thing they might protect the title, and taking a hint which Mr. Storrar threw out in the Committee he would move another amendment. The matter had lately been forcibly brought under notice from the fact that in a recent case in London a man was on one day in business as a draper and the next day announced himself as a chemist and druggist. The title was not very valuable, perhaps; there were more valuable titles in existence than that of chemist and druggist. But it was worth something, and at all events was worth this, that in future it would represent to all concerned that the person using it was a man who had proved to a competent Board of Examiners that he was fit to use the title and carry on the business the title represented. He would move, therefore, that a clause be inserted limiting the use of the title chemist and druggist, or chemist or druggist, etc., to persons on the register of chemists and druggists.

Mr. **Storrar** seconded the amendment.

Mr. **Southall** asked if it would not interfere with wholesale chemists and druggists in London, who were not all on the register.

The **President** said the object was to prevent bogus corporations calling themselves chemists and druggists.

Mr. Atkins thought the Council had power already to protect the title. He entirely agreed with Mr. Harrison, if it would not unduly weight the Bill. This was a matter which surely could not be contentious.

Mr. Evans said if the Council were going to make an exemption in favour of wholesale chemists and druggists, he should be glad if some idea could be given where the line should be drawn.

The President said the wording of the proposed clause would be on the same lines as in the fifteenth section of the Act of 1868, and it would cover all persons who used the title; but practically the Council never prosecuted wholesale chemists and practically no magistrate would convict unless the person kept an open shop.

Mr. Schacht did not understand how Mr. Harrison proposed to make his clause differ from the existing section 15.

The President said the existing section was in the singular only.

Mr. Allen said he agreed with Mr. Harrison in this matter.

Mr. Martindale asked whether it was worth fighting for.

Mr. Atkins did not think the opposition would be very great. He knew that some of the most aggressive of these Corporations were those who did not use the title. There was a midland firm which did an immense business in dispensing which avoided the use of any such title.

The President said he did not think there was much in it for the protection of chemists and druggists.

Mr. Cross pointed out that if the word "persons" were inserted in section 15 it would cover selling as well as the use of the title.

Mr. Harrison said his intention was to introduce a new clause in this Bill which would cover what he suggested.

The President said the same argument arose that it dealt with corporations, and the question would be raised whether anyone would accept such a Bill. His experience was not favourable to touching them at all. The statement had been made over and over again that the influence of these companies was enormous, as there were many people interested in them. Even if the Council could prevent them using this title the result would only be that they would use the name of the qualified man, and he did not think that would be any advantage. They would simply put the name of the company or store and then say Mr. So-and-So, Pharmaceutical Chemist, Manager of the Drug Department. He did not think it was worth fighting for.

Mr. Hills said he entirely sympathized with Mr. Harrison, but he feared his proposition would do more harm than good.

The amendment was put and negatived by a large majority.

The resolution for adopting the report of the Committee was then carried *nem. con.*

Report of the General Purposes Committee.

The report of this Committee included a letter from the Solicitor stating the progress made with cases which had been placed in his hands. Several defendants had paid penalties and costs to prevent going into Court.

Several cases of alleged infringement of the Pharmacy Acts had been reported to the Committee, and in most of them proceedings were recommended; in others it was left to the discretion of the President on obtaining further information.

A communication had been received from the Home Office, signed by H.M. Medical Inspector of Prisons, stating that he had recommended that in future all compounders (or dispensers) employed in the Prison Department should be qualified under the Pharmacy Acts, and that the Home Office and the Treasury had approved of the recommendation.

The communication from the chairman of the Parliamentary Bills Committee of the British Medical Association had again been considered, and the President had been requested to reply to it.

This report was read and considered in Committee.

On resuming, the report and recommendations were unanimously adopted.

Local Secretaries.

Mr. Newsholme said he presumed the voting papers for local secretaries would be sent out this month, and it had occurred to him that it would be very useful if a circular were sent with them, containing an extract from the last annual report, drawing attention to the importance of electing really good men to this office. There was no doubt that in the past some men had been elected who not only did the Society no good, but even injured it.

The President said he quite approved of the suggestion, and if the Council concurred he would give instructions that it should be carried out. He thought similar voting papers might also be sent with regard to the divisional secretaries, so that they might be nominated in the same way, and then they would be elected by the Council after the receipt of the voting papers.

This was agreed to.

EVENING MEETING IN LONDON.

Wednesday, October 1.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The Inaugural Meeting of the Session took place on Wednesday, October 1, the Chair being taken by the President, Mr. Michael Carteighe, at half-past eight o'clock, when the Hall was crowded to its utmost capacity.

The President said the first business of the evening was to call upon the Dean of the School to read his—

REPORT UPON THE SCHOOL OF PHARMACY PRIZE COMPETITION.

Professor Attfield then read the following Report:—

Report on the Society's School of Pharmacy, Session 1889-1890, *by the Dean of the School, Professor Attfield.*

During the past session eighty students attended the Society's School of Pharmacy. As regards about half of this number each student worked in every class every day during the whole of the session, that is, through all the junior or winter courses and through all the senior or summer courses; and he did this with the object of being properly trained for the Society's "Major," as well as "Minor" qualification, and therefore permanently trained for his vocation. About one-fourth of the eighty worked in all subjects, but through the junior courses only, while the remainder entered single classes for various periods. Respecting attendance at single classes it is necessary to state that apprentices and others located within easy distance of the School, and only being able to devote a short time daily to class instruction, have always been encouraged by the officers of the

Society to attend one class of the School in one year, another during a second year of apprenticeship, and so on. And the plan has many advantages. But, obviously, a pupil can only fully realize the relative importance of each subject of the curriculum to the other subjects, and can only obtain the full benefits of that thorough training which the School is designed to afford, if he enter the School after he has passed the Preliminary examination, after he has finished apprenticeship, after he is twenty to twenty-one years of age, and if he then attend the whole of the classes simultaneously, whether for the junior or winter courses only, or for both the junior and senior courses during the whole of the session. For several years the School has thus been more and more tending to become one in which students give up their whole time to education, and, consequently, one in which the teaching in the respective classes has become more and more perfectly interwoven, interdependent, inter-related, and useful. The figures just quoted will show that in no previous session has this satisfactory and growing character of the School been more appreciated than during the past session. The teaching staff is also now able to report that unquestionably the result just mentioned has largely been promoted by the comparatively recent reversion to a complete sessional curriculum, that is to say, the adopting of elementary courses extending from October to April, six months, followed by advanced courses during the remainder of the session, in place of the former five months' course repeated twice during the session.

This attendance in all classes by so large a number of students during the past session has also afforded the five teachers abundance of materials for frequent consultation with each other at staff meetings, each teacher thus ascertaining the requirements and attainments of the respective students in other classes than his own, and thus becoming better qualified to advise and assist his pupils, and to maintain the harmony of his own course of instruction with that of the other four courses. The teachers are of opinion that the recent appointment of one of their number to act as Dean of the School, whose more especial duty it shall be,—though a duty more or less shared by each of his colleagues,—to communicate with parents, pupils and others in all matters relating to the School as a whole, will promote this intercommunication and harmony throughout every department and every relationship of the School, and thus promote the welfare of the students and of the Society.

Coming now to the results of the competitive examination for the Council Prizes in the Society's School, I have to state, on my own behalf, that the Bronze Medal at the end of the winter or junior course of Practical Chemistry, was won by Mr. John Charles Umney, and Certificates of Honour by Mr. Birchall Sherlock (the Redwood Scholar), and Mr. Charles Ernest Boucher (one of the Bell Scholars). In the more trying sessional competition at the end of the ten months, Mr. John C. Umney was again first, securing the Silver Medal, Mr. Harry William Kilby Pears (the other Bell Scholar), gaining the Bronze Medal, while Certificates of Honour were obtained by Mr. William Butler Lord and Mr. William Frederick John Shepheard. Many other competitors gained high marks. The work of the class as a whole during the entire session was thoroughly satisfactory.

In the department of the Lectures on Chemistry Professor Dunstan reports that the students attended with great regularity throughout the session. It is satisfactory to notice that a majority of the students attended both the elementary and advanced courses; thirty-seven students having entered for both courses and seventeen for one course only. At the examination held at the conclusion of the first or elementary course the Bronze Medal was awarded to Mr. C. E. Boucher and the two Certificates of Honour to Mr. E. B. Sherlock and to Mr. H. W. K. Pears respectively. It is highly creditable to the perseverance of these gentlemen to have to add that they succeeded in maintaining their respective positions at the examination which was held at the conclusion of the second or advanced course, the Silver Medal being then awarded to Mr. Boucher, the first Certificate of Honour to Mr. Sherlock, and the second certificate to Mr. Pears; the third Certificate of Honour was awarded to Mr. W. B. Lord.

In Botany Professor Green reports that the conduct and demeanour of his students has been all that could be desired. There has been no cause to complain of any failure to attend either the lectures or practical exercises, and the work has been done with care and diligence. The Bronze Medal, in April, for the first term's work, was won by Mr. Pears, while Certificates of Honour were awarded to Messrs. Sturch and Sherlock. The Silver Medal was won in July by Mr. Sturch, who only headed Messrs. Sherlock and Pears by a very narrow margin. Certificates of Honour were given to the two latter.

As regards Materia Medica Mr. Holmes reports most favourably concerning the excellent conduct and untiring industry of the students during the past session. The interest displayed by them in the subject of Materia Medica was most creditable. He believes that the difficulties attending the acquirement of this branch of study might be greatly diminished if it were practicable for the student to attend a course of lectures on Botany and Chemistry before commencing a course on Materia Medica. The Bronze Medal offered at the close of the first course was obtained by Mr. Harry W. Kilby Pears and the silver medal at the end of the second course by Mr. Edward Birchall Sherlock. The competition for the Silver Medal was very keen, the prize winner exceeding his nearest competitor by only a very few marks.

In Pharmacy Mr. Ince reports:—The attention paid to Pharmacy during the session has been satisfactory. While theoretical pharmacy has not been neglected, the students have evinced unusual interest in the practical work of dispensing and laboratory manipulation. It will be a distinct gain when a more liberal preliminary education may obviate the necessity of including instruction in Latin in this department. The Bronze Medal offered by the Council at the close of the winter course, and the Silver Medal at the termination of the session, have both fallen to one of the Bell Scholars, Mr. H. W. K. Pears.

The Dean of the School then called the names of the prize-winners, to whom the President presented the prizes and certificates, as follows:—

William Fredk. John Shepheard.
  Certif. of Honour—Session—Practical Chemistry.
William Butler Lord.
  Certif. of Honour—Session—Practical Chemistry.
  Certificate of Honour—Session—Chemistry.
Harry Howes Sturch.
  Certificate of Honour—1st Course—Botany.
  Silver Medal—Session—Botany.
John Charles Umney.
  Bronze Medal—1st Course—Practical Chemistry.
  Silver Medal—Session—Practical Chemistry.
Charles Ernest Boucher.
  Certif. of Honour—1st Course—Practical Chemistry.
  Bronze Medal—1st Course—Chemistry.
  Bronze Medal—1st Course—Botany.
  Silver Medal—Session—Chemistry.
Edward Birchall Sherlock.
  Certif. of Honour—1st Course—Practical Chemistry.
  Certificate of Honour—1st Course—Chemistry.
  Certificate of Honour—Session—Botany.
  Certificate of Honour—Session—Chemistry.
  Silver Medal—Session—Materia Medica.
Harry William Kilby Pears.
  Certificate of Honour—1st Course—Chemistry.
  Certificate of Honour—1st Course—Botany.
  Bronze Medal—1st Course—Materia Medica.
  Bronze Medal—1st Course—Pharmacy and Practical Pharmacy.
  Certif. of Honour—Session—Practical Chemistry.
  Certificate of Honour—Session—Botany.
  Certificate of Honour—Session—Chemistry.
  Silver Medal—Session—Pharmacy and Practical Pharmacy.

Report on the Herbarium Competition.

Professor Green, in presenting his report on the Herbarium competition, said he had had the pleasure of examining five collections, though he felt sure the number would have been largely increased had the requirements not been quite so stringent. The requirements necessitated the sending in of a large number of plants, which he considered a great handicap upon pupils. Five herbaria had been sent in for the prize, which was an extension upon former occasions; but he could not but feel that those who had not the opportunity of collecting so many plants ought to have a chance of winning the prize. Two collections were exceptionally good, and the Council had thought fit to award the silver medal to a competitor whose collection comprised 700 plants. These plants were well mounted and the descriptions very good. He would suggest to those who were cultivating a taste for this kind of work that a consideration of the habitat of the plants, and so on, would tend to improve the acquaintance of the collectors with the plants they were dealing with. The collection second in order of merit was also very good. The next two collections were also very good, and in the absence of the others they might have been recommended for medals; however, certificates of honor had been awarded. The fifth collection was a very fair one and of considerable merit. He was in hope that with the new regulations which the Council in its wisdom had thought fit to pass, there would in future years be a larger competition for the prize. The work might be fairly commended to those studying botany.

The successful competitors were:—

Edward John Lumb.—Silver Medal.
Harold Horatio Prosser.—Bronze Medal,
John Austen.—Certificate of Honour.
William Moore.—Certificate of Honour.

The President then handed to each of the Silver Medallists a copy of 'Pharmacographia' and of 'Science Papers,' presented in memory of the author by his brother, Mr. Thomas Hanbury.

Council Examination Prizes.

The President said these prizes were open for competition to all persons who had passed the examinations of the Society during the year, and were not limited to those who had studied in the Society's School. The first was the Pereira medal. In his early days he had received a bronze Pereira medal, which was then the highest award, but now the medal was of silver, which was an additional honour to the distinguished man it represented. The second and third successful competitors also received awards, so that they had now the Pereira medal to award to the first man, the silver medal as first Council prize, and the bronze medal as the second Council prize. Associated with the medals were gifts of books from a fund given by Mr. Thomas Hyde Hills—a gentleman who had always taken a warm interest in education—of the value of £5, £3 and £2. The object of the competition was to encourage men not only to pass an examination under the statute, but, if possible, to encourage them to strive for a high standard, and in this respect it had been very satisfactory. In the absence of the two examiners he had to report that thirteen gentlemen had competed for the prizes. The first prize had been gained by Mr. E. B. Sherlock, who had attained a very high number of marks; the second, by Mr. Everitt, and the third by Mr. J. Lothian. These gentlemen had been examined in botany, materia medica and chemistry. They represented practically the science of examination and were the three best men all round of a given session.

The successful competitors were:—

I. PEREIRA MEDAL (SILVER); and Books of the value of £5 presented by Mr. T. H. Hills.

Edward Birchall Sherlock.

II. PHARMACEUTICAL SOCIETY'S MEDAL (SILVER); and Books of the value of £3, presented by Mr. T. H. Hills.

John Garwood Everett.

III. PHARMACEUTICAL SOCIETY'S MEDAL (BRONZE); and Books of the value of £2, presented by Mr. T. H. Hills.

John Lothian.

Report on the Bell and Redwood Scholarships.

Mr. Saul, in presenting his report on the examinations which had been conducted by Mr. R. H. Davies and himself, said the entries had not been quite so numerous as last year, but the work of the successful candidates had been equally meritorious. The examination was a fairly wide one, and the three gentlemen who headed the competition had done well in every subject. This, he thought, was extremely satisfactory. He then announced the result, as appears below, and the President awarded the Scholarships accordingly.

The Jacob Bell Memorial Scholarships.
Edward Frank Harrison
and
Henry Garnett.

The Redwood Scholarship.
William Bonny Hoile.

THE INAUGURAL SESSIONAL ADDRESS.

Sir Edward Sieveking then read the Inaugural Address, which will be found on p. 265.

At the conclusion of the address—

The VICE-PRESIDENT (Mr. BOTTLE) proposed a vote of thanks to Sir Edward for his courtesy in coming amongst them, for his kindness in delivering such an admirable address, for his recognition of the work of the Society, the labour of the students, and more especially for his manly, outspoken words respecting vivisection. Everyone must feel that the opposition had been made by a number of well-intentioned individuals who had allowed their sympathies to be carried beyond their reason. With reference to the suggestion as to the Chelsea physic garden, he could only say on behalf of the Council that it would be most happy to take the garden over if the trustees of Sir Hans Sloane could be induced to hand it over to them, and the Society would carry it on in perpetuity in recognition of the great man who gave it. With regard to the latter words of Sir Edward, he thought that educated pharmacists would only be too pleased to discourage right and left every tendency to quackery, though he questioned very much whether the medical profession were not more to blame for the existing state of things. The medical profession would have to co-operate with pharmaceutical chemists before they could hope to stop the progress of quackery. It was no part of his duty to criticize the observations of Sir Edward, but in the name of those present, and on behalf of the Society, he thanked him heartily for the address they had all had the pleasure of hearing.

Mr. HARRISON (Sunderland) in seconding the vote said he did so for the five reasons which had been adduced by the Vice-President, which were all good reasons for tendering their thanks to Sir Edward. If his manly outspoken words with reference to the two branches of medicine were widely circulated amongst the members of Sir Edward's profession he thought very much good must follow, and they might see a stop put to dispensing by medical men, which was not always attended by the best possible results to those for whom the prescribing was done. He felt sure that words coming from one so eminent as Sir Edward could not fail to carry weight with his professional brethren, and it was for this reason that he hoped the words would be widely circulated. Sir Edward had drawn important attention to the question of vivisection, but they could not ignore the fact that it was the custom of the English Government now to pay a larger amount of attention to the lives of cattle than to those of human beings. If anyone wanted to introduce a medicine for the relief of any sickness of Her Majesty's subjects and wished it to be widely known that they had such a medicine to dispose of, it was necessary to pay a considerable fine to Her Majesty's revenue before the medicine could be placed before the public; but if anyone wished to prescribe for horses or dogs they could do so without let or hindrance through the publicity of the papers. This was an unjust state of things, which ought to be put a stop to. Many years since it was not a more serious offence in the eye of the law to steal a dog than it was to slay the shepherd. There were undoubted signs of the commencement of more enlightened times, when the Legislature would value in a greater degree the health and prosperity of Her Majesty's subjects. On these grounds he was glad to be present that evening to take part in the distribution of prizes, when so many of their young friends were entering on their career—men who would adorn the profession in years to come, when he with others had passed away—and he trusted that these young men would prove themselves worthy of the good system of education which had been provided for them in the School. He had very great pleasure in seconding the vote of thanks.

The vote having been carried by acclamation was briefly acknowledged by Sir Edward Sieveking.

The PRESIDENT said he had the privilege of announcing the presence among them that evening of the following French gentlemen :—M. Adrian, M. Buchet, Dr. Wickham and M. Chalmel. On behalf of the Pharmaceutical Society of Great Britain he tendered these gentlemen, who were all engaged in duties more or less associated with pharmacy, a most cordial welcome.

British Pharmaceutical Conference.

Wednesday, September 3.

(*Continued from page* 262.)

The next communication read was on—

CREAM OF TARTAR.

BY H. BROADBENT, A.I.C., F.C.S.

Cream of Tartar being a recognized drug of the British Pharmacopœia and one which every pharmacist handles more or less, and having seen no *recent* communication to the societies or journals on this article, I thought it would be useful and interesting to give the members of this Conference the results of the examination of a great number of samples which have passed through my hands during the last few years.

Cream of tartar, as we all know, consists essentially of acid potassium tartrate; in fact that term is given as a B.P. synonym of the article. But with this salt there is always found a little neutral tartrate of potassium; some calcium tartrate, insoluble matter and moisture.

In the market there are three or four varieties of cream of tartar, known respectively by the names of the countries which produce them. Thus, we have Italian, French, German and Spanish, the process of manufacture being very similar in each case, viz., by crystallization and removal of impurities from crude tartar or argols, which are deposited in a crystalline mass during the fermentation of grape juice.

The analysis of cream of tartar presents no difficulties; the following is the method used in all these determinations.

The insoluble matter and moisture were estimated in the usual manner; the acid potassium tartrate was estimated by direct titration with decinormal soda solution, using phenolphthalein as an indicator.

The normal tartrates of potassium and calcium were found by incinerating a weighed quantity in a platinum crucible, at a *very low heat*, care being taken to obtain complete combustion of the carbon without causing the loss of any alkali.

The mixed carbonates of potassium and calcium were then boiled with water, the insoluble calcium carbonate filtered off; the precipitate then washed, dried, moistened with a few drops of ammonium carbonate, heated to dull redness, and weighed in the usual manner. From the weight of the carbonate, we can easily get its equivalent of tartrate.

To the filtrate from the calcium carbonate added an excess of decinormal sulphuric acid. Boiled, then estimated this excess by means of decinormal soda solution. From this we get the amount of sulphuric acid neutralized by the potassium carbonate, formed *both* from the acid potassium tartrate and from the neutral potassium tartrate, and having found the amount of acid potassium tartrate in the sample, we can reduce this to potassium carbonate. The difference between these two gives us the amount of carbonate formed from the neutral tartrate of potassium, from which we calculate the amount originally existing as neutral potassium tartrate.

Early in this year I published in the *Chemist and Druggist* the results of my work on about forty samples of Italian cream of tartar, and showed that the present average composition was—

Acid potassium tartrate . .	94·11	per cent.
Neutral potassium tartrate .	1·52	„
Calcium tartrate	4·02	„
Insoluble matter	·23	„
Moisture	·27	„

I have not had anything like this number of samples of French cream of tartar, nor of German, but from six analyses of each kind we get the following averages

	French.	German.
$HK\bar{T}$	93·00 per cent.	93·05 per cent.
$K_2\bar{T}$	1·73 „	1·45 „
$Ca\bar{T}$	4·78 „	5·00 „
Insoluble matter	·28 „	·25 „
Moisture . .	·30 „	·32 „

of Spanish cream of tartar; I have only come across one sample, and thus cannot give an average, but this one gave similar results to the ones given above.

Thus we see that cream of tartar, as we now find it in trade, whether it comes from Italy, France or Germany has a somewhat definite composition, and if that be so, we are in a position to settle how much calcium tartrate is allowable in a good sample.

Squire, in his latest edition, says it is a general impurity, 2 or 3 per cent. being found even in good samples, whilst Allen, in his work on organic analysis, says the amount varies from 2 to 9 per cent., and any proportion present in excess of 10 per cent. may be considered as an adulterant, whilst the American Pharmacopœia limits the quantity to 6 per cent.

From the above analyses I am of the opinion that this last amount is a very fair limit, and I think it would be an improvement in our own Pharmacopœia, if it was definitely stated the amount of calcium tartrate allowable, and for my own part should limit it to 6 per cent.

This would give a fair margin, and if we allow 1 per cent. for moisture and insoluble matter, which is more than sufficient, it leaves us with 93 per cent. for the two tartrates of potassium, which, according to my analyses, is a standard the manufacturers do attain.

If these or some similar standards should be adopted, it would be infinitely better than the present statement about the presence of lime in cream of tartar, and would remove from one article that ambiguity, preventable or otherwise, which surrounds some of the quantitative tests of the British Pharmacopœia.

My inability to find any published results on this article of more recent date than ten years ago, when Mr. Allen was finding as much as 12·14 per cent. of calcium tartrate, and also that cream of tartar was being systematically adulterated with heavy spar, as well as my desire to have, if possible, a recognized standard for this article, have induced me to lay these results before the Conference.

The **President** said this was an important subject, and it was well to have a good understanding as to what the cream of tartar of trade should be. The figures clearly showed the wisdom of the editors of the B.P. in stating that cream of tartar should contain about 93 per cent. of true bitartrate of potassium. That left a small margin. It appeared that the percentage was 94 in the Italian and 93 in the French and German, so that the compilers had held the scales very evenly between the chemistry of the substance and the actual conditions of commerce. A statement by Mr. Allen had also been quoted. Mr. Allen was a public analyst who was very well disposed to pharmacists, and always treated them honourably, and he allowed them a greater margin even than the B.P., viz., from 2 to 9 per cent. A great outcry was made some years since with regard to cream of tartar, but that was a very different matter, and arose through Dr. Paul calling attention to the practice of salting the casks of cream of tartar with sulphate of barium, which was a very serious matter. One per cent. more of tartrate of calcium, if natural to the wine was not so important. Some people preferred natural products, they preferred wine to spirit and water, but the barium was not natural, and its discovery caused a great sensation, but since then buyers had been on the look out and he did not know that it had been noticed lately.

Mr. **Fairley** thought the limits stated by Mr. Broadbent were quite in accordance with the experience of those who examined cream of tartar. In one case he found barium, but not for the last seven or eight years.

Mr. **Conroy** said he did not exactly remember the figures given in the Pharmacopœia, but he believed 91·8 was the percentage demanded, or about 92. For many years past he had had a good deal of experience in the examination of cream of tartar, and considered the Pharmacopœia standard a very fair one indeed. It was very rare that the percentage of lime exceeded 6. Some years ago, before the time when Dr. Paul drew attention to the matter, he did find some barium, and the singular thing was that barium never existed in a greater proportion than 1 or 2 per cent., and it seemed to him to be an accidental impurity rather than a wilful adulteration, as he thought anyone who wished to adulterate cream of tartar would put in more than 2 per cent. At present there was a cream of tartar being sold which was not cream of tartar at all; it was sold chiefly by grocers, and was an acid sulphate of potash with a certain percentage of starch added to it to bring it down to the same acid strength as natural cream of tartar. It was largely sold in Lancashire, and was used chiefly by bakers for making buns, etc. No doubt the public analysts present had met with samples of it.

The **President** suggested that possibly this article was sold, not as cream of tartar, but as baking powder.

Mr. **Cripps** said he had given a great deal of attention to this subject of late years, and what Mr. Conroy had mentioned as to the B.P. standard was very nearly correct. As far as his memory went it was 92·13 calculated on the sample after drying, and therefore it might be considered that it sanctioned a cream of tartar containing about 91 per cent. as the lowest limit of real acid tartrate of potassium. But the test given was not that employed by Mr. Broadbent (the direct saturation of the acid tartrate by alkali), but included also the normal tartrate, if any were present, because the direction was to incinerate and then titrate by acid. In his experience cream of tartar was very variable. He had examined considerably over one hundred samples during the last three or four years, and met with some which contained as little as 80 per cent. of real bitartrate of potassium, and others which contained as much as 95 or 96 per cent. It was pointed out in a paper in the *Pharmaceutical Journal* some two years ago that if a sample were taken from the top of a cask where there were usually the larger crystals it gave on an average a result about 2 per cent. higher than a sample taken after the whole had been ground and mixed. This was very important, because if a purchase was made on a sample which assayed at 92, when it was ground up it might not be a B.P.

sample at all. Cream of tartar was much better now than two or three years ago, and he believed it varied with the season, for three years ago he had great difficulty in meeting with a sample which when ground would produce a real official article, but this year the difficulty was much less. It was very wise, therefore, that the B.P. allowed of an article containing only 91 per cent. or thereabouts, but in his opinion it might be lowered to 90 per cent. The analyses in the paper were probably not those of samples representing the whole of the cask. Several of the samples referred to in the paper mentioned before were obtained from wholesale and retail houses of business in London and the provinces. No doubt these firms had in the first place procured samples, and bought on the analysis they obtained, but when it was ground it was not up to the standard. As the attention of public analysts was frequently called to this subject, he thought it would be as well to lower the standard to 89 or 90 per cent.

Dr. **Symes** asked if sulphate of barium had been found in any of these samples. It was a well-known fact that some years ago this substance was constantly found in small quantities, and it would be interesting to know whether the exposure then made had put a stop to this impurity. It was a question with him whether it was really an adulteration or an accidental impurity. It was never a large percentage, and it was a well-known fact that one might examine the upper portion of a cask and find none, but find a small proportion at the bottom.

Mr. **Hodgkin** said his impression was that the amount of tartrate of lime had nothing to do with the season, and the reason why it decreased was on account of the improved method employed by the manufacturers. He saw no reason for decreasing the standard. One of the objects of the Conference was to maintain a high standard of purity, and this suggestion seemed to be directly contrary to that. If the wholesale druggist were to insist on getting pure cream of tartar there would be no difficulty in doing so. It was now made abroad almost chemically pure, and the time had come when they ought to seek for a really pure article instead of retaining useless tartrate of lime in connection with it. With regard to the acid sulphate of potash mentioned it was generally sold under the name of tartraline, and had nothing to do with cream of tartar at all.

The **President** said the Conference would be glad to know from Dr. Paul if he remembered the percentage of sulphate of barium which he found present in the cream of tartar of trade. His recollection was that it was much more than 2 per cent.

Dr. **Paul** said he did not remember the exact figures, but it amounted to a sensible adulteration. It was found to be caused by the presence of heavy spar, and no reasonable explanation that he could see could be given for the presence of that substance as an accidental mixture with cream of tartar. By shaking the casks so as to get the heavy particles to the bottom the heavy spar was concentrated to such an extent that the powder at the bottom of the cask contained one-third or more of sulphate of baryta.

Mr. **Kinninmont** remarked that the consumption of cream of tartar for medicinal purposes was very small compared with that for baking purposes. A friend of his who used it very largely came to him recently and told him that he could get it 4 per cent. cheaper shipped from Bordeaux. He could not understand how it could be sold at that price, but his friend gave him a sample, and he found a crystalline body in it. He then sent samples for analysis to chemists in Glasgow, and they reported 4 per cent. sulphate of barium. There was a little difficulty in knowing how it got there, but it seemed to him so small that it was not worth while to adulterate the article for the sake of 4 per cent., and it occurred to him it was just possible that it might occur accidentally in the plastering of the wine. He took some trouble to find out whether sulphate of calcium existed along with barium, and it was so, but he had never settled the question whether it was accidental or not. Still it was a curious fact that there was 4 per cent. adulteration and 4 per cent. difference in price, so that it looked as if it were done intentionally. However, such an article had disappeared from the trade now altogether.

Mr. G. **Ward** (Leeds) said he had had some little experience with this article, and thought it would be a mistake to recommend the Pharmacopœia authorities to lower the standard. His experience confirmed the opinion expressed by Mr. Hodgkin that there was no difficulty in getting pure cream of tartar which would answer the test if people would pay the price. It was an article which was very much cut, and there was a strong temptation to reduce the quality on account of this great desire to purchase—not the purest article, but the cheapest—but where the purchaser was disposed to pay the proper value, he did not think there was the slightest difficulty in obtaining commercially pure cream of tartar. He could scarcely agree with the criticism as to the statement of the Pharmacopœia, which he thought was sufficiently clear for all purposes. It secured a commercially pure article without insisting on that which would be very difficult to obtain, unless it were specially prepared. He thought that 92 per cent. of tartrate was not too much to demand from the manufacturer. With regard to the presence of sulphate of barium, at first sight it might be supposed that it might come from the treatment of the wine, as they knew that sulphate of barium and kaolin were frequently used to assist the deposition and clarifying of the wines, but that would not account for sulphate of barium in cream of tartar, because that was a purified product, and the sulphate of barium if used for plastering the wine would not be present in the finished product. He thought, therefore, that its presence was a clear indication that it had been added intentionally for fraudulent purposes.

Mr. **Abraham** asked if it might be taken that all these samples were free from adulteration, and secondly what percentage of pure tartrate of potassium could be obtained by filtering the solution while hot, and thus taking out the impurities. That was a means of purification, probably efficient enough for pharmaceutical purposes. If an article can be obtained by that means having 95 or 96 per cent. of cream of tartar, they might regard it as sufficiently pure.

Mr. **Broadbent**, in reply, said the answer to Mr. Abraham's question, whether the samples were free from adulteration, depended on how the Pharmacopœia was read. He should say they were free. Mr. Abraham also wanted to know what degree of purity could be obtained. That week he had had a sample which was guaranteed to be 100 per cent. of bitartrate, and it was actually 99·6, but the price was just half as much again as that of the other. With regard to barium sulphate he saw that Mr. Allen found about 2 per cent., and he did not remember hearing of more than 1 or 2 per cent. In most of these analyses the insoluble matter was only 0·3, which clearly showed the absence of all barium sulphate, his insoluble matter being a little calcium tartrate and silica.

The **President** asked if the acid tartrate of potassium which was guaranteed to be 100 per cent. was natural cream of tartar, or was it chemically produced by tartaric acid and potash salts.

Mr. **Broadbent** said it was guaranteed 100 per cent. and was chemically prepared.

Communications, Letters, etc., have been received from Messrs. Long, Spurr, Newberry, Kirkby, Wilkinson, Fitch, and Blount.

TOXIC PROTEIDS.

In the field of physiological chemistry, perhaps no line of research is more attractive, as certainly none has been of late years more assiduously pursued, than the nature, classification and properties of the different groups of proteids. Studied originally from the idea of their importance as being most like to the actual living substance or protoplasm, they have since been found to possess a peculiar interest quite apart from this one. On the one hand the growth and repair of living substance has been proved to depend upon a supply of some form of them to the animal organism. To the vegetable organism they are equally necessary, occurring in its nutrition between the simple compounds of nitrogen originally absorbed and the living substance found in the cells. On the other hand, they are sometimes found to be possessed of deleterious qualities in no small degree. Even those normally occurring during digestion in the animal body have, when administered in particular ways to other animals, properties which lead to the appearance of most serious symptoms. Others, which are not found normally occurring, are constituents of the most virulent poisons known, the venom of such snakes as the cobra and the rattlesnake, and are associated with the deadly properties of that venom. In the vegetable world also these toxic proteids are found in some abundance, being characteristic of poisonous vegetable infusions prepared from parts of the higher plants and of toxic extracts which can be contributed by micro-organisms.

The toxic proteids which have hitherto been described belong mainly to two great classes known respectively as the globulins and the albumoses, the latter comprising the greater number. The first of these groups has two characteristic features which mark it off from the second. All the members of it are insoluble in pure water, but dissolve with considerable readiness when a certain quantity of a neutral salt, such as sodium chloride, is present in the liquid. Such a solution when gradually heated, parts with its globulin at a temperature which varies with the kind of globulin present, the latter being converted into another proteid of peculiarly insoluble nature which separates out as a flocculent or sometimes granular precipitate. The range of temperature at which this change takes place with the various globulins known is from 49° C. to about 80° C. The albumose group consists of members which differ a good deal as to their solubility in water, some being readily soluble, others requiring neutral salts to be present. They show a peculiarity in their relation to heat which separates them sharply from the globulins. With a little nitric acid they give a precipitate which dissolves as the temperature of the solution is raised. As the vessel cools after the warming, the albumose again separates out. The two groups show a certain relationship to one another in being precipitated by the addition of various quantities of neutral salts to their solution, the precipitation being in most cases complete only when the liquid is saturated with the salt.

As long ago as 1879, Schmidt Mülheim demonstrated the toxic effects of certain of the digestive products when injected into the veins of a living animal. At that time the various kinds of proteids had not been well established and he attributed the results to the action of peptone, a class of proteid into which the other two are easily converted. He described the effects of the injection as a deep narcosis, attended by such a fall of the normal blood pressure that the animal sometimes died as from asphyxia. This was accompanied by a strange change in the behaviour of the blood, which when shed was found to have lost its power of coagulation almost if not quite entirely.

More recent work by other observers, notably that by Pollitzer published in 1886, has shown these toxic effects ought to be attributed rather to albumoses mixed with the peptone than to the latter body. Peptone cannot cause a fatal result so long as the kidneys of the animal are uninjured. The albumoses, on the other hand, if in sufficient doses, are inevitably fatal. The symptoms of the poisoning are described by Pollitzer as being much the same as those quoted by Schmidt Mülheim. Immediately after the injection there is noted a stage of excitement preceding the narcosis, which is attended by strong intestinal peristaltic action, a passage of fæces and of urine accompanying the latter. After one or two minutes the narcosis supervenes, the animal becoming sleepy and gradually passing into a state of stupor. There is no motor paralysis, but the muscles become affected in an unusual way, the extremities remaining in any position in which they may be placed. The fall of blood pressure which accompanies these symptoms is due to vaso-motor paralysis, the chief region of the body which is affected being the abdominal viscera. The vessels of the mesentery are strongly congested, sometimes a bloody serum effusing into the peritoneal cavity. Pollitzer suggests that the accumulation of the blood in the vessels of the abdomen is really the cause of the narcosis, the brain being insufficiently supplied with blood in consequence.

The injection of these proteids into an animal is, according to other observers, always accompanied by the development of fever, the temperature rising several degrees Fahrenheit in the course of from two to three hours. Ott and Colmar suggest that their action is on the nervous system, and particularly that part of it which is concerned in the metabolism which produces heat.

The serious disturbances which follow snake-bite have been traced by several observers to the proteids which are present in the venom. These are stated by Woolfinden to be three in number, the chief being a globulin which can be prepared from the venom by saturating it with sulphate of magnesium, when it is precipitated.

Besides this the venom also contains a small quantity of albumin resembling the albumin found in the blood, and another proteid which Woolfinden holds to be syntonin.

In the 'Thanotophidia of India' Sir Joseph Fayrer describes in full detail the symptoms of cobra poisoning in the human subject. As a rule, the poison causes two kinds of disturbance. The first is a progressive paralysis which affects the legs and thence advances upwards. It is noted after a period of incubation which may last for three or four hours before the paralysis begins to be seen. After this initial period there is soon evident a difficulty of standing, a staggering gait, and great muscular weakness. The paralysis is probably one affecting the nerve centres in the lower part of the spinal cord. Later the paralysis extends upwards involving the larynx and tongue; it is then attended by salivation and vomiting. The second kind of disturbance sets in later, and is chiefly respiratory, the breath becoming slow and laboured. This leads to convulsions and asphyxiation. In dogs that have been bitten the paralysis is developed in somewhat different order, all four limbs being usually simultaneously affected. Death in these cases also results from asphyxia.

Examination of the effects of the proteids described by Woolfinden shows that they are the active bodies in the venom. The globulin can be isolated by saturating the venom with sulphate of magnesium, when it is precipitated. After well washing it may be dissolved in dilute solution of the same salt. This solution when injected into a rat will be found to be eminently toxic. The symptoms are those of the second class described above. The animal shows no signs of paralysis, running about as if not affected for three quarters of an hour. Then respiratory troubles may be noticed, the breath becoming laboured; the dyspnœa becoming more and more intense and culminating in asphyxia in about ten minutes longer, death then taking place. The toxic effect of the globulin seems therefore to be due to some action upon the respiratory mechanism. It is accompanied by effusion of lymph sometimes mixed with blood at the point of hypodermic puncture.

The albumin which remains in solution in the venom after removal of the globulin is found to act by causing the paralysis noted. When an injection of a solution of this proteid is made into a rat the limbs become useless, the animal tottering and gradually losing power of motion. In about ten minutes it becomes unable to stand, and in half an hour it is unable to respond to stimuli applied to the limbs. As the paralysis advances upwards the respiration becomes feeble and slow, and gradually it slows more and more until it ceases entirely. The fatal result in this case appears to be the result of the action of the poison on the muscles engaged in respiration and not upon the nervous mechanism.

The venom of the Indian viper produces different symptoms which are not constant, and which fall under one or other of the following descriptions:—1. Death from primary convulsions. 2. Death from convulsions and paralysis. 3. Death from blood poisoning. This venom contains three proteids, a globulin, an albumin, and an albumose. As in the cobra venom the globulin is present in largest quantity, and as in that case again it causes death by interference with the respiration. So far as experiments have been made, this does not seem to be the proteid concerned in the production of the convulsions which usually attend the bite of the viper. It does, however, give rise to gangrene, and this is attended by a congested condition of the internal organs, especially the lungs and liver. If the globulin be removed, injection of the rest of the venom does not produce this local effect.

It is interesting to note that the peculiar effects described as following the injection of the albumoses of digestion are attendant also upon the bite of some snakes of the viper class. These are the lowering of the blood pressure and the impairment of the coagulability of the blood. Albertini found that the poison from one species lowered the blood pressure, the fall being rapid and considerable, culminating in death. Sir Joseph Fayrer noted the fluid condition of the blood after death from the venom of the Indian viper.

The peculiar interference with the respiration may also be noted after injection of albumoses, though it is not so severe as in the case of the snake poisons, passing off after a short time.

The venom of the American snakes has been found to contain similar proteids, to which in all probability the toxic effect is due. If the venom be heated to a temperature of about 80° C. its toxic power is destroyed. At this temperature its proteids are coagulated.

(To be concluded.)

NOTE ON THE ESTIMATION OF UREA BY THE HYPOBROMITE METHOD.

BY S. HENRY SMITH, PH.C.

Now that the estimation of urea has become a feature in all urine analysis, the following method of calculating results and annexed table may be found useful to pharmacists who practice analytical chemistry. To those who have not had much experience the following *résumé* may be of service.

Method of Analysis.—Fill an Allen's nitrometer with strong brine and arrange as for the analysis of spirits of nitrous ether; place 10 c.c. of the urine previously freed from albumen in the cup, turn the tap and run into the burette exactly 5 c.c., letting the remainder run to waste, pass water through the cup and tap to thoroughly cleanse them from urine, readjust the tap, and having placed 10 c.c. of the hypobromite of soda solution in the cup, run 7 or 8 c.c. boldly into burette, allowing excess to run to waste as before; when the action has somewhat abated pinch the connecting rubber tubing and slightly shake the burette, allowing it to stand for two or three minutes; place burette and reservoir side by side, so that the level of the brine in both is equal, read off the number of c.c. of nitrogen and calculate as under.

The Reagent.—It is essential that the solution of hypobromite should be quite fresh. A convenient plan is to keep a solution of NaOH and add the quantity of bromine as required. The following form may be used: dissolve 200 grams of caustic soda in 500 c.c. of water, and to every 10 c.c. of this solution as required add by pipette 1 c.c. of bromine to form reagent.

Calculation of results.

Let x = the number of c.c. of nitrogen evolved by 5 c.c. of sample.

Now Russell and West proved by experiment that 5 c.c. of a 2 per cent. solution of urea invariably gave 37·1 c.c. of nitrogen at ordinary pressure and temperature, in other words

$$37{\cdot}1 \text{ c.c. } N_2 = {\cdot}1 \text{ urea.}$$

Therefore, to obtain the amount of urea in 5 c.c. we have, substituting x

$$37{\cdot}1 \quad : \quad x \quad :: \quad {\cdot}1$$

or expressed as a fraction

$$\frac{{\cdot}x}{37{\cdot}1} = \text{amount of urea in 5 c.c. of sample.}$$

To obtain the percentage we have

$$\frac{\cdot x}{37\cdot1} \times 20 = \frac{2x}{37\cdot1} \text{ or } \frac{x}{18\cdot55}.$$

Therefore, if we divide the number of c.c. of nitrogen evolved from 5 c.c. of sample we have the percentage of urea.

To obtain equivalent grains per ounce multiply percentage by 437·5 and divide product by 100.

The following table gives percentage and equivalent grains per ounce for quantities of nitrogen from 1 c.c. to 56 c.c. Intermediate quantities may be calculated from this table or direct from the formula:—

$$\text{Percentage} = \frac{x}{18\cdot55}$$

C.c. of nitrogen from 5 c.c. of urine.	Percentage of urea.	Expressed as grains per ounce.
1	·053	·231
2	·107	·468
3	·161	·704
4	·215	·94
5	·269	1·17
6	·323	1·41
7	·377	1·64
8	·431	1·88
9	·485	2·12
10	·539	2·35
11	·592	2·59
12	·646	2·82
13	·7	3·06
14	·754	3·29
15	·808	3·53
16	·886	3·87
17	·916	4·
18	·975	4·26
19	1·02	4·46
20	1·07	4·68
21	1·13	4·84
22	1·18	5·16
23	1·24	5·42
24	1·29	5·64
25	1·34	5·86
26	1·4	6·12
27	1·45	6·34
28	1·5	6·56
29	1·56	6·82
30	1·61	7·04
31	1·67	7·3
32	1·72	7·52
33	1·77	7·74
34	1·83	8·
35	1·88	8·22
36	1·94	8·48
37	1·99	8·7
38	2·04	8·92
39	2·1	9·18
40	2·15	9·4
41	2·21	9·66
42	2·26	9·88
43	2·31	10·1
44	2·37	10·36
45	2·42	10·58
46	2·47	10·8
47	2·53	11·06
48	2·58	11·28
49	2·64	11·55
50	2·69	11·76
51	2·74	11·98
52	2·8	12·25
53	2·85	12·46
54	2·91	12·73
55	2·96	12·95
56	3·01	13·16

SHEFFIELD SCHOOL OF PHARMACY.

INAUGURAL SESSIONAL ADDRESS.

Delivered at the Commencement of the Sixth Session, by

WILLIAM MARTINDALE, F.C.S.

I have been invited to address a few words to you on the occasion of the inauguration of your School this session. It is with diffidence that I fulfil the task, as among my sundry occupations I make no pretensions to being an orator. Still it is a duty we owe to posterity to try to implant in the minds of the rising generation the desire to emulate their fathers. Youth needs encouragement, and if those who are growing grey would occasionally narrate their experience of how amid the toils and troubles of life they have had to fight their way onward, and from what sources they received aid, many a fainting brother might take heart again.

Without being egotistical, I may refer to two such influences which attracted my attention just as I was leaving my teens, as many of you, I suppose, are now doing. One was the reading of Smiles' "Self Help," which had just then been published; the other was the Installation Address of Lord Brougham as Chancellor of the University of Edinburgh in 1860, an extract from which I wish to take as my text this evening. I may preface it by saying that as you will find life too short for you to learn all the 'ologies which might prove of use to you as pharmacists, your learning and teaching should be applied with some directness of purpose. You must first of all endeavour to obtain the necessary all-round knowledge, and afterwards individualize and pursue those portions of it suitable for your future career.

Lord Brougham says:—

"First of all, it is to be observed, that though the acquisition of general knowledge is a primary duty, and the confining our attention within the narrow limits of one or two branches enfeebles the mind—impairing its powers—and even prevents our entire mastery of the selected branches, yet it is on every account highly expedient—indeed all but absolutely necessary—to single out one branch as the main object of our attention. This selection is required by the impossibility of thoroughly mastering different unconnected kinds of knowledge, and the risk of distraction which passing from one subject to another occasions, the danger even of the greatest evil occurring, that of superficial learning, the rule being inflexible that no one subject must be studied without going to the very bottom, fully and accurately, of what we would learn; not proposing to ourselves, it may be, to go beyond a certain length, but as far as we profess and propose to go, becoming thoroughly master of the subject. There is, however, another reason for selecting one special branch. We must draw, as it were, a meridian line to which all our steps in other directions may be referred. The acquisitions thus made derive additional interest from their connection with the principal and prevailing pursuit; the attention to these is kept awake, and the memory in proportion retentive, of the accessory or subordinate matters, while they lend help and illustration to the main object of our study. That object is of engrossing, though not exclusive interest; it does not preclude a moderate attention to others; but this selection, this singleness of entire absorption, is absolutely necessary to avoid the dispersion of the faculties caused by intemperate devotion to several subjects, whereof the certain tendency is to produce mediocrity in all, making ordinary capacity, even when united to great industry, yield but little return of value, and from the rarest endowments, which temperately and judiciously used might render the most important service, only obtaining the exhibition of varieties more wonderful than useful, like displays of the mocking bird, which can warble all the notes that make the grove vocal, but has no song of her own." After drawing attention to "great lights of the world" who apparently afford a few exceptions to this rule, amongst others he mentions Priestley, whose discoveries, he says, "All but accidental, however important, were confined in their extent, and perversely misapprehended in their results, by the controversies, religious and political, which engrossed his attention through life." Brougham might also have included himself, as although he was so brilliantly versatile as an orator, author, philosopher, philanthropist, naturalist, historian, mathematician, theologian, politician and statesman, he would have made a greater lawyer had he given his attention more closely to his profession.

He then proceeds:—

"The same principle applies to active life as to the pursuit of science and letters. Everyone should have a special occupation the main object of his attention, to which all others are subordinate, and all more or less referable. With most men this is inevitable, because they are engaged in professional employment, but all ought to single out some pursuit, whether speculative or active, as the chief occupation of life. Nothing conduces more to comfort and happiness; nothing is a greater safeguard against the seductions of indolence, or of less innocent, perhaps not less hurtful indulgences; nothing gives a greater relish and zest to the subordinate pursuits. He who has professional duties has no right to call any time that is not earned by the discharge of those duties his own, for other occupations, whether of relaxation, or even of mental improvement. His business is his master."

This is emphatically the case in regard to pharmacists, whose daily occupations furnish them with all they need to ask for in the way of investigation. The "meridian line" on which your minds should principally dwell is chemistry. With the advances made and being made in this science, it has become a very broad line. Pharmacy is an art requiring skill in manipulation, but a knowledge of the general laws of chemistry is essential to those who follow it. Physics and botany play their part, but the mysteries of our art are founded on chemistry; pharmacy is but chemistry applied. We have no art, as of old, in mere secrecy.

I assume you have all of you passed a satisfactory Preliminary examination, and that with a fair knowledge of English, Latin and arithmetic you know something of mathematics (Euclid and algebra) and geography, and can translate a modern language, German or French. I wish that our pharmaceutical Preliminary embraced such a field for examination, as without mathematics it is impossible to comprehend simple chemical equations. Elementary education has made vast strides since I went to school, but even yet the embryo pharmacist requires his teaching before leaving school to be applied with more directness of purpose. The rudiments of natural philosophy, of chemistry, and often of botany, ought to find a place in the education of a boy of 14 intended to be a pharmacist. To give you an instance of the pernicious waste of time permitted and encouraged when I was a schoolboy, I remember that about the age of 14 I had drawn about a dozen maps of Palestine, to illustrate its different geographical features and historical epochs. I was then transferred to another school, where I drew about as many maps of England. I leave you to judge of the comparative utility of these two sets of maps in my subsequent career. Certainly, the bearings of London and Liverpool are of more importance to an Englishman than those of Jerusalem and Jericho. With the object of better directing the course of the pharmacist's study, the Council of the Pharmaceutical Society, with the aid of its professors and the Board of Examiners, has drawn up and lately published a schedule for the guidance of both students and teachers, which will come into force next year. This we trust will prove of service, at any rate until a compulsory curriculum comes into force.

The training you will receive in your School of Pharmacy will be by processes of experiment, observation, and induction. I need not dwell on these as regards chemistry. But many ask with regard to botany, "*Cui bono* to the pharmacist?" If for no other purpose, it brings out the powers of observation. You must observe to study botany, and not be like Peter Bell, to whom

"A primrose by a river's brim
A yellow primrose was to him,
And it was nothing more."

Children early begin to observe flowers, and this power of observation requires cultivation. The Germans, by their kinder-garten system, which I am glad to say we are now following, have long taught elementary botany to even young children as object lessons.

The advantage of training the powers of observation is well exemplified in the case of Lord Brougham in his writings on the structure of the cells of bees. He pointed out the marvellous formation of the honeycomb. When we handle a shapeless piece of beeswax we rarely think that it has been produced by the destruction of the work of a little architect who knew how to produce the greatest strength in his building from the least materials. Examine the hexagonal prisms of which the cells are formed, and you will find that the centre of the base of one is the converging point of the angles of three cells on the opposite side of the comb. You see we can get more from the busy bee than honey, and wax, and lessons in industry; he can also teach us architecture and other knowledge, if we observe his habits in the spirit of a Brougham, a John Hunter, a Cumming, or a Lubbock.

But not only is it necessary to cultivate your powers of observation and your reasoning faculties, you must learn a number of dry facts. Many of your dry facts are contained in the Pharmacopœia; but you will find that chemistry abounds in these dry facts, which must be laid hold of by the memory as useful knowledge to you as pharmacists. It would be useful knowledge for a painter to know how many windows there are in this room, and the dimensions of them, had he to paint and glaze them, but to us it is worthless.

One of the objects, perhaps the main object, with most of you, for which you come to this school of chemistry and pharmacy, is to obtain the knowledge necessary to pass the pharmaceutical examinations. The motive is a good one, if the examinations are right, as preparing for examination is preparing for life. I cannot say that our examinations are as perfect as they might be. One thing is, that to our qualifying examination—the Minor—too little time is given. A candidate can pass this examination, and become a fully fledged chemist and druggist in less than two hours and a half; on the other hand, he may be plucked in half an hour: the examiner hardly becomes acquainted with the candidate in the time. The examination of candidates for the Associateship of the Institute of Chemistry occupies about four days. I have long held that our system is not right. Part of the examination should be conducted in writing, and the pass examination should be extended over at least two days. It is not just to the candidates, and I hold that in the interests of the public it is not fair to them, that a chemist can pass a qualifying examination in a little over two hours. It favours cram. I trust ere long that this will be rectified. One difficulty was that the room available in Bloomsbury Square became inadequate to the growing needs of the examinations;

the office arrangements proved inconvenient for carrying them on efficiently: this has now been remedied. Another point is, it has been hoped that a curriculum with new bye-laws would come into force by the passing of a new Act of Parliament. Seeing that one has been recently passed for Ireland, there still is hope that we also may obtain one from the present Parliament.

The young pharmacist's manipulative powers particularly require training during his apprenticeship. I am sorry that there seems to be a tendency among enterprising manufacturers to try to persuade the pharmacist that he has nothing to do but trust himself to their tender mercies, and they will supply him with everything ready made, from pills and plasters, tinctures and ointments, to concentrated infusions and compound decoctions, and that they will do this at less cost than he can buy drugs to make the preparations himself. This is the acme of their ambition,—they can sell him a compound for less than its ingredients can be bought! Under such circumstances the training of the retail apprentice suffers, and he has little opportunity of learning his art. Added to this the late hours of labour in some instances allow him little time for evening study. Still in a number of cases he has better opportunities, and we hope under an improved system of examination to require the youth to show, probably during his apprenticeship, that he has embraced the facilities so afforded. He will, under such circumstances, make best progress by attending courses of instruction such as are given in this institution. Your syllabus rightly suggests, by Mr. Worrall's courses, early attention to chemistry. Botany, to my mind, is more of a summer subject; most interest is at first awakened in it by living plants, still Mr. Humphreys' class will prepare you for the histological portion of it. Materia medica has its foundation on botany; Mr. Watts' course therefore follows. Mr. Grierson's demonstrations on pharmacy will be the application of the three preceding subjects: they will include practical dispensing. After learning the routine of your business at home you will have explained to you by an expert the application of scientific principles to your daily work. The systematic, step by step training is most beneficial to the mental culture of the student. Studying alone his work is apt to become desultory; it needs to be continuous and he requires to be kept at it.

Our craft needs union. With the spread of education and the smattering of chemistry taught in public schools, it behoves us to keep up our standard. If we retain the title of chemist we must prove worthy of it. We shall not do so unless our training in the principles of chemistry is superior to that of the average well-educated Englishman.

Through the devotion of a few noble minds the Pharmaceutical Society was established for the protection of those who carry on the business of chemist and druggist, but they voluntarily undertook also to establish an uniform system of education for those who should practise the same. The Legislature has since imposed on the Society the onerous duty of administering and regulating the sale of poisons, as well as the much more important one of conducting the examination of all those who seek to enter the ranks of pharmacy. Parliament did not force these on us, they were sought for in the interest of public safety. I am old enough to have observed the great advance that has been made by the Pharmaceutical Society during the last quarter of a century, mainly through the instrumentality of two of its Presidents, Sandford and Carteighe. Others might be mentioned, but these two stand out boldly as having devoted their time, energies, and administrative talents for the advancement of pharmacy. Do not therefore forget your *alma mater*, which has done so much for you.

To return to your mode of preparing for examinations, you must read carefully and observe. Reading, one of our philosophers says, makes a full man, speaking, a ready man, and writing, an exact man. Now to pass your examinations and also to be worthy pharmacists, you must be all these. You must make notes of what you read and digest them well. Knowledge comes, but wisdom lingers.

"Knowledge, a rude unprofitable mass,
The mere materials with which wisdom builds,
Till smoothed and squared and fitted to its place,
Does but encumber whom it seems t'enrich."

To be prepared also for your examinations and for your way through life, it is necessary to be *ready*, to have your wits about you; speaking makes a ready man. It is a good thing for students to catechise one another, so as to get into the habit of answering questions, and to have their knowledge come-at-able; this tends to give you clearer ideas, and will prevent you losing your heads or being nervous when you go into the examination room. Still, you must pay the price for your learning, and it is worth it. There is no royal road to knowledge; comfort yourselves in this respect, comparatively few can attain it. We sometimes talk of popular science; there is no such thing, any more than there is popular mathematics. The higher mathematics and high scientific attainments are reached only by few minds. Their popular application we all reap the benefit of Nevertheless, aim high.

"Pitch thy behaviour low, thy projects high,
So shalt thou humble and magnanimous be.
Sink not in spirit; who aimeth at the sky
Shoots higher much than he that means a tree."

Having learnt your art, aim at being something more than mere chapmen of drugs and nostrums on the one side or advertising ding-dongs on the other. Not that I would condemn advertising entirely, although it is much abused; yet if you have something to sell you must make it known, or often you will not sell it. Our occupation is one of anxiety and responsibility, and the anxiety of responsibility weighs heavily on the dispensing pharmacist. Often after a busy day's work the prescriptions I have dispensed have seemed to have a resurrection before my mind's eye, and with anxious thought I have mentally dispensed them again to know that I had done them right.

But with experience comes trust and hope. Yet we never get rid of our responsibility. I fear this is rarely fully appreciated in us by the public. I remember once, when a hospital dispenser, having to prepare for a poor child the following, which had been prescribed by a surgeon in the out-patients' room: Perchloride of mercury, 1 grain; pure ether, *quantum sufficat*; cod liver oil to 4 fluid ounces. Dissolve and mix. Dose, a teaspoonful three times a day. After it had been supplied, an American surgeon who had seen the writer prescribe it came to the dispensary and having been informed it had been dispensed, said, "Well, I guess I should have required a five dollar fee to prepare that medicine."

I must draw to a close with a few final words of exhortation. It is said that youth is the time for pleasure; it is also the time for work. You take your pleasures by the way; they are not the objects of your existence. Be diligent. "Seest thou a man diligent in his business? he shall stand before kings" is as true now as it was in the days of Solomon. The child is father of the man, and—

"If the spring put forth no blossom,
In summer there will be no beauty,
And in autumn no fruit;
So, if youth be trifled away without improvement,
Manhood will be contemptible
And old age miserable."

The Pharmaceutical Journal,

SATURDAY, OCTOBER 11, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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CONCEALED POISON.

UNDER the somewhat startling title of "Homicide as a Misadventure," an article has appeared in the *National Review*, dealing with the sale of secret medicinal preparations containing poisons that are included in the schedule of the Pharmacy Act, 1868. The writer of the article is Dr. H. W. HUBBARD, who has long devoted considerable attention to the evil effects of the present irregular and it may even be said unlawful practice of selling scheduled poisons in this way, without the precautionary measures which the legislature has prescribed as necessary for ensuring the public safety. The result of the recent prosecution of a registered chemist and druggist for the sale of medicine of this kind without the requisite poison label, and the fact that the prosecution was undertaken by the Treasury are in themselves sufficient evidence of the view that is taken of this matter by the authorities, and it is unquestionably one which affects the public interest and commands the attention of those who are constituted by Act of Parliament the proper persons to conduct the sale of poisons. Under existing conditions the sale of secret medicinal preparations is carried on to a very large extent in a manner that ignores altogether these considerations, and as Dr. HUBBARD points out a vast number of perilous preparations are now offered for sale to the public under fanciful and alluring designations with labels in no way indicating the nature or potency of their ingredients, though they contain poisons of very dangerous character. Moreover these mysterious and secret preparations are sold throughout the country not only by chemists and druggists, but also by grocers, linen drapers and general-store keepers who know absolutely nothing of their natures and properties. As a natural consequence of this irregular traffic and of the disregard of necessary precautions there is corresponding negligence on the part of those who make use of these preparations, and hence it is not unusual to find bottles, boxes and other packages of them lying about the bedrooms and nurseries in thousands of houses while they are spoken of and recommended from one person to another with the same simplicity and confidence as one might recommend syrup of squills or peppermint lozenges.

The reports of coroners' inquiries into sudden and unexpected deaths caused by the dangerous medicines here alluded to are constantly furnishing evidence of the mischief arising from ignorance of their nature, and the consequent absence of due care by those who use them. The general verdict given in such cases is "death by misadventure," but Dr. HUBBARD gives them a more serious significance in the title he has chosen for his article. He designates them as cases of homicide, and by so doing suggests that there is a responsibility for these deaths by misadventure which still remains untouched. In endeavouring to ascertain where that responsibility lies it is necessary to consider the conditions which give rise to the demand for the class of medicinal preparations here referred to. Prominent among these is the fact that, notwithstanding the advanced civilization of the nineteenth century, and the easy access to medical aid afforded by philanthropic and charitable institutions, occult and mysterious concoctions of drugs still possess a special fascination, and recourse to them plays no insignificant part in the endeavour to obtain relief from disease. The popular prejudice, so marked in this country in favour of empirical practice in the art of healing, is another condition that tends to promote the use of secret remedies and to furnish a profitable field for enterprise that cultivates the softer side of human nature. But while recognizing these facts as influences that cannot well be dealt with in a general way by legislative interference, there is a limit beyond which the unguarded sale and use of secret preparations ought not to be permitted. Such a limit appears to be reached when a preparation of this kind contains an ingredient that is in the schedule of the Pharmacy Act, 1868, and that has been thus declared to be an article that should not be sold or supplied to the public without the observance of certain specified precautions. From that point of view every sale of a secret medicinal preparation containing a scheduled poison would constitute a breach of the 17th section of the Pharmacy Act, and for such a breach of the law the seller would be liable to the penalties imposed by the Act. But the secrecy maintained as to the composition even of preparations containing scheduled poison to some extent relieves the vendors of them from responsibility for any "misadventure" they may cause, as well as from liability to punishment. In many cases there may be a presumptive knowledge that such a preparation contains poison, but even then in selling an article that comes from the maker enclosed in a sealed wrapper, and bearing the Government stamp, the seller would have no right to act upon that presumption and place upon the packet the poison label that the composition of the medicine might demand. That is properly a duty that lies upon the makers of such preparations, and as a matter of principle as well as of law it is a duty that should be observed by them.

There are some secret preparations containing poison which are so labelled by the makers of them, and it has been found that compliance with the law in this respect has not been detrimental to their sale, so that there is no reason founded on trade interest why the practice should not be observed in all cases. The contention that these preparations are exempted from the provisions of the Pharmacy Act because they are by popular error spoken of generally as "patent medicines" cannot reasonably be sustained, for if the claim for exemption be based upon analogy to patent medicines the essential condition of disclosure of their composition is wanting. It is by the secrecy maintained as to the composition of these remedies that they are made to differ from patent medicines properly so called, and since it is from that secrecy that there is danger to the public in the sale of such articles, there is no kind of ground upon which it can be argued that the provisions of the 17th section of the Pharmacy Act should not apply to all proprietary medicines that are not actually the subject of letters patent. The provisions of the 17th section of the Act are so framed that any person selling poison otherwise than is therein provided shall, upon summary conviction before two justices of the peace in England or the sheriff in Scotland, be liable to a penalty not exceeding five pounds for the first offence and ten pounds for any subsequent offence. The section is not drawn up in such a way as to allow of any hindrance of the prosecution of offenders from consideration for the interests of chemists and druggists. It is open to any person or authority to institute a prosecution, and the representative of the Treasury stated in the case heard before the Lord Mayor that it was the intention of that department to put the law in force whenever occasion arises. If we may judge from the purport of a circular issued by Messrs. NEWBERRY and SONS, who deal largely in preparations of the class now referred to, the avowed intention of the Treasury department has not been without effect in calling attention to the risk incurred by dealers who consciously or unconsciously are infringing the law by the sale of secret remedies that contain scheduled poisons. Messrs. NEWBERRY state in their circular that they are prepared to indicate in the next issue of their catalogue whether or not any medicinal preparation appearing therein is deemed by the manufacturer to be affected by the Pharmacy Act 31 and 32 Vict., cap. 121. Appended to the circular is a statement of the precautions required by the Act to be observed in selling poisons by retail and in dispensing. The poison schedules are also reprinted in the circular, and the question put as above to the makers of medicinal preparations can only be understood as asking whether they contain poison. A further question is whether the preparation is already labelled in accordance with the provisions of the statute. The step thus taken ought to meet with a prompt response of such a nature as to put an end to the evil dealt with in Dr. HUBBARD'S article. It is to be expected that in the sense of Sir EDWARD SIEVEKING'S remarks at the last evening meeting of the Society chemists and druggists will assist in effecting this desirable regulation of the trade in medicines containing poison. Though the Pharmacy Act was not passed for their protection, but in the interests of the public, observance of its provisions would not only be beneficial to the public but advantageous to chemists and druggists, and for both reasons it is incumbent upon them to take advantage of the opportunity offered for co-operating with medical men in the endeavour to remove a grave abuse and the most fertile source of infringement of the Pharmacy Act.

The new session of the Chemists' Assistants' Association commenced on the 9th inst., when an inaugural address was delivered by the President, Mr. A. Campbell Stark. The programme for succeeding meetings states that papers will be read on the 23rd inst. on "Stereo Chemical Theories" by Mr. T. P. Blunt, M.A.; "Our Breakfast Beverages," by Mr. A. H. Allen, on the 6th Nov.; "Electro Chemistry," by Mr. T. A. Ellwood on the 27th Nov.; "Our Best Pasture Soils," by Miss E. A. Munro, on the 4th Dec. On the 16th inst. and the 11th Dec. the meetings will be musical and social, and the annual conversazione will be held on the 13th Nov. at the Portman Rooms. The meetings will take place as usual at 8.30 p.m., and the chair will be taken at nine o'clock precisely.

* * *

The first meeting of the thirteenth session of the Edinburgh Chemists' Assistants and Apprentices' Association will be held at the house of the Pharmaceutical Society, 36, York Place, on Wednesday evening the 15th of October at a quarter past nine o'clock. On that occasion an inaugural address will be delivered by the President of the Association, Mr. Donald McEwan.

* * *

The Royal Society of New South Wales has published an offer of its medal and a money prize of £25 for the best communication sent in before the 1st of May next containing the results of original observation upon each of the following subjects: "The Meteorology of Australia, New Zealand and Tasmania," "The Anatomy and Life History of the Echidna and Platypus," and "The Microscopic Structure of Australian Rocks." Similar prizes are offered for original papers, to be sent in before the 1st of May, 1892, on "The Iron Ore Deposits of New South Wales;" "The Effect which Settlement in Australia has produced upon Indigenous Vegetation;" and "The Coals and Coal Measures of Australasia." The competition is not confined to members of the Society or to residents in Australia.

British Pharmaceutical Conference.

MEETING AT LEEDS.

(*Continued from page* 292.)

An abstract of the following paper was then given, the principal formulæ being shown on a blackboard:—

The Constitution of Synthetic Remedies Explained from a Chemical Point of View: Showing their Relationship One to Another.

BY JOHN HODGKIN, F.L.S., F.C.S., F.I.C.

Amidst the marvellous developments of chemistry, through the appreciation and direct application of Kekulé's theory of the "benzene ring," must be reckoned that series of coal tar derivatives, which is playing a not unimportant part in modern therapeutics.

The systematic nomenclature of such bodies is, however, most cumbersome and inconvenient for the use of medical men, and others engaged in handling these bodies. It has therefore been found generally useful to bestow upon them new names, which, as a rule, express rather the object that is supposed to be obtained by their use, than to call them by their true chemical names, which are however directly expressive to the student of modern chemistry. But by using these adopted fancy names it too often happens that we lose sight of the real relationship existing between bodies of analogous and allied constitutions, the connection being absolutely hidden under the fancy name, though easily recognized when examined from its chemical standpoint.

It occurred to me, therefore, that it might be perhaps of permanent interest, if such bodies were arranged under their proper chemical groups and subdivisions, and I, therefore, in the paper which I have the honour to lay before this Conference, propose to attempt this, and to point out in as simple a way as I can, the differences and connections between the chief synthetic remedies that are now employed in medicine.

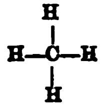
The synthetic remedies that we now employ may be divided into two great groups; those, such as Chloroform, Paraldehyde, Sulphonal, etc., which belong to the series of Methanes and Aldehydes, and those such as Antifebrin, Antipyrin, Exalgin, β-Naphthol, Thallin, etc., which belong to the Aromatic series. As the methane and aldehyde series includes compounds such as Chloroform, which occupy an earlier position in the history of synthetic remedies, I propose to deal briefly with this series first. Speaking generally, this series contains the Anæsthetics and Hypnotics; the Aromatic series, containing the Antipyretics, Antiseptics, etc. There are, of course, exceptions to this classification, but this division may be taken as being fairly correct.

The way in which I shall indicate the constitution of these bodies is by what are known as graphic formulæ, which serve to express very well, in one plane, the formation and structure of such bodies.

Part I.

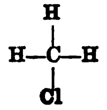
The bodies belonging to the first series can be written on two types, viz., Marsh Gas, CH_4, and Formic Aldehyde, CH_2O.

Marsh Gas or Methane consists of *four* atoms of hydrogen, a monovalent element, united to *one* atom of carbon, a tetravalent element. They are supposed to be united thus:—



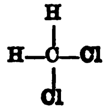
$$\begin{array}{c} H \\ | \\ H-C-H \\ | \\ H \end{array}$$

Each of these four atoms of hydrogen is capable of being replaced by other monovalent elements or groups. Now, if you replace one of these hydrogens (written by the symbol H) by chlorine (written Cl) you obtain *Methyl chloride* CH_3Cl, of which the graphic formula is written thus:—



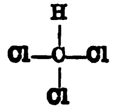
$$\begin{array}{c} H \\ | \\ H-C-H \\ | \\ Cl \end{array}$$

If two atoms of H are replaced you obtain *Methylene chloride*, CH_2Cl_2.



$$\begin{array}{c} H \\ | \\ H-C-Cl \\ | \\ Cl \end{array}$$

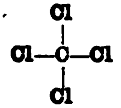
If you replace three hydrogens by chlorine you obtain *Chloroform*, $CHCl_3$,



$$\begin{array}{c} H \\ | \\ Cl-C-Cl \\ | \\ Cl \end{array}$$

Bromoform, and *Iodoform*, are exactly analogous, bromine and iodine respectively, taking the place of the chlorine.

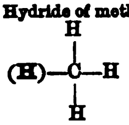
If you replace all the hydrogens by chlorine you obtain *Tetrachloride of carbon*, CCl_4:—



$$\begin{array}{c} Cl \\ | \\ Cl-C-Cl \\ | \\ Cl \end{array}$$

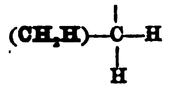
Marsh gas, as well as being considered as methane, CH_4, may be considered as a *Hydride of methyl*, CH_3, the most elementary of alcohol radicles: thus $CH_3{\cdot}H$. If you take the next body in this series, *i.e.*, by adding CH_2 to it you obtain *Hydride of ethyl*, $C_2H_5{\cdot}H$. Thus:—

Hydride of methyl.



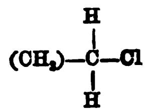
$$\begin{array}{c} H \\ | \\ (H)-C-H \\ | \\ H \end{array}$$

Hydride of ethyl.



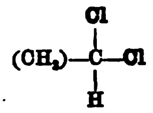
$$\begin{array}{c} H \\ | \\ (CH_3H)-C-H \\ | \\ H \end{array}$$

If you substitute a chlorine atom for one of the free hydrogens you obtain *Ethyl chloride*, $C_2H_5{\cdot}Cl$, but if two H atoms are replaced you obtain *Monochlorethyl* chloride or *Ethylidene chloride*. Thus:—



$$\begin{array}{c} H \\ | \\ (CH_3)-C-Cl \\ | \\ H \end{array}$$

Ethyl chloride.
$C_2H_5{\cdot}Cl$

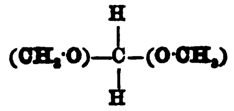


$$\begin{array}{c} Cl \\ | \\ (CH_3)-C-Cl \\ | \\ H \end{array}$$

Ethylidene chloride.
$CH_3{\cdot}CH{\cdot}Cl_2$

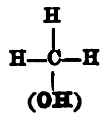
This latter compound is isomeric with Ethylene chloride $C_2H_4{\cdot}Cl_2$ or Dutch liquid.

If you replace two of the H atoms in marsh gas by the groups $(O{\cdot}CH_3)$ you obtain *Methylal*. Thus:—



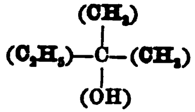
$$\begin{array}{c} H \\ | \\ (CH_3{\cdot}O)-C-(O{\cdot}CH_3) \\ | \\ H \end{array}$$

If you replace one H in marsh gas by the group OH, called hydroxyl, you obtain *Methyl alcohol* (wood spirit), called also *Carbinol*.



$$\begin{array}{c} H \\ | \\ H-C-H \\ | \\ (OH) \end{array}$$

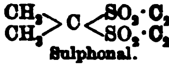
and if you replace the three remaining H atoms by two groups of CH_3, and one of C_2H_5 you obtain *Amylene hydrate*, called also tertiary amyl alcohol, or ethyl-dimethyl carbinol



$$\begin{array}{ccc} & (CH_3) & \\ & | & \\ (C_2H_5)- & C & -(CH_3) \\ & | & \\ & (OH) & \end{array}$$

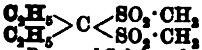
Now if you take this group and add an SO_2 group to the ethyl group, making $C_2H_5\cdot SO_2$, and then replace the OH group by a similar $C_2H_5\cdot SO_2$ group, you obtain *Sulphonal*, or diethyl-sulphone-dimethyl-methane, $C(CH_3)_2(C_2H_5\cdot SO_2)_2$. *Reversed sulphonal* has two plain ethyl groups and two methyl-sulphone groups instead. *Trional* has three ethyl groups, whilst *Tetronal* has four ethyl groups.

This is a most interesting series from a chemico-physiological point of view, the hypnotic action having been alleged to directly increase as the number of ethyl groups is raised. The Sulphonals are thus represented:—



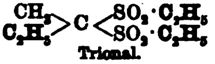
$$\begin{matrix}CH_3\\CH_3\end{matrix}>C<\begin{matrix}SO_2\cdot C_2H_5\\SO_2\cdot C_2H_5\end{matrix}$$

Sulphonal.



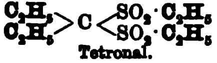
$$\begin{matrix}C_2H_5\\C_2H_5\end{matrix}>C<\begin{matrix}SO_2\cdot CH_3\\SO_2\cdot CH_3\end{matrix}$$

Reversed Sulphonal.



$$\begin{matrix}CH_3\\C_2H_5\end{matrix}>C<\begin{matrix}SO_2\cdot C_2H_5\\SO_2\cdot C_2H_5\end{matrix}$$

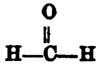
Trional.



$$\begin{matrix}C_2H_5\\C_2H_5\end{matrix}>C<\begin{matrix}SO_2\cdot C_2H_5\\SO_2\cdot C_2H_5\end{matrix}$$

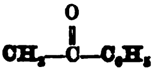
Tetronal.

We now come to the bodies that can be written on the second type, namely, FORMIC ALDEHYDE:—



$$\begin{array}{c} O \\ \| \\ H-C-H \end{array}$$

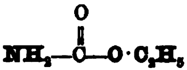
The first member is *Hypnone*, or *Phenyl-methyl-ketone*, *i.e.* to say, formic aldehyde in which one H is replaced by the group phenyl C_6H_5 and the other by methyl. Thus:—



$$\begin{array}{c} O \\ \| \\ CH_3-C-C_6H_5 \end{array}$$

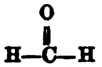
[This not an aldehyde, although it can be written on this type; it is in reality a ketone, *i.e.*, a body which consists of two alcoholic radicles united by a CO group.]

Urethane, or *Ethyl carbamate*, is the COH_2 group in which one H is replaced by amidogen NH_2, and the other by an oxyethyl group:—



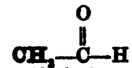
$$\begin{array}{c} O \\ \| \\ NH_2-C-O\cdot C_2H_5 \end{array}$$

A further derivative of urethane is *Ural*, or *Uralium*, but before we can consider this, we must turn to the aldehyde group. Ordinary *Aldehyde*, CH_3COH or C_2H_4O, is the next in the series to formic aldehyde, a CH_3 group replacing the H thus:—



$$\begin{array}{c} O \\ \| \\ H-C-H \end{array}$$

Formic aldehyde.

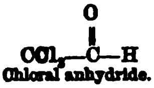


$$\begin{array}{c} O \\ \| \\ CH_3-C-H \end{array}$$

Aldehyde.

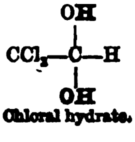
Paraldehyde and *Metaldehyde* are what are known as polymerides of aldehyde, *i.e.* to say, they are of the same percentage composition but of different vapour densities.

If you replace the three hydrogens in the methyl CH_3 group, by chlorine, you get *Chloral anhydride*, or trichloraldehyde, CCl_3COH, and if you hydrate this, *i.e.*, add one molecule of water, you obtain *Chloral hydrate* $CCl_3C(OH)_2H$. Thus:—



$$\begin{array}{c} O \\ \| \\ CCl_3-C-H \end{array}$$

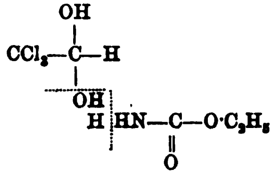
Chloral anhydride.



$$\begin{array}{c} OH \\ | \\ CCl_3-C-H \\ | \\ OH \end{array}$$

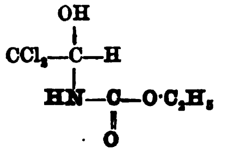
Chloral hydrate.

Ural is a compound of chloral hydrate and urethane, the bodies under suitable conditions combining with the elimination of water. Thus:—



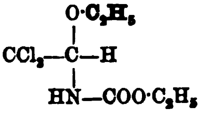
$$\begin{array}{lllll} & OH & & & \\ & | & & & \\ CCl_3- & C-H & & & \\ & | & & & \\ & OH & & & \\ & H & HN- & C- & O\cdot C_2H_5 \\ & & & \| & \\ & & & O & \end{array}$$

The carbon is tacked on to the nitrogen of urethane, forming *Ural*. Thus:—



$$\begin{array}{llll} & OH & & \\ & | & & \\ CCl_3- & C-H & & \\ & | & & \\ & HN- & C- & O\cdot C_2H_5 \\ & & \| & \\ & & O & \end{array}$$

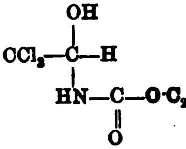
Somnal is another urethane derivative, being Ural in which the hydrogen in the OH group is replaced by ethyl.



$$\begin{array}{ll} & O\cdot C_2H_5 \\ & | \\ CCl_3- & C-H \\ & | \\ & HN-COO\cdot C_2H_5 \end{array}$$

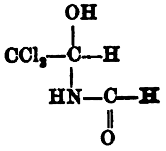
The Germans call it "ethylirtes chloralurethan," or ethylated chloral urethane.

Starting again from formic aldehyde COH_2, if we replace one of the H atoms by the group NH_2, amidogen, we obtain *Formamide*, $CO{\cdot}NH_2{\cdot}H$, and if we combine this with chloral anhydride we obtain *Chloralamide*, which is similar to *Ural* with the exception that the oxy-ethyl group is replaced by H. Thus:—



$$\begin{array}{llll} & OH & & \\ & | & & \\ CCl_3- & C-H & & \\ & | & & \\ & HN- & C- & O\cdot C_2H_5 \\ & & \| & \\ & & O & \end{array}$$

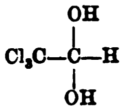
Ural.



$$\begin{array}{llll} & OH & & \\ & | & & \\ CCl_3- & C-H & & \\ & | & & \\ & HN- & C- & H \\ & & \| & \\ & & O & \end{array}$$

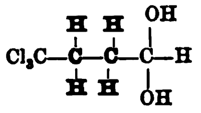
Chloralamide.

Butyl chloral hydrate (*Croton chloral hydrate*) is of course analogous to ordinary chloral hydrate, the difference being the addition of two CH_2 groups. Thus:—



$$\begin{array}{c} OH \\ | \\ Cl_3C-C-H \\ | \\ OH \end{array}$$

Chloral hydrate.



$$\begin{array}{c} \quad\; H \quad H \quad OH \\ \quad\; | \quad\;\; | \quad\;\; | \\ Cl_3C-C-C-C-H \\ \quad\; | \quad\;\; | \quad\;\; | \\ \quad\; H \quad H \quad OH \end{array}$$

Butyl chloral hydrate.

Bromal hydrate is, of course, exactly analogous to chloral hydrate, bromine atoms replacing the chlorine.

PART II.

THE AROMATIC SERIES.

As regards the aromatic series of synthetic remedies, it may for our purposes be divided into two great groups, the *Benzene* C_6H_6 and the *Naphthalene* $C_{10}H_8$, which may be again sub-divided as follows:—

Benzene. Group I.

Aniline, benzoic acid and phenol derivatives.

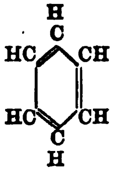
Naphthalene. Group II.

Naphthylamine, naphthoic acid, naphthol and quinoline derivatives.

I shall deal first with the Benzene or (benzol) group, as it comes first from a chemical point of view. And as some of you may not be intimately acquainted with

Kekulé's benzol-ring theory, it will perhaps be better to explain it briefly in order that you may be better able to follow the changes that I shall indicate.

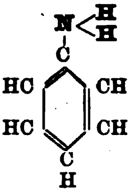
Benzol or benzene consists of six atoms of carbon, a tetravalent element, and six atoms of hydrogen, a monovalent element, *i.e.*, C_6H_6. Professor Kekulé, just twenty-five years ago, conceived the brilliant notion of representing this body by a graphic formula, which might explain for all general purposes its structure. The formula he chose was a hexagon, drawn as follows:—



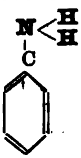
which shows the carbon atoms united to one another by one and two bonds alternately, the hydrogen being united to the carbons by a single bond: the desires of each element are thus completely satisfied. Each of the six hydrogen atoms is capable of replacement by a monovalent group or radicle, and under suitable conditions a carbon can be replaced.

Now by employing this hexagon, or benzene ring, as it is called, you will be able to follow with great ease the structural differences of these synthetic remedies, as element or group is substituted to form fresh compounds.

The first subdivision of the benzol group consists of those bodies which are derived from *Amidobenzene* or *Aniline*:—



Note.—For convenience sake and for greater distinctness, I shall leave out the symbols for carbon and hydrogen, where they do not differ from the original benzene hexagon, and only fill in those which show the replacements: for example, the abbreviated formula for aniline will then be as follows:—

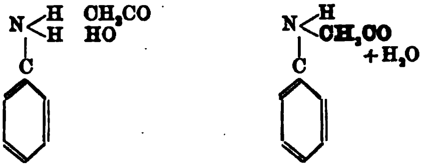


Aniline may be regarded as benzol, C_6H_6, in which one H is replaced by amidogen, NH_2. It may therefore be called Amido-benzene, or Phenylamine, Phenyl being the group C_6H_5 and benzol being theoretically its hydride $C_6H_5 \cdot H$; or *Aniline* may be considered as ammonia NH_3 in which one H is replaced by phenyl, so that aniline may be considered an organic ammonia, and in fact it is, both from its behaviour and its constitution.

$$N\begin{cases}H\\H\\H\end{cases} \qquad\qquad N\begin{cases}H\\H\\(C_6H_5)\end{cases}$$

Ammonia. Aniline.

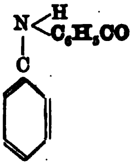
The hydrogens in the NH_2 group in aniline are both replaceable by monovalent radicles, so that if you act upon aniline under suitable conditions you replace one hydrogen by the monovalent group acetyl, CH_3CO, obtaining *Acetanilid*, or *Phenylacetamide*, known as *Antifebrin*.



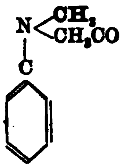
Aniline + Acetic acid = Acetanilid + Water.

$$C_6H_5NH_2 + CH_3CO \cdot OH = C_6H_5NHCH_2CO + H_2O.$$

If instead of using acetic acid, and thus replacing the H by acetyl, you used benzoic acid, you would substitute benzoyl, forming *Benzanilide*, $C_6H_5 \cdot NH \cdot C_6H_5CO$.

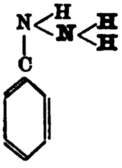


If the residual hydrogen in the NH_2 group be replaced by methyl CH_3 we get *Methylacetanilid*, or *Exalgine*.

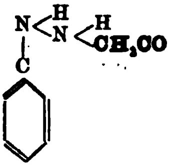


Exalgine$=C_6H_5N \cdot CH_3 \cdot CH_3CO$.

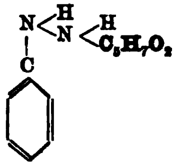
If instead of replacing the H in the NH_2 group in aniline by bodies such as acetyl, benzoyl or methyl, we replace it by a second amidogen group, we obtain a body known as *Phenylhydrazine*, $C_6H_5 \cdot NH \cdot NH_2$. Thus:—



From this body both *Pyrodin* and *Antithermin* are derived. *Pyrodin* is acetyl-phenylhydrazin, or phenylhydrazin in which one of the replaceable hydrogens in the new NH_2 group is replaced by acetyl, whilst *Antithermin* is the product of the reaction of levulinic acid upon phenylhydrazin, so that it may be considered as levulinyl-phenyl-hydrazin.



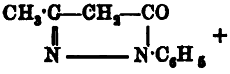
Pyrodin (or Hydracetin)
$C_6H_5 \cdot NH \cdot NH \cdot CH_2CO.$



Antithermin.
$C_6H_5 \cdot NH \cdot NH \cdot C_5H_7O_2.$

We now come to a much more complex body, viz., *Antipyrin*, which must, however, be regarded a derivative of phenyl-hydrazin. If you act upon phenylhydrazin with aceto-acetic ether, condensation takes place with elimination of water and alcohol, and a new body, originally called methyl-oxychinizin, but now called phenylmonomethyl pyrazolon, is formed. The equation may be represented thus:—

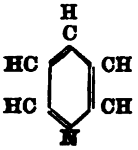
$$CH_3 \cdot CO \cdot CH_2 \cdot COO(C_2H_5) + H_2N \cdot NH \cdot C_6H_5 =$$



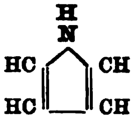
$$\begin{array}{l} CH_3 \cdot C — CH_2 — CO \\ \quad\ \Vert \qquad\qquad\quad | \\ \quad\ N ——— N \cdot C_6H_5 \end{array} + C_2H_5 \cdot OH + H_2O.$$

By heating this body with methyl iodide CH_3I and methyl alcohol CH_4O to 100° C. a fresh methyl group is introduced, and we get *Phenyl-dimethyl-pyrazolon*, or *Antipyrin*.

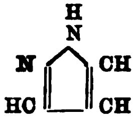
The theoretical derivation from pyrazol is thus well explained in an editorial note in the *Pharmaceutical Journal*, 1887, April 30, p. 888. Pyrazol is represented as the type of a new class of bodies standing in the same relation to pyrrol as pyridine to benzol, thus:



Pyridine.



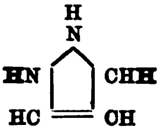
Pyrrol.



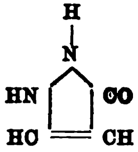
Pyrazol.

A CH group in pyrrol being replaced by nitrogen to form pyrazol. The successive reactions are then supposed to be as follows:—

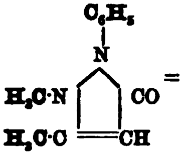
Pyrazin, a dihydride, is first formed.



Then a CH_2 group is replaced by CO, the product being *Pyrazolon*.



and then two hydrogens are successively replaced by methyl groups, forming *Dimethyl-pyrazolon*, and then the H attached to the top N is replaced by phenyl C_6H_5 forming

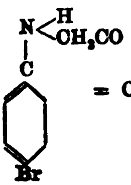


$= C_6H_5\cdot(C_5H_7N_2O)$

Phenyl-dimethyl-pyrazolon, or *Antipyrin*.

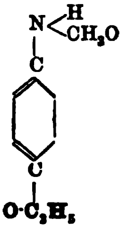
So far we have been considering aniline derivatives, in which the differences lay in the replacements of hydrogen in the NH_2 group. We may now consider four compounds; viz., antisepsin, methacetin, phenacetin and methyl-phenacetin; in which the base, so to speak, is an aniline, in whose benzol ring a H has been replaced by another monovalent group or element.

The first is *Antisepsin*, or *Para-monobromo-acetanilide*; *i.e.*, antifebrin or acetanilide, in which the H in the para position is replaced by bromine. Thus:—



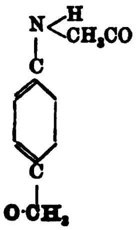
$= C_6H_4Br\cdot NH\cdot CH_3CO.$

The next is *Phenacetin* or *Para-acet-Phenetidin*. This is practically acetanilide again, with the exception that the para H is replaced by an oxy-ethyl group. Thus:—



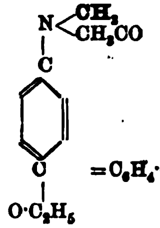
$= C_6H_4\cdot(O\cdot C_2H_5)\cdot NH\cdot CH_3CO.$

If we replace the oxy-ethyl group by an oxy-methyl group, we obtain *Methacetin* or *Para-acetanisidin*.



$= C_6H_4\cdot O\cdot CH_3\cdot NH\cdot CH_3CO.$

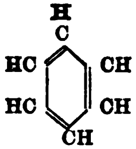
If we replace the residual H in the NH_2 group in phenacetin by CH_3 we obtain *Methyl-Phenacetin*.



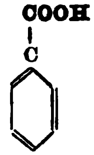
$= C_6H_4\cdot O\cdot C_2H_5\cdot N\cdot CH_3\cdot CH_3CO.$

The next series that claims our attention is the benzoic acid series.

Benzoic acid is benzol in which one hydrogen is replaced by the group COOH, or carboxyl Thus:—



Benzol $= C_6H_6$.



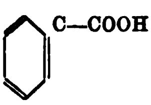
Benzoic acid $= C_6H_5\cdot COOH$.

This is the simplest of all the benzol series of acids, as formic acid is in the fatty acid series; it may, in fact, be regarded as formic acid in which the H is replaced by phenyl. Thus:—

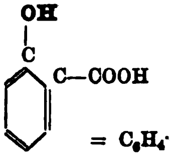
$\left\{\begin{array}{l}COOH\\ H\end{array}\right.$ Formic acid.

$\left\{\begin{array}{l}COOH\\ C_6H_5\end{array}\right.$ Benzoic acid.

Now if we replace by hydroxyl, OH, one of the hydrogens next to the carbon to which the COOH group is attached, we obtain *Ortho-oxybenzoic acid* or *Salicylic acid*. Thus:—



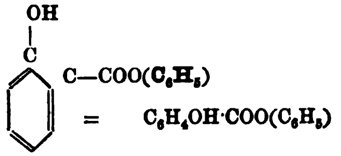
Benzoic acid.



$= C_6H_4\cdot OH\cdot COOH$

Salicylic acid.

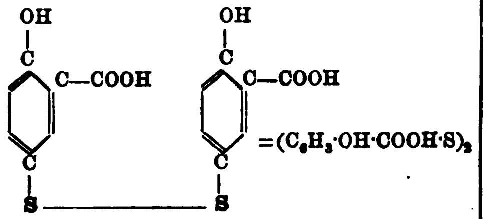
If we replace the H in the COOH group by phenyl, C_6H_5, we obtain *Salol* or *Phenyl salicylate*. Thus:—



$= C_6H_4OH{\cdot}COO(C_6H_5)$

Salol.

Another salicylic acid derivative is *Dithio-Salicylic acid*. This is two molecules of salicylic acid in which the para hydrogens are each replaced by an atom of sulphur, which are also connected to one another. Thus:—



$=(C_6H_3{\cdot}OH{\cdot}COOH{\cdot}S)_2$

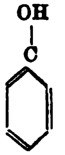
The third sub-division of the benzol series is that of the *Phenol* derivatives. *Phenol* is benzol in which one H is replaced by hydroxyl, OH, and may be considered as water H_2O in which one H is replaced by phenyl C_6H_5. It is thus analogous to alcohol, which is water in which one H is replaced by ethyl. Thus:—

$\left.\begin{matrix}H\\H\end{matrix}\right\}O$ Water.

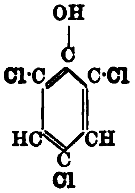
$\left.\begin{matrix}C_6H_5\\H\end{matrix}\right\}O$ Phenol.

$\left.\begin{matrix}C_2H_5\\H\end{matrix}\right\}O$ Alcohol.

Under suitable conditions three of the H atoms in phenol can be replaced by chlorine in alternate positions, forming *Trichlorophenol*. Thus:—

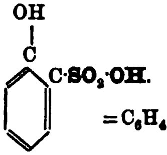


Phenol = $C_6H_5{\cdot}OH$



Trichlorophenol = $C_6H_2Cl_3{\cdot}OH$.

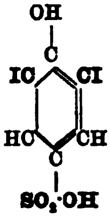
By acting upon phenol with sulphuric acid you can replace an H in the ortho position by the group SO_3H, forming *Ortho-phenol-sulphuric acid*, known in a 33 per cent. solution as *Aseptol* or *Sozolic acid*.



$=C_6H_4{\cdot}OH{\cdot}SO_2{\cdot}OH$.

Aseptol or Sozolic Acid.

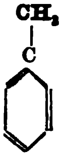
Whilst if instead of replacing the *ortho* H you replace the *para* H by (SO_2OH), and then replace both the *ortho* hydrogens by iodine, you obtain *Di-iodo-para-phenol-sulphonic acid* or *Sozoiodol*. Thus:—



Sozoiodol=$C_6H_2I_2{\cdot}OH{\cdot}SO_2OH$.

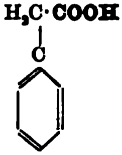
This body must not be confounded with *Iodol*, with which it has no connection, as will be seen later on.

Starting again from benzol, if you replace a H by a methyl group you obtain Toluene (or Toluol):—



Toluene=$C_6H_5CH_3$=C_7H_8.

If you replace a H in this methyl group by carboxyl COOH you obtain *Alphatoluic acid*:—



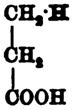
$=C_6H_5{\cdot}CH_2COOH=C_8H_8O_2$

This is also called *Phenylacetic acid*, for it may be regarded as ordinary acetic acid in which one of the hydrogens is replaced by phenyl, thus:—

$\left\{\begin{matrix}CH_3\\COOH\end{matrix}\right.$ Acetic acid.

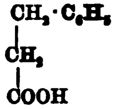
$\left\{\begin{matrix}CH_2{\cdot}C_6H_5\\COOH\end{matrix}\right.$ Phenylacetic acid.

The next acid in the series used in medicine is *Homotoluic acid*, also called *Hydrocinnamic* or *Phenylpropionic acid*, since it may be regarded as propionic acid in which a H in the CH_3 group is replaced by phenyl. Thus:—



$CH_2{\cdot}H$, CH_2, COOH

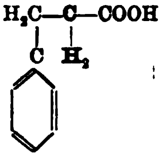
Propionic acid.



$CH_2{\cdot}C_6H_5$, CH_2, COOH

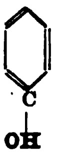
Phenyl propionic acid.

Its graphic formula is represented thus:—

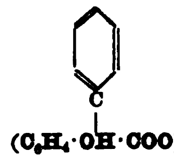


Homotoluic acid = $C_6H_5{\cdot}CH_2{\cdot}CH_2COOH$ = $C_9H_{10}O_2$.

The phenol of toluene is called *Cresol*, and the salicylate of the *para* variety is called *Cresalol*, and is analogous to salol in its structure, thus:—

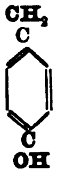


Phenol=$C_6H_5(OH)$.

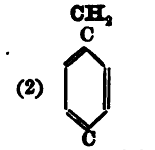


Salol=$C_6H_5(C_6H_4{\cdot}OH{\cdot}COO)$.

(1)

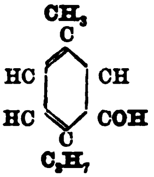


(2)



(1) Para-cresol=$C_6H_4CH_3OH$.
(2) Cresalol=$C_6H_4CH_3{\cdot}(C_6H_4{\cdot}OH{\cdot}COO)$.

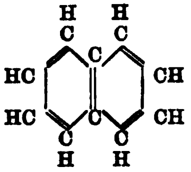
Thymol is a further derivative, having in addition to the CH_3 and OH groups, a propyl group C_3H_7, arranged as follows:—



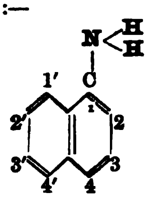
Aristol is an iodine derivative of thymol, but its constitution is not yet settled.

We now come to the second great division, namely, the Naphthalene series.

Naphthalene, $C_{10}H_8$, is the next highest body in the benzol series, and consists of ten atoms of carbon and eight of hydrogen. This is represented by a double hexagon, thus:—

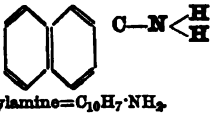


The first subdivision of the naphthalene group consists of the naphthylamines, corresponding to the phenylamines. You will remember that the first body in the benzol series, was one in which one H was replaced by NH_2, forming phenylamine or aniline. So the first body in this group is *Naphthylamine*, $C_{10}H_7NH_2$, written thus:—



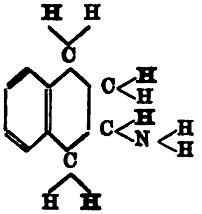
$=C_{10}H_7 \cdot NH_2$

This is called *alpha* Naphthylamine, because the replacement of the amidogen group has been effected in what is called an *alpha* position. The *alpha* positions are those numbered 1, 1′ and 4, 4′ on the graphic formula above, whilst if the substitution takes place at 2, 2′, 3 or 3′, the body becomes a beta-compound, so that β-Naphthylamine is written thus:—



β-Naphthylamine$=C_{10}H_7 \cdot NH_2$.

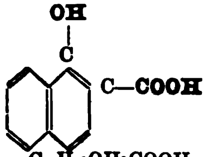
Now if you take this body and add four hydrogens to that hexagon in which the NH_2 group has been produced, you obtain *Tetra-hydro-β-naphthylamine* or *Thermine*, a body which is reputed to raise the temperature of the human body instead of reducing it.



Thermine$=C_{10}H_{13}N$.

You will doubtless notice that the carbons in the ring in which the replacements and additions have taken place, are no longer united by double bonds, but are joined by single bonds, the bonds that are thus set free being satisfied by hydrogen.

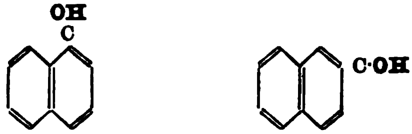
The next subdivision consists of the *Naphthoic acid series*, which is analogous to the benzoic acid group. The acid directly analogous to benzoic acid is alpha-naphthoic acid $C_{10}H_7 \cdot COOH$, but at present I am not aware that this has been used in pharmacy. The corresponding acid to salicylic acid is *Alpha-Oxynaphthoic acid*.



$= C_{10}H_6 \cdot OH \cdot COOH$.

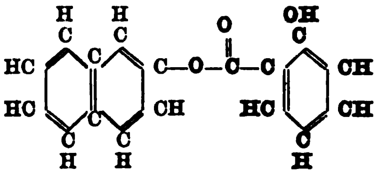
This is really α-oxy-β-naphthoic acid, which is a β-naphthoic acid derivative.

The corresponding bodies to phenol are *Alpha and Beta-Naphthol*.



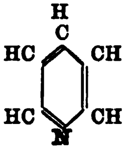
Alpha-Naphthol$=C_{10}H_7 \cdot OH=$Beta-Naphthol.

Now if you take β-naphthol and substitute the group $C_6H_4 \cdot OH \cdot COO$ for the OH group you obtain *Salicylate of β-naphthol* or *Betol*, which is thus analogous to salol and cresalol.

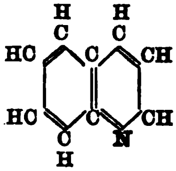


Betol$=C_6H_4 \cdot OH \cdot COO(C_{10}H_7)$.

We now come to a rather complicated series of bodies which are derived from *Quinoline*, C_9H_7N. You will remember when dealing with antipyrin that pyridine C_5H_5N, was referred to. Now if you replace a CH in naphthalene, $C_{10}H_8$, by a nitrogen atom you obtain quinoline. The relation between this and pyridine being thus shown:—

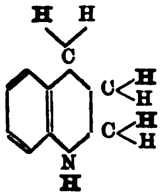


Pyridin C_5H_5N.

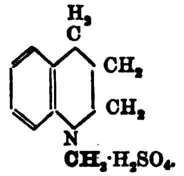


Quinoline C_9H_7N.

It is necessary to refer to this since Quinoline, or Chinoline, is the starting point for a great many important bodies. The hexagon in which the N is replaced is known as the pyridine ring. Under suitable conditions four hydrogens can be added to this pyridine ring, forming *Tetra-hydroquinoline*, $C_9H_{11}N$.



and if you replace the nitrogen-hydrogen by methyl and make the sulphate of this body, you have *M. Kairolin*.

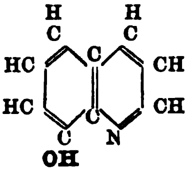


M. Kairolin = $C_9H_{10}NCH_3 \cdot H_2SO_4$.

The M stands for methyl, the ethyl compound or *A. Kairolin* being distinguished by an A for Aethyl—the German mode of spelling ethyl.

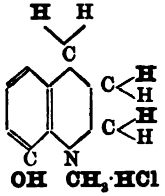
M. Kairin and *A. Kairin* resemble the kairolins, differing in having an OH group in the benzol nucleus and in being hydrochlorates instead of sulphates. The kairins are really derived from—

1. Oxyquinoline—



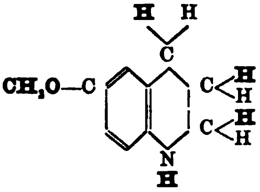
1. Oxyquinoline = $C_9H_6(OH) \cdot N$

which is a derivative of quinoline. The formula for the M. Kairin is written thus:—



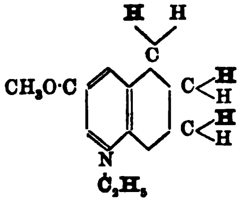
M. Kairin = $C_9(OH)H_9 \cdot N \cdot CH_3 \cdot HCl$.

Starting again from quinoline, if we replace the para-hydrogen in the benzol group by ($O \cdot CH_3$) we obtain *Parachinanisol*, and if we add 4 hydrogens to the pyridine ring as before, we obtain *Tetra-hydro-parachinansol*, or *Thallin*.



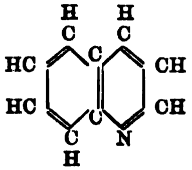
Thallin = $C_9(O \cdot CH_3) \cdot H_{10}N$.

Thallin is generally used as the sulphate. If we substitute ethyl for hydrogen in the NH group we obtain *Ethyl-tetra-hydro-parachinanisol* or *Ethyl-thallin*.

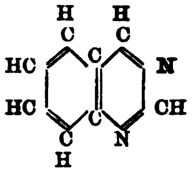


Ethyl thallin = $C_9CH_3OH_9 \cdot N \cdot C_2H_5$.

A further derivative of quinoline is *Orexin*; this is derived through a body called *Chinazoline*, which is quinoline in which a further CH group has been replaced by nitrogen. Thus:—

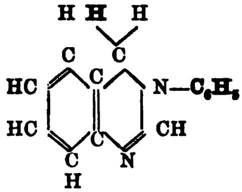


Quinoline C_9H_7N.



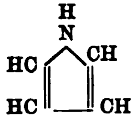
Chinazoline $C_8H_6N_2$.

The variety of chinazoline here shown is the *meta*, and *Orexin* is *Phenyl-dihydrochinazoline*, *i.e.* to say meta-chinazoline in which a hydrogen has been added to the CH group in the para position, and a phenyl-group to the N in the meta position. Thus:—

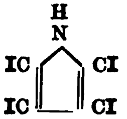


Orexin = $C_8H_7N_2 \cdot C_6H_5$.

The last body that I shall mention is *Iodol*, which is tetra iodo pyrrol, that is to say *Pyrrol* in which the four carbon hydrogens are replaced by iodine. Thus:—



Pyrrol = $C_4H_4 \cdot NH$.



Iodol = $C_4I_4 \cdot NH$.

You may remember that pyrrol was referred to when speaking of antipyrin, as being the starting point of one of its theoretical derivations.

Pyrrol and its derivatives form a special group by themselves, but as there was only this one derivative (Iodol), I did not think it worth while to enumerate the pyrrol type as a special class.

I have now come to the end of the description of the more important synthetic remedies. There are many others that will doubtless occur to the well informed pharmacist that are not here alluded to, but I hope that my endeavours will enable several of you to look at these bodies in a new light, and to realize that these graphic formulæ really help us to understand these new bodies, and to perceive the relationship that exists between bodies of an allied constitution.

As Messrs. Martindale and Westcott point out in the preface to the sixth edition of their 'Extra Pharmacopœia,' "the current of pharmacology seems to be following the course of modern chemistry through the intricacies of the endless series of derivatives obtained from coal tar and various alcohols," and if I, by means of this paper shall have been able to elucidate any of these difficulties, and to put facts into a more tangible and intelligible form for the benefit of the members of this Conference, I shall feel that my labour of love has borne good fruit.

NOTE.—It must not be assumed that the replacements mentioned in this paper are always those which actually occur in making fresh bodies: they are simply to shew the differences from a structural point of view that exist between the type and the derivative.

APPENDIX.

Single-line formulæ, showing the constitution of the synthetic remedies mentioned.

1. Methanes and Aldehydes.

Marsh gas	CH_4.
Methyl chloride . .	CH_3Cl.
Methylene chloride .	CH_2Cl_2
Chloroform	$CHCl_3$.
Tetrachloride of carbon	CCl_4.
Ethyl chloride. . .	$C\cdot H_2(CH_3)\cdot Cl$.
Ethylidene chloride.	$CH_3(CHCl_2)$.
Methylal.	$C\cdot H_2\cdot(CH_3O)_2$.
Methyl alcohol . .	$C\cdot H_3\cdot(OH)$.
Amylene hydrate. .	$C\cdot(CH_3)_2\cdot(C_2H_5)\cdot(OH)$.
Sulphonal	$C\cdot(CH_3)_2\cdot(SO_2\cdot C_2H_5)_2$.
Reversed sulphonal .	$C\cdot(C_2H_5)_2\cdot(SO_2\cdot CH_3)_2$.
Trional	$C\cdot(CH_3)(C_2H_5)(SO_2\cdot C_2H_5)_2$.
Tetronal.	$C\cdot(C_2H_5)_2(SO_2\cdot C_2H_5)_2$.
Formic aldehyde. .	$C:O(H_2)$.
Hypnone.	$CO(CH_3)(C_6H_5)$.
Urethane	$CO(NH_2)(O\cdot C_2H_5)$.
Aldehyde	$CO(CH_3)H$.
Chloral anhydride .	$CO(CCl_3)H$.
Chloral hydrate . .	$C(OH)_2(CCl_3)H$.
Ural	$C(OH)[CO(NH)(O\cdot C_2H_5)](CCl_3)H$
Somnal	$C(O\cdot C_2H_5)[CO(NH)(O\cdot C_2H_5)](CCl_3)H$
Chloralamide . . .	$C(OH)[CO(NH)H](CCl_3)H$.
Butylchloralhydrate	$C(OH)_2[(CH_2)_2(CCl_3)]H$.

2. Aromatic Series.

Benzol	C_6H_6.
Aniline	$C_6H_5\cdot NH_2$.
Acetanilide . . .	$C_6H_5\cdot NH\cdot CH_3CO$.
Benzanilide. . . .	$C_6H_5\cdot NH\cdot C_6H_5CO$.
Exalgine.	$C_6H_5\cdot N(CH_3)\cdot CH_3CO$.
Phenyl-hydrazine .	$C_6H_5\cdot NH\cdot NH_2$.
Pyrodin	$C_6H_5\cdot NH\cdot NH\cdot CH_3CO$.
Antithermin . . .	$C_6H_5\cdot NH\cdot NH\cdot C_5H_7O_2$.
Antipyrin	$C_6H_5\cdot(C_5H_7N_2O)$.
Antisepsin	$C_6H_4Br\cdot NH\cdot CH_3CO$.
Phenacetin	$C_6H_4(O\cdot C_2H_5)\cdot NH\cdot CH_3CO$.
Methacetin. . . .	$C_6H_4(O\cdot CH_3)NH\cdot CH_3CO$.
Methyl-phenacetin .	$C_6H_4(O\cdot C_2H_5)\cdot N(CH_3)\cdot CH_3CO$.
Benzoic acid . . .	$C_6H_5\cdot COOH$.
Salicylic acid , . .	$C_6H_4(OH)\cdot COOH$.
Salol	$C_6H_4(OH)\cdot COO(C_6H_5)$.
Dithiosalicylic acid .	$(C_6H_3OH\cdot COOH\cdot S)_2$.
Phenol	$C_6H_5\cdot OH$.
Trichlorophenol . .	$C_6H_2Cl_3\cdot OH$.
Aseptol	$C_6H_4OH\cdot SO_2OH$.
Sozoidol	$C_6H_2I_2OH\cdot SO_2OH$.
Toluol	$C_6H_5\cdot CH_3$.
Alpha-toluic acid .	$C_6H_5\cdot CH_2(COOH)$.
Homo-toluic acid .	$C_6H_5\cdot CH_2\cdot CH_2(COOH)$.
Cresol	$C_6H_4CH_3\cdot OH$.
Cresalol	$(C_6H_4\cdot CH_3)OOC\cdot C_6H_4OH$.
Thymol	$C_6H_3\cdot CH_3\cdot C_3H_7\cdot OH$.
Aristol	(Iodine derivative of Thymol).
Naphthalene . . .	$C_{10}H_8$.
Naphthylamine . .	$C_{10}H_7\cdot NH_2$.
Thermine	$C_{10}H_7\cdot H_4\cdot NH_2$.
α-Naphthoic acid .	$C_{10}H_7COOH$.
α-Oxynaphthoic acid	$C_{10}H_6(OH)\cdot COOH$.
α-Naphthol. . . .	$C_{10}H_7\cdot OH$.
b-Naphthol. . . .	$C_{10}H_7\cdot OH$.
Betol	$(C_{10}H_7)OOC\cdot C_6H_4OH$.
Quinoline	C_9H_7N.
M. Kairolin. . . .	$C_9H_7(H_3\cdot CH_3)N\cdot H_2SO_4$.
A. Kairolin. . . .	$C_9H_7(H_3\cdot C_2H_5)N\cdot H_2SO_4$.
M. Kairin	$C_9H_6(OH)\cdot(H_3CH_3)N\cdot HCl$.
A. Kairin	$C_9H_6(OH)\cdot(H_3\cdot C_2H_5)N\cdot HCl$.
Thallin	$C_9H_6(O\cdot CH_3)\cdot(H_4)N$.
Ethyl-thallin . . .	$C_9H_6(O\cdot CH_3)(H_3\cdot C_2H_5)N$.
Chinazoline . . .	$C_8H_6N_2$.
Orexine	$C_8H_6(HC_6H_5)N_2$.
Pyrrol	$C_4H_4N\cdot H$.
Iodol	$C_4I_4N\cdot H$.

NOTE.—The hydrogens (with or without replacements) in the brackets immediately preceding the nitrogen in the quinoline and chinazoline formulæ, denote the hydrogens added in forming hydro-compounds.

The PRESIDENT said this paper came most opportunely, for pharmacists had been working somewhat in a maze, as it were, with regard to these preparations which were springing up so quickly on all sides. The Conference was much indebted to Mr. Hodgkin for explaining the matter so clearly and concisely, and the paper would furnish material for study for some time to come. If the President of the British Association, Sir Frederick Abel, or Professor Thorpe, who had honoured the Conference with their presence, had any remarks to offer, he was sure they would be very highly esteemed.

Sir F. ABEL said it had afforded him great pleasure to visit the Conference, where he saw many gentlemen whom he was proud to recognize as his colleagues in the paths of science, and he was especially glad to be present on this occasion and observe pharmaceutical chemists following with such interest what appeared to be the intricacies of graphic formulæ, but which after all afforded the best means of grappling with the ever increasing knowledge with regard to the organic branch of chemical science. In the hands of the scientific chemist these formulæ had been of the greatest assistance in explaining the results of his researches to those who desired to follow them, and he was quite sure that to the pharmacist the study of the graphic formulæ of these interesting groups of bodies, which were becoming of such great importance, could not but assist very materially in the knowledge of their constitution, which knowledge led to that further knowledge which was also daily increasing of their uses and appliances. He could not venture to discuss the paper, but Mr. Hodgkin had certainly put the whole subject very clearly and concisely in the abstract of it which he had given, and when the paper was published *in extenso* it would be well worthy of study, not by pharmaceutical chemists merely, but by all who desired to see a connected history of this most interesting class of remedies, for which they were indebted to some of the most distinguished workers in pure chemical science. It had afforded him the greatest pleasure to attend the Conference although he could only do so for so short a time.

Mr. A. H. ALLEN (Sheffield) said he had listened to the paper with great interest, and must congratulate Mr. Hodgkin on the very thorough manner in which he had covered the ground. Of course Mr. Hodgkin had been handicapped by having so much to say in so short a time, but he had been much struck by the completeness with which he had formulated the whole of these new remedies, each of which seemed to have been at least mentioned. He had hoped that there would be some reference made to the effect of isomerism on the physiological action of these bodies. For instance there was more than one form of sulphonal. Again Dr. Knorr discovered antipyrin, the scientific name of which was phenyldimethylpyrazolon, and there were two other bodies of similar constitution, it being merely a question of the exact arrangement of the CH_3 atoms in the molecule. But he was not aware of any researches having been published as to the physiological effect of these isomers. He should be glad to learn something on that subject. Again, there were two other hydroxybenzoic acids isomeric with salicylic acid, which were perfectly well known, and were said to be very distinct as to their antiseptic properties; indeed, one was said to be absolutely deficient in this property. If so, it was a very curious fact that the mere position of the carboxyl group in the benzene chain should produce such a difference in its character in this respect. He agreed with the author that it was very important to master the constitution of these bodies, for it was only by attending to these minute differences that any explanation could be afforded of what appeared to be their anomalous effects. Sometimes a new body when prepared gave results which were not satisfactory, but it turned out afterwards that this was due to the presence of an impurity. This had been the case with salicylic acid, and on examination the isomeric hydroxybenzoic acid had been found in the salicylic acid. Similarly the homologous body creasotic acid had been found in salicylic acid more frequently sometime ago than at present; in the same manner that carbolic acid used to be obtained contaminated with its homologue cresol more frequently than it was now. He thought the use of these descriptive names should be encouraged. Sometimes, it was true, they were very long and unwieldy; but if instead of calling a man John Smith, which gave very little idea of his character, a name could be used which would describe him as a tall, light-haired man, blind with the right eye, limping with the left leg, and having a peculiarly irascible temperament, besides giving the names and occupations of his parents and the number and dispositions of his children; that was the sort of name which we really had for many chemical substances, the names of which clearly described them. If trivial names were to be adopted, he would rather that they suggested the characters of the body than the method of preparation. For instance, taking antipyrin, the constitution originally attributed to it by the discoverer was that of dimethyloxychinizin, but it was now known to be a phenyldimethylpyrazolon. If the first of these names had been adopted and it had been described in the Pharmacopœia as a derivative of quinoline that would have been a great mistake; it was neither made from quinoline, nor was it derived from quinoline. The name now suggested was phenylon, but he would much rather call it antipyrin at once. He would rather stick to the old name than adopt such a one as phenylon.

Dr. THRESH thought a discussion of this paper would take up more time than the Conference could afford for it. On the previous day the President had referred to the subject of fashion in medicine, but these changes of fashion were only to be deprecated when carried to excess, and it was admitted on all hands that the present change was one in the right direction. Chemists were now busily engaged in the formation of multitudes of new bodies such as those Mr. Hodgkin had so ably described, and on the other hand physiologists and therapeutists were engaged in the much more difficult task of ascertaining the action of some of them. Unfortunately for the public the number of new bodies was legion, whereas those whose physiological action had been carefully ascertained could be counted on one's fingers. It was, however, beginning to be acknowledged that there was a relationship between chemical structure and physiological action, and it was in this direction one must look for some of the most important discoveries of the future, and in this direction must medicine advance on its way to become a science. In his opinion the author of the paper had been a little too dogmatic, and he gathered that Mr. Allen also shared this opinion. He had had an opportunity of glancing at the paper, and though he believed from the statements of the discoverers and others that the probable formulæ of these bodies were such as Mr. Hodgkin had given, it was quite possible that in a year or two some of them might be regarded from a different point of view. At the present time students were advised to attempt to assimilate so much knowledge in a short time that they were often unable to distinguish between fact and theory, or what was really based on well attested fact. With these words of warning he should like to add that the paper would be of lasting interest to pharmacists and also to chemical and medical students. The arrangement of the series, so far as he could follow it, showing the relationship of one body to another, was excellent, and would enable those who desired to keep themselves abreast of the time to do so with comparative ease.

Mr. FAIRLEY thought one of the most important points in the paper was that which drew attention to the connection between chemical composition and physiological action. That matter was studied some time ago by Dr. Crum Brown, partly with reference to strychnine and some of the other alkaloids, and showed the change which took place in the physiological action, when their methyl derivatives were employed. This paper was likely to draw attention to this point, and if followed up it would, no doubt, by-and-bye, enable pharmacists to supply the drugs which physicians required for special purposes, as they would learn how to modify the action of drugs in any desired direction.

Mr. SCHACHT said when he saw these graphic formulæ a question occurred to his mind, which he had more than once asked without ever getting a satisfactory reply, and which he would now repeat. Had any experiments been made with a view to determine whether these complex chemical remedies acted as a whole, or whether their physiological effects depended upon the action of one or more of the groups of atoms which in the graphic figure appear at one of its angles? Such group might easily be conceived to be less closely held in bondage than the other atoms of the molecule, and, becoming detached within the organism, be the real remedial agent. Had any investigations been made in that direction of inquiry?

The PRESIDENT said it was quite clear that chemists differed on this matter, as doctors did on other matters, and perhaps the whole theory might be pulled to pieces in the next two years; but in the meantime the paper would be of the greatest value to pharmacists in helping them to know exactly where they were, and the younger members in particular could not do better than carefully study it.

Mr. HODGKIN, in reply to Mr. Allen, said he had carefully endeavoured all through the paper to avoid all reference either to physiological or pharmaceutical relations, as he wished to avoid contentious matter. These things were not at all settled yet, and he had simply attempted to take the best recognized formulæ that existed for these bodies, and to show the changes which might be supposed to have taken place in their formation. He had nothing to do with their physiological action, but had treated the question entirely from a chemical point of view. As to Dr. Thresh's remark that he had been rather too dogmatic, he thought a sentence at the conclusion of the paper would relieve his mind on that score. He had simply dealt with the subject from a structural point of view. As regarded the physiological action and the question put by Mr. Schacht, he might say that some time ago this question of the relationship of the physiological action to the chemical structure was most fully discussed in Dr. Lauder Brunton's Croonian lectures, which were published in the *Pharmaceutical Journal* and should be carefully read by all who were interested. Dr. Brunton there dealt with the effects of the introduction of fresh groups in an extremely able manner, and really helped one to understand the subject. To take, for example, the new body, methylphenacetin, it was known that the introduction of a methyl group into acetanilide to form methylacetanilide had increased its remedial properties in certain directions, and so the experiment was made of introducing a methyl group into phenacetin in an analogous position with very happy results.

(*To be continued.*)

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The usual monthly meeting of the Council was held on Wednesday, the 1st inst., at 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. Charles Evans, was in the chair, and the other members of the Council present were the Vice-President, Mr. Wells and Messrs. Merran, McCormack, Beggs, Hayes, Doran, Hodgson (Treasurer), Professor Tichborne and Dr. Burnes.

A letter was received from Mr. John Evans, L.S.H., 49, Dawson Street, Dublin, thanking the Council for re-electing him their Examiner in Practical Pharmacy.

A letter was received from Dr. Alexander Gordon, 18, Rathmines Road, Dublin, declining to offer himself for re-election as a member of the Council in consequence of inability to attend its meetings.

The President: We all regret the loss of Dr. Gordon.

A letter was received from Mr. Hugh Montgomery, notifying that he had changed his address to the "Medical Hall, Tipperary."

A letter was read from Mr. J. B. Alister, asking whether as an assistant he could be allowed to go in for the Major examination before he was twenty-one years of age. He stated that he had served four years apprenticeship with a pharmaceutical chemist, and had a certificate of having spent 100 hours' study of practical chemistry at one of the schools recognized by the Society.

The President: We have no option in the matter. The Act prohibits candidates under twenty-one years of age from presenting themselves. Some licensing bodies allow a candidate under twenty-one to be examined, but do not give him the certificate until after he has attained his majority. It might be well for us to do so.

The Registrar was directed to write to Mr. Alister, stating that the Council were unable to grant his request.

A letter was read from Mr. Thomas McDowell on the part of the City of Belfast Young Men's Christian Association asking that their Chemical School shall be added to the list of schools recognized by the Society. The laboratory of the school, the writer stated, was newly fitted up two years ago and contained every convenience for the study of practical chemistry. The school was recognized by the Science and Art Department, South Kensington; and most successful classes had been conducted in the school in connection with the Department during the last two years. In reply to a letter from the Registrar asking for further information, there was a second letter dated September 18th from Mr. McDowell, in which that gentleman stated that the work of the school had been hitherto directed to the preparation of candidates for the examinations under the Science and Art Department, but that they hoped to commence classes in chemistry for the London University Science Examinations. The writer stated that he held degrees from Trinity College, Dublin, and the London University, and that the teachers in the school were Mr. W. I. Cameron, M.B., London University, and Mr. George Elliott, C.M., Science and Art Department.

The President: I think it would be a pity not to include the school if it be a good one. He should ask some of our members to inspect it.

On the motion of Mr. McCormack, seconded by Dr. Burnes, it was resolved that Messrs. Payne and Montgomery should be requested to visit the school and report upon it to the Council.

A letter was received from Mr. John W. Cussons, 3, Albion Street, Belfast, directing attention to the fact that under section 19 of the Pharmacy Amendment Act the Council now have power to arrange examinations for assistants, and practically to insist upon every chemist's assistant holding a qualification under the section; and asking information as to when the examinations would be held.

The Vice-President: The section gives a power of qualification, but it does not make it compulsory on the employer to have his assistants qualified.

On the motion of Dr. Burnes, seconded by Professor Tichborne, the Registrar was directed to write to Mr. Cussons, informing him that section 19 was not yet in force, and that even when it should become so, it would not be compulsory upon any assistant to be examined, nor upon any employer to require his assistant to submit himself for examination, although it was advisable that all should do so. A letter was received from Mr. W. Francis Crofts, Stoke-on-Trent, asking whether a registered associate of the Pharmaceutical Society of Great Britain could legally trade as a chemist and druggist in Ireland and *vice versa*.

The Registrar was directed to answer the inquiry in the negative.

A letter from Mr. John Stewart stated that he had been in business in Westport, co. Mayo, as a chemist and druggist during the years 1887 and 1888, and asked when he could present himself for examination.

The Registrar stated that he had replied saying that due notice would be given of the days of examination.

A letter was received from Mr. Charles J. Strother inquiring whether a person who had been engaged in pharmacy in England and elsewhere for upwards of twenty-six years and who had been in business as an active partner in a firm of chemists and druggists in London from 1874 to 1878, was entitled to be registered by the Pharmaceutical Society of Ireland.

Mr. Hayes: He can go in for our examination.

Mr. Hodgson: Does not the Amendment Act say that the trading must be in Ireland?

The Registrar was directed to reply stating that the Council had no power to register any person who had not passed their examination.

Letters were received from the following gentlemen applying to be registered as chemists and druggists:—Mr. Thomas Boland, Ballinagh, co. Cavan; Mr. James Clarke, Shercock, co. Cavan; Mr. Henry Faris, Killeshandra, co. Cavan; Mr. James McCann, Killeshandra, co. Cavan; Mr. Daniel Brogan, Castlepollard, co. Westmeath; Mr. Joseph Holton, Nenagh, co. Tipperary; and Patrick Carroll, Dunleer, co. Louth.

The President said the letters of all those applicants stated that they were in business prior to 1875.

Professor Tichborne suggested that the letters should be referred to the Certificates Committee.

The President moved pursuant to notice that schedules be drawn up and printed for those who are desirous of being registered as chemists and druggists or as registered druggists, the schedules to contain all necessary information.

The motion was agreed to; and the President submitted a series of forms in which the proposed schedules were to be drawn up.

On the motion of Dr. Burnes, seconded by Professor Tichborne the forms were approved of, and it was ordered that copies of the schedule appropriate to their case should be forwarded to each of the seven applicants.

Mr. Hayes moved pursuant to notice,

That the regulation allowing rejected candidates to present themselves for re-examination without payment be amended, so as to read "on paying the examiners' fees." On looking at the certificates last week they found that four candidates were coming up for re-examination. Under the existing regulations they could do so without paying the examiners' fees; so that the Society would have to pay six guineas for which it would get nothing. That was scarcely fair. He did not think any other institution but their own had such a regulation.

The Vice-President, in seconding the motion, said the present system was hardly fair to the Society when it was so short of funds. When a young man knew that a second examination would cost him nothing he was tempted to come up for the first not sufficiently prepared, and on the mere chance of passing. If he knew that he would have to pay the second time he would not do so. The result was a loss of 31*s.* 6*d.* to the Society in respect of each re-examined candidate. For some reason or other the present rule was made eight or ten years ago.

Mr. Hodgson said as well as he recollected there was a long argument about it at that time, and the feeling of the Council was that five guineas was a very large sum for a young man to have to pay, in addition to railway fare and hotel expenses, for perhaps two or three days, more especially as he might be rejected a second time.

Professor Tichborne said Mr. Hodgson had stated the substance of what occurred. It was deemed a kind of compromise, an act of charity.

Mr. Hayes: It will be a kindness to the students to make them come up better prepared. Of the six candidates who are coming up this time two are presenting themselves for the third time and will have to pay.

The motion was put and unanimously agreed to.

The President: It cannot affect those who have already failed; we are bound to give them a second examination free.

Professor Tichborne: The resolution just passed will have to be ratified by the Privy Council.

The following report from the Pharmacy Amendment Act Committee was read:—Meeting to consider the regulations for examinations under the Pharmacy Act, (Ireland) 1875, and the Amendment Act, 1890. Present—The President, the Vice-President, Dr. Burnes, Mr. Hayes and Professor Tichborne. Mr. Samuel P. Boyd was present by invitation, to confer as to the rules and fees for the modified examinations. The following basis of examination was arranged:—If the examination be held in the country, the candidate to pay 10*s.* 6*d.* extra for expenses. All candidates to pay one guinea for examination and one guinea for registration. No examination to be held outside Dublin unless there be twelve candidates. Dr. Burnes proposed that the extra payment should be one guinea instead of half-a-guinea, in which the Vice-President concurred. The feeling of the committee was in favour of the half-guinea.

The President said that in consequence of the committee not having been unanimous about the amount of the fee for examinations in the country, the matter remained for decision by the Council. Mr. Boyd had stated that if the Council should not be satisfied with the amount proposed by the report, there would be no use in appointing a sub-committee to meet those whom he represented: but that if the Council accepted the fees as recommended in the report, his friends would meet a sub-committee from the Council.

Dr. Burnes maintained that nothing less than a guinea fee from each candidate examined in the country would recoup the Council, having regard to the expense that would be incurred in sending an examiner to the country.

Mr. Beggs: I do not think it is enough.

Dr. Burnes: The Act of Parliament gives us power to recoup ourselves any expense that we may be at.

Mr. McCormack: Shall we not have to send with the examiner either the registrar or a member of the Council?

The President: I think so.

Professor Tichborne: My view is that outside Belfast and Cork you will have very few applications. There are very few towns that will supply twelve candidates at the same time.

On the motion of Mr. Hayes the report was adopted.

Reports from the Certificates Committee and the Law Committee were adopted.

Mr. Hodgson (Treasurer) said he wished to say a few words in connection with the School of Chemistry. The Registrar had given a report of the receipts and expenditure in connection with that school. During the week he had had a troublesome job in making out the accounts of the Society for the annual meeting, and it cropped up that some money had been received and some had been paid away, during the year, and these figures came into the general account. Against that he entered his solemn protest. He thought it extremely irregular. He had received a letter from Mr. Brunker in which that gentleman called attention to the fact of the outlay on the chemical school, looking on it as extremely irregular. Mr. Brunker said in the letter that as no regulations respecting the school had been approved of by the Privy Council no payments could be made out of the Society's funds on its account; and he mentioned that he had written a letter to the auditors on the subject. He (Mr. Hodgson) highly approved of the school and thought that they should give it every countenance; but he entirely protested against the finances of the school being mixed up with those of the Society. The two should be kept perfectly distinct. The accounts showed that during the year payments had been made and moneys received in respect of the school, with the result that there was now exactly £7 9*s.* 9*d.* in hand belonging to the school. He would now move,—

> "That a committee be selected from the members of the Council of the Pharmaceutical Society to control and manage the chemical school; that they elect out of their members one gentleman to act as secretary and treasurer to the school, who shall receive all fees and make all payments in connection with it; that the Pharmaceutical Society in future have nothing to say to the monetary affairs of the school; and that a cheque for £7 9*s.* 9*d.*, balance in the hands of the Pharmaceutical Society to the credit of the school, be handed over to the secretary of the committee of the school as soon as he is appointed."

The Vice-President: That motion requires notice.

Mr. Hayes said he would second it. As one of the auditors he had been put into rather an awkward dilemma on this occasion. He had acted as auditor of the Society for fifteen years, and during that time he had found the accounts most satisfactory, and had never had to change a figure presented by the Treasurer. On this occasion he approached the accounts with a feeling of uncertainty as to how he should act. He was glad of the establishment of the school, which he thought was a necessity under the present condition of things.

Mr. Hodgson: We all agree to that.

Mr. Hayes: But the way in which the school should be carried on, and whether the Society should be mixed up with it were quite different matters. He had received a letter from Mr. Brunker with reference to the auditing of the accounts. Mr. Hayes read the letter, in which the writer stated that no regulations relative to the school had as yet been approved of by the Lord Lieutenant in Council. He (Mr. Brunker) did not wish for a moment to be taken as objecting to the establishment of the school as, if properly regulated and kept, it would form a legitimate and extremely useful part of the Society's work. No direct statutory power, the writer continued, was conferred on the Council by the Act of 1875 to establish such a scheme, but the general powers conferred by subsection 8 of section 16 of that Act probably covered such a scheme, subject to the limitations of section 17. In the absence, however, of approval by the Privy Council, he held that it would be illegal to expend a penny of the Society's funds on the school, and he protested against the allowance of any expenditure under that head if it should appear in the accounts. He should make use of this caution as might be necessary in future should occasion arise. He (Mr. Hayes) found, on going into the accounts, that there was nothing charged against the Society so far. There had been an expenditure certainly of £17 14*s*. 3*d*., but against that they held funds to the amount of £25 4*s*., leaving a balance of £7 9*s*. 9*d*. But the agenda paper of that day contained accounts presented for payment on behalf of the school amounting to £18 0*s*. 6*d*., which would leave a deficit as regarded the Society of £10 10*s*. 9*d*. That was perhaps not his business as auditor of an account of the past year, but with the knowledge that he had of the matter he felt bound, whilst passing the account for the year expired, to draw the attention of the Council to the matter and also to add an explanatory note to the account. In the absence of Mr. Simpson, his co-auditor, Dr. Burnes, had gone through the accounts with him. He would therefore second Mr. Hodgson's motion because he did not wish that the members of the Council should be surcharged any deficiency that should accrue in respect of the school. He did not suppose that any member of the Council would object to subscribing for the support of the school. He should not.

Mr. Hodgson: Nor should I.

The President said that, to a great extent, he agreed with Mr. Hodgson and Mr. Hayes. In money matters one could not be too plain and above board. At the same time the members of the Council should recollect that they committed themselves to the school twelve months ago, and said they would adopt it; and if the Privy Council had not replied to their communications about the school that was not their fault. He did not think it would be fair for them at the end of twelve months to turn round and say that they would not be responsible for the school. They had committed themselves to it and were bound to support it for the year. If at the end of the twelve months they should wish to reverse that decision, and Mr. Hodgson should send in his notice of motion to put it on another basis, well and good. But in view of the decision of the committee held on the 16th December, 1889, which was afterwards ratified by the Council, he did not see how they could go back on their determination and say, "We are not responsible for any expense that the school has been at." Since the Council met that day six guineas had been handed in, in connection with the school, and there was also a sum of £11 0*s*. 6*d*. due by candidates.

Mr. Hayes: Are not the six guineas from two students who did not pay all the fees before?

The Registrar: No, new men.

Professor Tichborne said it was not his intention to have taken any part in this discussion, but if he were allowed to make a statement it might clear the way. In the first place the six guineas which had been handed in to-day would be almost all profit. Then some expense had been incurred for gas and hat racks in the adjoining room which could not be fairly charged against the school. During the winter months the Society's examinations could not be conducted without light.

Mr. Hayes: I did not put a penny against the school that was not down as done for the school.

Professor Tichborne said the school was an excellent idea, and he had very little doubt that it would ultimately pay very well. The Registrar had informed him that a gentleman had come from France to study at our school. At the same time it would be desirable to have a regular school committee to work the school. As to the financial question he was quite sure that it was all right, although if all the expense of the school were put down to it there would not, in his opinion, be much profit the first year, in fact the school would but clear itself.

Mr. Hodgson said the question was one of principle, and he utterly protested against the money for the school coming out of the funds of the Society.

The Vice-President said he was very sorry that this matter had been brought forward in the way it had been. Mr. Brunker wanted to upset the working of the Council. They had got on very well during the past year, and the licentiates were satisfied with what the Council had done. There was no doubt that in this matter there was a certain amount of attacking people in the dark. Mr. Hayes had charged the Council with doing what was illegal. But Mr. Hodgson himself was a party to the act, for he was a member of the committee that recommended the establishment of the school. The Council thought the matter fully over, and were told that it should be submitted to the Lord Lieutenant. They were of opinion, however, that they need not; and if Mr. Hayes's present contention were right he should have got the consent of the Privy Council to the payment out of the funds of the Society for the bookcase that stood in that room, and the benches that were in the adjoining one. He challenged Mr. Hayes to show under what rule or provision of the Act they were bound to go to the Privy Council for leave to establish a chemical school. But they did write to the Privy Council, asking them if it was necessary to have their authority for the purpose. They had not said that it was. The school was formed over twelve months ago, and Mr. Hayes never took any exception to it. The school had been a success, and now, because there was no other way of upsetting the Council they were to be stuck in the dark at the annual meeting, by trying to upset the accounts. He hoped that at that meeting the licentiates would show the respect they had for the President by carrying the accounts in spite of the auditors. The Privy Council had pointed their attention to the words, "generally for all such matters as may be necessary for the execution of the Act," in subsection 8 of clause 16 of the Act of 1875, and said that if they could not establish the school under that subsection, they did not know what they could do it under. As to the accounts of the school being mixed up with those of the Society, Mr. Hodgson was misinformed on that point. Mr. Ferrall was told that the accounts were to be kept separately. If Mr. Hodgson was not prepared to accept the responsibility of the school, he had no right to accept profit from it and put them into the funds of the Society.

Mr. Hodgson: That is the very thing I want you not to do.

The Vice-President: Do you mean to say that it is to be the Pharmaceutical Society of Ireland's school, but that any profit that is made by it is to be given away?

Mr. Hodgson: Do what you like with it but it should not come into the funds of the Society.

The Vice-President: You can do with the funds of the Society all things necessary for carrying out the Act. It was found that if we did not start the school we might as well give up trying to work the Act.

Mr. Hodgson said he would give the notice of motion he had read.

The Vice-President: Well I shall object to the school being carried on except as the school of the Society, its profits going into the funds of the Society; and if there be a deficit, which I do not believe, we shall bear the loss, and if necessary go to the Privy Council about it.

Mr. Hayes denied that either he or Mr. Hodgson had been led by Mr. Brunker in this matter. They had had no communication with him. He (Mr. Hayes) opened Mr. Brunker's letter in the presence of Dr. Burnes, and they both read it together and decided that if they took any other course than that which they had taken they would be doing wrong as auditors.

The Vice-President: Mr. Hayes says we have been acting illegally. Let him produce his authority for that

Mr. Hodgson: I have nothing to do with whether it is legal or illegal. I have given my notice of motion; and I believe the appointment of a committee will facilitate the working of the school, make your accounts simple, and prevent them from being mixed up with outside transactions.

The Vice-President: I object to your throwing out your own child.

Mr. Hodgson: I object to Mr. Wells making these statements that are not founded on fact. Nobody wants to throw over the school.

Dr. Burnes said he accepted Mr. Hayes's invitation to assist him in the auditing of the accounts; and he was greatly surprised at finding that Mr. Brunker intended to take an opportunity of giving them a stab in the back. He might have known that Mr. Hayes would pass the accounts, believing the expenditure to have been honestly incurred, subject to the approbation of the Privy Council. If that approbation should not be given, the members of the Council could make up the deficiency, and he (Dr. Burnes) would pay ten guineas if necessary.

Mr. Hodgson: There is money in our hands belonging to the school; there is no deficiency. I want to get rid of that money.

The President said the views of both parties in this matter should be regarded with appreciation, for the circumstances of their having applied to the Privy Council showed that there was a question as to whether they were within their rights or not. It should be remembered that but for the school they would not have had any candidates for the licence during the past year. It was very late in the day to object to what the Council had committed themselves to; at the same time he fully appreciated the difficulties Mr. Hodgson had indicated. If necessary a subscription could be raised.

Professor Tichborne: Excuse me. That is quite superfluous.

The President: The question has been raised, and if there be any difficulty the Society must look after the school.

Dr. Burnes: Mr. Brunker almost threatens legal proceedings against the auditors, and in the face of that I went on with it and said let him do his utmost.

Mr. McCormack said it was a very strange thing that the attacks on the school had been hitherto made by ex-presidents of the Society. Mr. Allen was one of the first who wrote to the Privy Council about the school; and the Privy Council themselves pointed out the clause under which the Council were acting legally, and that it was not necessary to go to them at all.

The following gentlemen were elected members of the Society:—Mr. Christopher Garry, L.P.S.I., Greville Street, Mullingar; Mr. Robert M. Lees, L.P.S.I., Main-street, Wicklow; and Mr. James Aloysius Walsh, L.P.S.I., 30, Westmoreland Street, Dublin.

The Council then adjourned.

Obituary.

Notice has been received of the death of the following:

On the 23rd of September, Mr. William Pearce, Chemist and Druggist, New Road, Southampton. Aged 74 years.

On the 25th of September, Mr. Walter Hibbert, Pharmaceutical Chemist, New Street Square, Neath. Aged 71 years. Mr. Hibbert was one of the Founders of the Pharmaceutical Society, having been a member since 1842.

On the 25th of September, Mr. Joseph Wood, Chemist and Druggist, Chapel Street, Sheffield. Aged 47 years.

On the 27th of September, Mr. Charles Butland, Chemist and Druggist, Bridge Town, Totnes. Aged 76 years.

On the 28th of September, Mr. George Dunbar, Chemist and Druggist, Langlands, Dumfries. Aged 30 years.

On the 1st of October, Mr. Heneage Parker Catterns, Pharmaceutical Chemist, late of Church Street, Camberwell. Aged 52 years. Mr. Catterns had been a member of the Pharmaceutical Society since 1872.

On the 4th of October, Mr. Edward Thomas Towle, Chemist and Druggist, Dryden Street, Nottingham. Aged 47 years.

BOOKS RECEIVED.

The Law relating to Medical Practitioners in England; as well in Private Practice as in Public Offices. By Joseph Craven and Theodore Coppock. London: Shaw and Sons. 1890. From the Publishers.

Pasteur and Rabies. By Thomas M. Dolan, M.D., etc. London: G. Bell and Sons. 1890. From the Publishers.

Correspondence.

_ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Charge for Poisons.

Sir,—In answer to the inquiries made in this Journal, by the chemists of Exeter, through Mr. W. H. Harris, I give my method of dealing with poisons.

I have never since the passing of the Pharmacy Act allowed any assistant or apprentice to sell any scheduled poison except under my supervision; and I never allow the poisons in Part 1 of schedule A to be sold by anyone but myself; in virtue of my registration, I strictly comply with the Act by registering, labeling, etc., and my minimum charge is sixpence for any quantity however small of the poisons of Part 1, schedule A, and it is astonishing how few object to pay this sum, when the responsibility is explained. I think my brother chemists who negotiate the sale of a threepenny Battle's Killer are only one remove from madness.

If Messrs. Battle would discontinue to make a threepenny packet of their vermin killer it would be a public safeguard and to their own credit.

When a cat is brought to be poisoned the charge is one shilling; to go to a house and operate it is half a crown.

Robert Owen Fitch,
Divisional Secretary for South Hackney.

Hyoscyamus.

Sir,—Although Mr. Gerrard's results and conclusions are interesting in themselves, some misconception seems to exist, as to their influence upon the cultivation of henbane for commercial purposes.

I do not think that they will influence the market value of the biennial leaves to any great extent. In 1885 I gathered some first year's leaves of biennial henbane, which were analysed by my brother, Mr. P. W. Squire, and he informed me that there was practically no difference in alkaloidal value between the first and second year's leaves; but commercially, this was not of much importance, because a crop of first year's leaves should be very small compared with that of the second, and I am strongly of opinion that collecting the first year's leaves would damage the plants for the second year's crop. With regard to the root, the price of this article must always be high, owing to the small crop as compared with that of second year's leaves and flowers, which would of course then be lost.

I may mention that the roots, collected in the spring just as the plants appeared above ground, were found to be considerably richer in alkaloid than roots from the same field collected in the previous September. A. F. Squire.

Communications, Letters, etc., have been received from Messrs. J. C. Shenstone, C. W. Seccombe, H. Wilson, Hopkin and Williams J. Findlay, J. H. Dinwoodie.

The Pharmaceutical Journal,

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SATURDAY, OCTOBER 18, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE USE OF BOTANY TO PHARMACISTS.

THIS is a sceptical age and in some respects it is fortunate for present-day humanity that it is so. For the result of the increasing general unwillingness to accept things as they are without question, is seen in the marvellous advances of recent times and the enormous development of the world's resources. But scepticism may be based on indolence, and it is to be feared that a too common question of pharmaceutical students, " What is the use of botany to us ? " is suggested less by a doubt as to the real utility of that science than by a desire to contract the sphere of study.

In olden times, when botanic lore and details concerning the materia medica were to be found in one and the same book—the quaintly worded herbal—it was taken as quite a matter of course that a knowledge of the principles of the science, so far as they were known, should be useful to those engaged in its practical applications. Nowadays it is frequently assumed that those who collect, buy, sell or prepare plants or their organs as medicines are as likely to perform their work well whether they first study botany systematically or not. The fallacy, however, is almost too absurd to be worth refutation. Yet we find that Mr. MARTINDALE thought it necessary on a recent occasion to refer to the matter, and, if anything, his language was rather apologetic than otherwise. It is not a sufficient reason for including the study of botany in the pharmaceutical curriculum, to say that if useful " for no other purpose, it brings out the powers of observation," nor is the assertion that one " must learn a number of dry facts" any more to the point. The powers of observation should be developed before entering upon the practice of pharmacy, and if this has not been done, one's everyday surroundings ought to suffice for the purpose. With regard to dry facts, these are very easily crammed without carrying with them any acquaintance with the principles of the science of which they form the foundation. How many have misused that useful little book of COOKE'S and passed the "Minor" supremely ignorant of botany! Supposing all the candidates who were able so glibly to define a cell as consisting of " a firm elastic outer wall, a soft, inelastic albuminous substance and a watery fluid," had been asked to look at a specimen of fresh brewer's yeast under the microscope, and describe what they observed, how different might have been the result of their examination. For it is difficult to conceive without actual experience how students who can accurately describe and explain the differences between the chief types of cells, tissues, stems, etc., and also skilfully reproduce facsimiles of the text-book illustrations, will yet make the wildest guesses when shown magnified images of actual typical sections. Who could wonder for a moment that botany was dubbed a dry subject, when this imperfect assimilation of text-book definitions passed for a study of the science. Even those who delight in field botany are repelled by such class-work, whilst those who cannot or will not take lessons in fields and lanes find in the science of botany no redeeming feature.

The real and only universally satisfactory reason why pharmacists and their pupils should devote time and attention to botany is that it daily becomes more and more necessary that he who would succeed in any particular path in life should be able to handle in a workmanlike fashion, and know the varied capabilities of all the tools and materials that lie at his service. And it is hardly credible that any sane individual is prepared to assert that the vegetable materia medica of to-day is of so little consequence that we can afford to neglect becoming acquainted with it as intimately as possible. The imperfect specialization of subjects which has cut vegetable materia medica adrift from botany, and caused it to be regarded almost as a distinct study, whilst, on the other hand, the chemical materia medica remains bound up with the science to which it gave birth, must be remedied. We should retrace our steps a little way, and correlate the divorced branches of the science, as Professor HILLHOUSE recommended four years ago. The use in class demonstrations, as he suggested, of specimens taken from regular stock drugs would go far to level the artificial barrier that has grown up in the course of time. Another advantage of the innovation would be that learners would at the same time pick up the rudiments of botany and familiarize themselves with the characteristic appearances of the drugs. Briefly summarizing a method of study that suggests itself as suited to the needs of pharmaceutical students, a first essential seems to be a knowledge of the chief organs of plants together with a clear understanding of such of the principles of classification as will enable specimens to be readily identified by the aid of a flower. This engages interest at once and gives encouragement by the feeling of power it imparts to the tyro. Also, by necessitating constant reference to a glossary, it insensibly assists him to gain an acquaintance with the different forms assumed by the various organs. This, it will be seen, obviates any resort to "cram." Next there should be a thorough grounding in the elements of plant life. This should be eminently practical, section cutting and the use of the microscope being taught at the beginning and practised constantly afterwards. Chemical knowledge should be applied and the structure of cells and tissues be made clear by appropriate reagents. At the same time the functions of the various plant elements must be explained in detail. Later the students should be led to the critical examination of both macroscopic and microscopic characters of typical specimens of the different plant organs and taught their relative uses in the economy of the plant as an individual. During the whole course fresh or dried specimens should regularly be made use of and, at the end, the knowledge of classification thus imparted could be summarized. Of course this plan admits of variation and amplification, but above all things there should be an excess of practical work, and it may confidently be predicted that few students at the close of the session will ask what is the good of the work they have done.

Our readers may be reminded that the very stringent provisions of the Weights and Measures Act of 1889, to which attention has already been directed in this Journal, will come into force on the first of January next. In a report brought before the London County Council at a recent meeting, it was stated that it will be the business of that body after the time above mentioned to take proceedings for enforcing penalties against all traders using scales or other weighing machines that have not been stamped and verified by an inspector. It was also stated that London tradesmen show remarkable apathy in regard to this matter although a considerable opportunity has been afforded them for meeting the requirements of the Act. The inspectors charged with the duty of verifying and stamping weighing machines have been appointed for some time, and last June the County Council publicly announced the times and places at which the inspectors would attend to fulfil their duties, but up to the present time so small a number of scales and weighing machines have been presented for verification that it will now be impossible for the inspectors to carry out within the time allowed by the Act the verification of the many thousands of such instruments that must be in use in the county of London. As regards scales employed in pharmaceutical establishments the importance of their accuracy need not here be insisted upon, but since there is now in addition to that, the necessity of conforming to the provisions of the Weights and Measures Act by having all such instruments stamped, it is highly important that this requirement should not be overlooked.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

October 14, 1890.

The following are the questions that were set for this examination:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin*:—

1. Procas, King of the Albans, had two sons.
2. He says that the enemy have come.
3. It is very difficult to conceal faults from a friend.
4. Caesar was murdered by the conspirators.
5. All things had to be done by the King at one time.

II. Translate into English either A. (Caesar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CAESAR.

1. Id hoc facilius eis persuasit, quod undique loci natura Helvetii continentur; una ex parte flumine Rheno, latissimo atque altissimo, qui agrum Helvetium a Germanis dividit; altera ex parte monte Jura altissimo, qui est inter Sequanos et Helvetios; tertia lacu Lemanno et flumine Rhodano, qui provinciam nostram ab Helvetiis dividit. His rebus fiebat, ut et minus late vagarentur, et minus facile finitimis bellum inferre possent; qua de causa homines bellandi cupidi magno dolore afficiebantur.

2. Haec quum animadvertisset, convocato consilio, omniumque ordinum ad id consilium adhibitis centurionibus, vehementer eos incusavit; primum, quod aut quam in partem, aut quo consilio ducerentur, sibi quaerendum aut cogitandum putarent. Ariovistum, se consule, cupidissime populi Romani amicitiam appetisse; cur hunc tam temere quisquam ab officio discessurum judicaret? Sibi quidem persuaderi, cognitis suis postulatis, atque aequitate conditionum perspecta, eum neque suam neque populi Romani gratiam repudiaturum.

Grammatical Questions.—For those only who take Caesar.

1. Decline throughout, singular and plural—*his rebus, magno dolore.* (Par. 1.)

2. Write, in full, the indicative present and subjunctive pluperfect of *ducerentur* and *appetisse.* (Par. 2.)

3. Parse fully—"*Id hoc facilius eis persuasit.*" (Par. 1.)

4. What are *deponent* verbs and *impersonal* verbs? Write two short sentences in illustration.

B. VIRGIL.

1. Talia voce refert, curisque ingentibus aeger
Spem vultu simulat, premit altum corde dolorem.
Illi se praedae accingunt dapibusque futuris:
Tergora deripiunt costis et viscera nudant,
Pars in frusta secant veribusque trementia figunt,
Litore aëna locant alii flammasque ministrant.
Tum victu revocant vires, fusique per herbam
Implentur veteris Bacchi pinguisque ferinae.

2. Postquam introgressi, et coram data copia fandi,
Maximus Ilioneus placido sic pectore coepit:
O Regina! novam cui condere Jupiter urbem,
Justitiaque dedit gentes frenare superbas,
Troes te miseri, ventis maria omnia vecti,
Oramus: prohibe infandos a navibus ignes,
Parce pio generi, et propius res aspice nostras.

Grammatical Questions,—For those only who take Virgil.

1. Decline in the singular—*altum dolorem*, *veteris Bacchi*. (Par. 1.)

2. Write, in full, the indicative present and subjunctive pluperfect of *coepit*, *parce*. (Par. 2.)

3. Parse fully—"*propius res aspice nostras*." (Par. 2.)

4. What are *deponent* verbs and *impersonal* verbs? Write two short sentences in illustration.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. Multiply 98,756 by 60,324; and find what number added to the result will make it divisible by 90,000 without remainder?

2. Multiply the difference between 11 cwt. 3 qrs. 17 lbs. 10 oz. and 5 cwt. 2 qrs. 23 lbs. 11 oz. by 528.

3. The captain and his two mates have respectively $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{16}$ of the cargo allotted to them; the remainder belongs to 121 shareholders, and each of these receives £119 10*s*. What was the total value of the cargo?

4. Reduce $2\cdot\dot{6}$ of $£\cdot87708\dot{3}$ to the decimal of half-a-sovereign.

5. Write down the Metric Table of Weight. If, with 34 kilog. of wool, 25 m. of flannel, 60 centim. wide, can be made; what length of similar flannel, 80 centim. wide, can be made with 108 kilog. of wool?

6. The length of a street is 937 ft. 6 in., and its breadth 66 ft. 8 in. Find the cost of paving it, at 8½*d*. per square yard.

7. A bankrupt has good debts to the amount of £456 18*s*. 1*d*., and the following bad debts—£360 7*s*. 10*d*., £120 13*s*., and £19 18*s*.—for which he receives, respectively, 4*s*., 5*s*., and 9*s*. in the £. His own liabilities amount to £3408 12*s*. How much can he pay in the £?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following—

"Well had he learned to curb the crowd
By arts that veil and oft preserve the proud;
His was the lofty port, the distant mien,
That seems to shun the sight, and awes if seen."

2. Parse the following words taken from the passage given in Question 1:—*well*, *veil*, *lofty*, *if*, *seen*.

3. Write down ten compound verbs with different prefixes, and give their meanings.

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—a few voices however were raised in favour of a censorship these papers it was said frequently contain mischievous matter then why are they not prosecuted was the answer has the attorney general filed an information against any one of them and is it not absurd to ask us to give a new remedy by statute when the old remedy afforded by the common law has never been tried on the question whether the bill should be read a second time the ayes were only sixteen the noes two hundred.

*5. Write a short composition on *one* of the following subjects:—

(i.) The Evils of Procrastination.
(ii.) Frugality.
(iii.) "Unity is Strength."
(iv.) "There is a tide in the affairs of men
Which, taken at the flood, leads on to fortune."

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* This must be attempted by every Candidate.

British Pharmaceutical Conference.

MEETING AT LEEDS.

(*Continued from page* 308.)

The following papers were then read:—

ON THE ESTIMATION OF MINERAL OIL OR UNSAPONIFIABLE MATTER.

BY MESSRS. FAIRLEY AND BURRELL.

In this district large quantities of oil and grease are used in the woollen and leather manufactures and other purposes. Much of this oil is recovered and used again for the same or other operations.

It is frequently found that these recovered oils and greases contain large proportions of mineral oil or unsaponifiable or resinous matter, which are not always readily estimated by the processes given in text books.

The following process, worked out in my laboratory, has been found to succeed in these cases:—

Five grams, equivalent to nearly 80 grains of the oil, are weighed out, saponified with alcoholic potash (about 80 grams KHO in 1000 c.c. of alcohol), evaporated in a basin on the water-bath to pastiness, then dissolved in from 45 to 50 c.c. warm water and treated in a separating funnel with an equal volume of ether, and 2 to 3 c.c. of alcohol and shaken 3 to 4 minutes. On standing the ethereal solution which comes to the surface is decanted and evaporated.

A second treatment with ether is unnecessary, because, as a rule, the results with a single extraction are correct within 0·1 and 0·2 per cent.

The points in this process are—

1. Keeping the aqueous solution of the soap within a volume not exceeding (for 5 grams of oil), 50 c.c.

2. Treating with an equal volume of ether in one operation, at a temperature of near 90° Fahr. Then the ethereal solution of the mineral oil separates, and, in all successful experiments, is very nearly equal to the volume of ether employed.

3. Washing this ethereal solution with warm water in the separator, which can be done very quickly.

4. When the residue, left after evaporation of the ether and drying, has been weighed, it should always be distilled in a small tube retort. If it distils unchanged, without blackening or formation of acrolein, it is free from soap or ordinary fats.

The peculiar bitter after-taste and fluorescence of oils containing mineral oil are also of importance.

The following results were carried out by the above process, and by different operators:—

1.	Mineral oil	16·40 per cent.	A.
	„ „	16·24 „	B.
2.	„ „	17·87 „	A.
	„ „	17·60 „	B.
3.	„ „	18·85 „	A.
	„ „	18·69 „	B.
4.	„ „	32·8 „	A.
	„ „	31·4 „	B.
5.	„ „	35·50 „	A.
	„ „	35·36 „	B.

ON THE ESTIMATION OF COTTON-SEED OIL IN LARD.

BY MESSRS. FAIRLEY AND COOKE.

For this purpose Bechi's test, when carefully worked, gives useful results, which can be confirmed by the observation of the heat given out in mixing the samples with a definite proportion of sulphuric acid.

Attempts have been made to apply the specific gravity test; and Bockairy, in a recent number of the *Bulletin de la Société Chimique* (3rd series, ii., 310), takes the density of the lard at 50° C. = 122° F. He finds that unadulterated lard varies little in density at this temperature, and that there is a sufficient difference between the density of lard and cotton-seed oil to give a means of approximate quantitative estimation.

Bockairy gives the following numbers:—

	Density at 50° C.
Lard, highest	·8915.
„ lowest	·889.
„ mean	·890.
Very rancid lard	·8895.
Oleo-stearine	·8885.
Renal fat of the ox	·8895.
New cotton seed oil	·897.
Old cotton seed oil	·896.

New Cotton-Seed Oil and Lard.

Cotton-seed oil.	Lard.	
0	100	·890
10	90	·8915
20	80	·892
30	70	.8925
50	50	.894
75	25	·8953
100	0	·897

Careful experiments, made by my assistant, Mr. A. W. Cooke, fully confirm the utility of the method and prove that it may give a most valuable confirmatory test.

The following is a list of results:—

Experiments with Lard.

Sp. Gr. of Mixtures at 50° C. (Water at 50° C. = 1000).

Lard.	
900·42 900·35	Mean = 900·38
Lard + 10 per cent. Cotton Seed Oil.	
901·19 901·13	Mean = 901·16
Lard + 20 per cent. Cotton Seed Oil.	
902·15 902·03	Mean = 902·09
Lard + 30 per cent. Cotton Seed Oil.	
903·11 902·93	Mean = 903·02
Lard + 50 per cent. Cotton Seed Oil.	
905·13 904·85	Mean = 904·94
Lard + 75 per cent. Cotton Seed Oil.	
907·33 907·39	Mean = 907·36
Cotton Seed Oil.	
908·72 908·86	Mean = 908·79

Experiments with Lard.

Sp. Gr. of Mixtures at 50° C. (Water at 15·5° C. = 1000).

Lard.	
891·63 891·56	Mean = 891·59
Lard + 10 per cent. Cotton Seed Oil.	
892·39 892·53	Mean = 892·46
Lard + 20 per cent. Cotton Seed Oil.	
893·34 893·22	Mean = 893·28
Lard + 30 per cent. Cotton Seed Oil.	
894·30 894·12	Mean = 894·21
Lard + 50 per cent. Cotton Seed Oil.	
896·29 896·06	Mean = 896·17
Lard + 75 per cent. Cotton Seed Oil.	
898·48 898·53	Mean = 898·50
Cotton Seed Oil.	
899·87 899·98	Mean = 899·92

Note on Analysis of Bile.

BY T. FAIRLEY.

The average quantity secreted in a case of biliary fistula during twenty-four hours was about 30 ounces, or deducting 2½ ounces gall bladder fluid, average bile 27½ ounces. Twenty-four hours' bile, corrected for gall-bladder fluid:—

Quantity	968 c.c.
Specific gravity	1·0086
The bile contained in 1000 parts,—	
Water	981·76
Total solids	18·24
	1000·00
The solid matter of the bile contained,—	
Cholesterin	0·45
Fatty matter (free)	0·12
Fat combined (chiefly sodium stearate)	0·97
Sodium glycocholate	7·51
Sulphur equal to sodium taurocholate	0·09
Organic substances precipitated by alcohol, chiefly mucus and epithelium	0·85
Chlorides equal to sodium chloride	4·95
Carbonates and phosphates of sodium, potassium, lime, magnesia and iron	2·54
Copper	trace
Silica	trace
Sulphates Urea Sugar	none.
The solid matter of the bile gave on ignition,—	
Ash per 1000 parts	8·34

The above analysis was confirmed by a further quantitative analysis of the bile taken five days later.

Analysis of Fluid from the Gall-bladder (collected during twenty-four hours).

Quantity	72 c.c.
Specific gravity	1·0095
Reaction	alkaline.
The fluid contained in 1000 parts,—	
Water	984·64
*Total solids	15·36
The solid matter contained,—	
Organic; chiefly mucin, trace of albumen	6·72
Chlorides equal to sodium chloride	5·73
Sodium carbonate	2·20
Phosphates, potassium salts, etc.	0·71

Mr. **Allen** (Sheffield) said he had listened with great pleasure to Mr. Fairley's paper on the estimation of mineral oils in fats. It might seem a trivial matter, but it really got over a serious practical difficulty. It was only those who had experience in the separation of ether from soap solution who would appreciate the value of the observation. A great deal of time was often wasted, and in the end the operator had to throw up the analysis, and begin again through the obstinate refusal of the two liquids to separate, and any little device by which the separation could be effected conveniently and quickly was of considerable value. The difference in the specific gravity of melted lard and cotton-seed oil was well-known to all chemists now, and was constantly used as a means of distinguishing them and approximately estimating the proportions, but the point which Mr. Fairley had brought out was the use of a temperature of 50° C. instead of the ordinary temperatures which had been used, either 100° F., or as was almost universal now, the boiling point of water, 100° C. There was a considerable practical advantage in using 100° C., or 99° C., as boiling water was always available, and it seemed to him there would be considerable difficulty in using such an awkward temperature as 50° C. and keeping the fat at that during the manipulation. Nevertheless, it was exceedingly interesting to see at that temperature the same difference of some 7 or 8 in the third place occurred in the gravity of the lard and the cotton-seed oil. He did not hear the paper read by Mr. Conroy at Bath, but from the moment of its being published he had used the method there described of employing the silver test with great success.

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* The solid matter was carefully dried until its weight was constant, and on ignition gave 8·64 parts of ash.

Mr. **Conroy** said perhaps Mr. Fairley had grounds for considering the specific gravity of lard to be ·889, and it would be only fair if he would tell them what he considered lard to be. Was it the B.P. article, the fat of the abdomen only? or was it the ordinary lard sold, made from the backs of bacon containing a lot of oil? or was it the American pressed lard? Because one could hardly expect the specific gravity of those three kinds of lard to be identical. The specific gravity of cotton-seed oil was, he believed, correct; however, that oil was not added to lard by itself, but always together with mutton suet or some other solid fat, and the introduction of such matter entirely upset the test. He did not know that it would be possible to add cotton-seed oil without reducing its solidity.

Mr. **Cripps** agreed with the last speaker, but he understood from Mr. Fairley's figures that the specific gravity was not of much value for estimating cotton-seed oil. He would ask if Mr. Fairley had tried the iodine absorption as a means of estimating fats. He had found it useful in the case of olive oil and had also employed it to a small extent in the case of lard, but should like to know definitely if it would give accurate results in the estimation of cotton-seed oil in that substance.

Mr. **Hasselby** said the admixture of cotton-seed oil with mineral oil affected a great number of chemists. They could not all rely on pure pharmacy, and had to deal with threshing machine owners and others who use a great deal of oil. But the difficulty was they got blown rape and blown cotton seed oil mixed with it. If analysts would give them a test for detecting this admixture it would be a great boon to chemists throughout the country. It would touch the outer fringe of the calling. He should like to see at future Conferences a lecture given for outsiders, say on Monday night.

Mr. **Naylor** asked if Mr. Fairley had used auric chloride.

Mr. **Fairley** in reply said the temperature used for taking the specific gravity was adopted by Bockairy to secure complete fluidity in the fatty substances. The sample of lard was made in the town; it was not American lard. He had not made experiments to test the influence of the addition of solid beef suet or simple fats, but no doubt that would modify the result. The iodine absorption of oils no doubt would be useful, but his paper was mainly a study to corroborate or correct Bockairy's paper. He had not used auric chloride.

The Conference then adjourned for luncheon.

(*To be continued.*)

Pharmaceutical Society of Ireland.

ANNUAL GENERAL MEETING.

The annual meeting of this Society was held on Monday the 6th instant, at 11, Harcourt Street, Dublin, the chair being taken by the President, Mr. Charles Evans, and the Registrar, Mr. Arthur Ferrall, read the minutes of the last annual meeting, which were confirmed. As the only candidates for the seven vacancies on the Council were the six members who retired by rotation and one additional one there was no contest, and the President declared the following gentlemen duly elected members of the Council for twelve months:—Messrs. Robert Simpson, Dublin; G. Lane McCormack, Monkstown; Dr. R. A. C. Burnes, Dublin; William F. Wells, junr., Dublin; Richard Sumner, Cork; and Edward M. Hodgson, Dublin, the six outgoing candidates, and Mr. Thomas Wm. Robinson, of Kingstown.

The President, in addressing the meeting, said: The past twelve months will always remain a marked era in the history of the Pharmaceutical Society of Ireland on account of the passing of the Pharmacy Act (Ireland), 1875, Amendment Bill, 1890; and I think you will be unanimous in admitting that the chief point gained in the Act as it now stands, is, that men who went into the drug business since the passing of the principal Act of 1875, will have to submit to an examination as to the appearance of drugs and chemicals in common use sufficient to show whether or not the candidates are familiar with the nature of the articles they handle, in addition to an examination in the rudiments of the English language. That the latter is requisite I consider there can be no manner of doubt, although some gentlemen who formerly were our opponents strongly protested against such a supposition as insulting, but I think you will agree that some test and competency is required when letters are received here addressed to the "Register" of the Society, enclosing a "statuory" notice, and asking to be "registard" to sell "medesines," the applicant having been for many years in "buisness." It is to be regretted that the Legislature in 1875 did not insert a clause in the Pharmacy Act passed for Ireland in that year, providing that no persons should take the title of "chemist and druggist" unless they were properly qualified and registered, and that unless registered, they should not act towards the public as chemists and druggists. It could not be contended even by the most ardent advocates of free trade that there should be an unrestricted sale of poisons. The public are in a measure protected from purchasing bad food by its appearance, taste and smell; but it is impossible for them to judge in this manner of drugs; and therefore in the interest of the public it would be beneficial to stop free trade with regard to drugs, with the exception of a few household remedies in daily use. Eliminate special technical knowledge from pharmacy and let drugs be sold by any shopkeeper, and the public will have no guarantee as to the quality of the drugs with which they are supplied. But when the health of the public at large is at stake an exception is required, and the only question to be settled is, where the limit of exception should be fixed. The calling of a pharmacist can be looked at in two aspects, one professional and the other commercial; and both phases must be attended to in efforts for success. If pharmacy be merely a trade it should be free; but if the State requires as a condition of its practice a special education, that a pharmaceutical chemist, since he desires to deal in drugs, should for the welfare of the community be properly trained, educated, examined and registered, in order that he may secure a legal qualification, it is unwise for the public health that those who have but a smattering of elementary knowledge, not even embracing the three "R's," and who have received no training, no special education, unexamined and unregistered should be allowed to do the same. But when once protection is spoken of the cry of "monopoly" is raised. Were this the case it would necessitate the enactment of a law limiting the number of those who keep open shop for the sale of medicine to a percentage of the population, as I am given to understand is the case in some foreign countries. As regards patents there seems to be a very general impression that the Government stamp gives a sort of official guarantee of the value of the preparation; but even if such were the case it could not render the poisons contained in many of them harmless, and on these grounds the sale of these medicines likewise should be restricted. Unfortunately in the age in which we live the desire seems to be to subordinate every other consideration to the supply of drugs and medicines at a cheap rate regardless of quality; and patents are sold at a fractional profit under the plea that thus more medicine will be sold. But will a person purposely take cold for the sake of obtaining an eighteenpenny cough mixture for a shilling? On the contrary, as you are all aware, medicines are only taken in cases of necessity, let that necessity be real or imaginary. As the editor of the *Pharmaceutical Journal* has said in a recent issue—referring to the sale of poisons—"That is a matter that urgently requires consideration by chemists occupying the responsible position conferred upon them by the Pharmacy Act. They being the only recognized vendors of poison, and being compelled under the pain of penalties to conduct sales of poison in accordance with specified regulations and formalities devised for the purpose of protecting the public, are entitled while conforming to those requirements of the law, to fix the terms of remuneration for the services they render in this respect. It is unsuitable to the conditions of the case that the sale of poisons should be treated as a mere matter of trade, and that the price charged for a supply of poison should be regulated solely by regard to the intrinsic value of the article sold and to the rate of remuneration appertaining to an ordinary trade transaction which involves no special obligation or formality." I would now refer to section 19 of the Amendment Act, which treats of the examination of assistants, and has perhaps more than any other called forth disapprobation. But it is an easy matter to multiply adjectives such as "crude," "ill-advised," "mischievous" and so forth, or to speak of the "wooden-headed policy of the Council." No grave objections were advanced to the Apothecaries' Hall conducting a similar examination. On the contrary, those who employed assistants were, as a rule, anxious that they should pass it as a test of their having a knowledge of the Pharmacopœia and of the various processes by which the compounds, both vegetable and chemical, are prepared. How such a test can be advantageous when conducted by one examining corporation, and prejudicial when conducted by another, I must leave to wiser heads than mine to solve. The plea that men who would pass would be content and would be hindered from seeking the higher qualification, seems a strange conclusion: as the assistant qualification would not give any right to keep open shop on one's own account; and one may naturally conclude that were any man satisfied with such a qualification he would be satisfied to remain without any qualification whatsoever. As to the chemical school which has been established during the present year, the closing of all medical night schools made it absolutely indispensable to have some chemistry class in Dublin where intending candidates could study practical chemistry, especially since the introduction of the rule (of doubtful utility) that all candidates must work at the bench for upwards of 100 hours. Had not this school been started that would have been an impossibility to the majority of those desirous of entering for the licence examination. The school has furnished an opportunity to candidates of acquiring knowledge of practical scientific work indispensable to a pharmacist. Strange as it may appear even this project was met by strenuous opposition. Nevertheless, the school—considering that it is but in its infancy—has succeeded beyond expectation, and at such a difficult crisis the Pharmaceutical Society may well be congratulated that amongst its members could be found teachers whose pupils have been eminently successful, not only in the examinations of the Pharmaceutical Society but also in the examinations of the leading medical boards of the three kingdoms. Gentlemen, although it may appear self-evident that since the calling of a pharmaceutical chemist necessitates a curriculum involving hard study and much expenditure, when men had obtained the qualification they should be protected, yet I can assure you that had it not been for the able advocacy of your cause by the most Hon. the Marquis of Waterford, your representatives would have had a very different tale to tell. To him you are indebted for the clauses in the Pharmacy Amendment Act of 1890, which are favourable to the Pharmaceutical Society. During the past year there were forty-five candidates for the Preliminary examination, of whom twenty-two were successful, and thirty-six candidates went in for the licence, of whom twenty-four passed. We have five more members than we had this time last year. I take this opportunity of strongly recommending every licentiate to join the Society. Complaints are frequently made that the Society has done little, and that nothing is received for the guinea that is expended; but were the Society supported by all its licentiates the Council could show a bolder front when circumstances require it. I shall now call on our treasurer to lay the statement of accounts before you.

Mr. Hodgson said he was sorry that for the first time in his experience as treasurer he had to report that the balance was at the wrong side. However, it was a very small amount; and if they could have made up their books two or three days after the 1st of October the balance would have been on the right side. The account as made up showed a balance against the Society of £6 8*s.* 10*d.* That had been covered by lodgments made since. The operations of the Society had been steady as compared with those of the preceding year. He received £168 for thirty-three examinations for the licence, as against £115 for twenty-two examinations in the preceding year; and £111 6*s.* for fifty-three Preliminary examinations, as against £96 12*s.* for forty-six examinations in the preceding year. The total amount received for examinations this year was £289 15*s.* 6*d.* as against £229 10*s.* last year. He was sorry to say that there had been a falling off, although not a large one, in the subscriptions,—they had received £80 this year as against £94 10*s.* in the preceding year. They had been under the impression that the Society had obtained some popularity by the action it had taken and that should have produced an increase instead of a falling off in the subscriptions. However, such had been the result. Of course the balance against the Society was the result of exceptional expenditure; and it was for the members to say how far they were satisfied with the result of the year's operations. The prosecutions had involved a large amount of expenditure and they had no doubt also involved the Bill; for if they had not instituted those prosecutions in Belfast they would not have had the Bill forced on them by the Chemists and Druggists' Society. That Bill was law now; and it contained many points which would perhaps work in their favour and some that they would rather be without. When the former Bill fell through the feeling of the Council was not to revive it but to "let sleeping dogs lie;" however, the prosecutions in Belfast roused the ire of the Chemists and Druggists' Society. The Act contained clauses which were to a large extent beneficial to the Society; and the credit of that was entirely due to the three gentlemen whom they sent to London to represent their interests. Their President, their Vice-President, and Mr. Hayes worked unremittingly for their interests, and secured the powerful aid of members of the House of Lords, through whose influence very important alterations were made and accepted by the House of Commons. He, as treasurer, had to deal with all these things as matters of pounds, shillings and pence. He had a bill from Messrs. Casey and Clay amounting to £80 6*s.* 1*d.*, which would have to be paid—and there was also an account of Messrs. Clay and Close for expenses in connection with the Bill in London, which had not been furnished yet. The expenses of their representatives who went to London amounted during the year to £88 3*s.* 5*d.* However, the Society's account was at present, he was very happy to say, not overdrawn. There was just one other point to which he wished to allude. It would come before the next meeting of the Council, and had reference to the Chemical School. They had received on account of the Chemical School eight fees amounting to £25 4*s.*, and they had paid on account of the School £17 14*s.* 3*d.*, so that there was a small balance in hand in favour of the School. He referred to that because the general meeting ought to know what is going to be done at the next meeting of the Council. In his opinion as treasurer it was inconvenient to have the small items of the accounts of the Chemical School mixed up with the accounts of a large and important Society like theirs. In saying that he was not saying one word in disparagement of the Chemical School. There was not a member of the Council who had a greater appreciation than he had of the benefits that were to be derived from that school. He knew from experience the necessity of having a chemical school in the evening. He saw it in connection with the working of his own house. Young gentlemen who served their apprenticeship to him some years ago had been enabled to make their mark in the world by reason of their having had the advantage of instruction from Professor Galloway at an evening school of chemistry. They could not be given the time for it during their day hours of labour; they had plenty to do from morning till night until the establishment closed. But being men who wanted to work their way in the world they took advantage of those evening classes at the College of Science and thus gained a knowledge of chemistry which they could not by any other means have obtained: and several of them had since made very great progress in the world. A day school was of no value to young men who had to earn their daily bread; and he maintained that the young man who after having done an honest day's work, devoted three or four hours in the evening to learning chemistry with a view to his own future advancement had grit in him and deserved support. He thought it a very great mistake that the evening chemical school should have been closed. Consequently he was strongly of opinion that the school started by the Society just filled the gap, and was very deserving of their countenance and support. But as their treasurer he did not think it desirable or wise to have the accounts of the school mixed up with the accounts of the Society, and he had consequently put notice of a motion on the agenda paper for the next meeting of the Council which he hoped would not be misconstrued, for it was not in any hostile spirit to the school that he did so, quite the opposite. He was most friendly to the school, and would willingly subscribe if necessary for its support. He was happy to say that it was flourishing, but in his notice of motion he suggested that there should be a committee of members of the Council appointed to manage the school, and that that committee should appoint a secretary and treasurer who should receive the school fees and make the school disbursements. And if, at the end of the year he should want support he (Mr. Hodgson) was quite sure that there were gentlemen around that board who would subscribe to keep the school in a state of thorough efficiency. He assuredly would do so. But he hoped most sincerely that he would not be misunderstood. It was in no hostile spirit to the school that he was making this move. On the contrary, he was most friendly to the school and most desirous that it should be successful.

Mr. Hayes said he had been asked to move the adoption of the accounts and it was always a pleasure to him to audit Mr. Hodgson's accounts. As they had at the last Council meeting a discussion on the account he did not think it necessary now to enter into what he said on that occasion or to answer objections to some observations which he made as auditor. It was very pleasant to see a number of their friends whom they only saw once a year gathered round the table. They all looked as if they were pleased with the work which had been done during the past year; and if he were to judge from the applause which the President's speech had received, they must be all fully satisfied with the work which the President had done and the attention which he had given to the welfare of the Society. They had passed through a good deal during the past year, but he thought they had come out of the ordeal in a very satisfactory way. There was no doubt whatever that had the Bill which was promoted by the chemists and druggists of the north of Ireland become law in the form in which it passed the House of Commons, that Society would have become a mere name without any substantial position or any government of pharmacy. The President had told them how nearly the Bill became law as sent up from the House of Commons, and that but for their kind friend, the Marquis of Waterford, who was on the Committee of the House of Lords in 1888, the Pharmaceutical Society would that day be in a very unenviable position. When he had satisfied himself that their demands were justifiable and called for by the public safety he never went back until he had accomplished what he had put before himself. A writer in one of the journals said that if the Marquis of Waterford was able to learn his lesson in three hours and a half, it was a badly learnt lesson. But although his lordship did after a three and a half hours' interview with them make a speech in the House of Lords, which had the effect of causing the Bill to be sent back to the Committee of the House of Commons and amended, he received a great deal more instruction than was given in the first two or three interviews with them. He was quite conversant with the whole case, and he certainly did not do anything without having personal knowledge that what he was doing was right. It was not necessary to go any further into that matter. They were all satisfied that the best was done that could be done under the circumstances. There were many things in the Act as it now stood that they might wish to be a little different from what they were; but on the whole he did not think it was a bad Act, and they had great cause for satisfaction in the fact that the matter was now finally settled, and that their opponents of the past would become their friends. He believed those gentlemen would be satisfied that what they had got was more for their good than what they asked for would have been. The Society did not want to have any persons on their register as members who could not write their own names, or who were incapable of distinguishing between virulent poisons and commodities of ordinary household necessity. Therefore, the chemists and druggists were to be congratulated on the fact that there was to be a test examination, which would bring into the Society only men who were really fit, having regard to the safety of the public, to conduct the trade of a chemist or druggist. He wished to say just one word with reference to Mr. Evans and Mr. Wells, as regarded their efforts to have the Bill brought into a proper shape. They received instructions from the Society as to what its wishes were; and he knew that no two men could have possibly done more to carry out the wishes of their constituents than the President and the Vice-President did. In saying that he did not mean to convey that he quite approved of everything they did. Personally, he would rather have had a compromise in the beginning. It would have saved them a great deal of trouble in the end; but they felt otherwise. They thought that even if they should be beaten, they would at all events have done their best to carry out the wishes of the members of the Society. That was no easy matter, and theirs was downright hard work, which required a great deal of self-sacrifice. Their visit to London was no holiday, they were at work day and night, and it was not everyone that would have carried it out as they did.

The Vice-President, Mr. Wells, begged to second Mr. Hayes's motion. Some members of the Society thought that if they spent more money on prosecutions they would get more members, and that the Society was bound to protect its licentiates. It was not very easy for the Council to protect its licentiates if the licentiates would not come forward and support the Council. It was generally found that those who found fault with the Council were the very ones that would not give a pound a year towards the funds of the Society. He was happy to say that last year when there was a change in the Council a great many licentiates joined the Society, something between thirty and forty he thought in three months. Such a thing had not occurred in the Society before. Mr. Hodgson had said that there were only eighty subscribers during the past year; but that was the number according to the money received. But taking into account that thirty-three licentiates became members of the Society prior to the last annual meeting it would be found that they really had 104 members. It was very desirable that the licentiates should support the Society now; otherwise the election of the whole Council that time twelve months would be placed in the hands of the druggists. If the associate druggists outnumbered the pharmaceutical members of the Society, they would have the election of the Council in their hands; but if pharmaceutical chemists subscribed in larger numbers they would prevail in the election of the Council. He hoped the licentiates would bear this in mind and support the Council. The trials in Belfast certainly cost them a great deal of money. But they were conducted in a very peculiar way. They were brought down to Belfast about six times before they could get convictions. The first time they had six cases but the magistrates only heard two. The defendants asked to have a case stated, and the magistrates gave them three days to state their point of law. They failed to show that they had any point of law and consequently no case was stated for them. Then they came back six weeks afterwards and got another adjournment. Each time the Society had to send counsel at a cost of about £15. Of course they got some fines; but it would cost them £80 before they were done with it. As to these proceedings having been the means of spurring on the Amendment Bill, he believed their only effect had been to bring the evil day a little nearer. Although the Society was not flourishing in a financial point of view, it had still a little money which Mr. Hodgson had not told them of but had been saving for years and did not like to part with. To show them what an interest Mr. Hodgson took in the Society he would mention that a few months ago upon the Council coming to the conclusion that it should part with some of that stock Mr. Hodgson at once offered to go to the Bank of Ireland and get an overdraft, and accordingly he and the President became sureties to the Bank for the Society's overdraft. Again, although Mr. Hodgson was opposed to the Belfast trials being proceeded with out of the funds of the Society he said he was prepared to put down a £10 note towards the expense of those prosecutions if other members of the Council should think it well to do the same thing. He (the Vice-President) mentioned these things because he knew that a great many members and licentiates looked on Mr. Hodgson as being opposed to their interests. They never made a greater mistake in their lives. Mr. Hodgson and he had differed more than most members of the Council, because he held one view and Mr. Hodgson held the other extreme; but they must give Mr. Hodgson the credit that was due to him of having manfully fought on his own side. When he thought they were wrong he opposed them; nevertheless during the past year they had got on very harmoniously together in the Council. As to the Chemical School Mr. Hodgson had spoken a good deal about the possibility of their having to put their hands in their pockets. He (the Vice-President) thought nothing was more distant than any such possibility. In the accounts of the School during the past year several things were charged against it that should not have been so charged, such as repairing of water pipes, gas supply, hat racks, etc. If these items were taken off, the School would at the present moment owe nothing. There were four pupils entered for the next session, and they only wanted a few more in order to be able to show a profit at the end of the coming year. The expenses of the school after that would be almost nothing; so they need have no hesitation in supporting it,—in fact he believed it would never cost the Society a penny, but be a source of income to them in the future. He thought that the success of the school so far was attributable to its teachers. Of course Professor Tichborne would draw students to a school whilst unknown names would not do so; and he firmly believed that the objections of some members of the Society to the school were founded on nothing save the fact that Professor Tichborne had been selected as the teacher in it.

Mr. Hodgson said that perhaps it was a lapse of his not to have referred to the invested capital; but his account showed that the Society had on the 1st October, 1890, in new two and three quarter per cent. stock £248 3*s.* 1*d.*, the amount being the same as last year.

The Vice-President said it should be mentioned that last year they were told they had no further debts then outstanding, but a few days afterwards a bill came in for £24 5*s.* for printing calendars, etc. If that liability had been brought forward in time it would have put a balance on the wrong side for last year and shown a more favourable account for the present year.

Mr. Hayes, as auditor, certified to the accuracy of Mr. Hodgson's statement of the invested capital of the Society. They were not bankrupts, as had been stated by some of their friends in the North.

Mr. Hedgson said his object was to preserve that nest-egg, with a view to its being added to by benevolent members of the Society to enable the Society to get a place to live in.

The Vice-President said Mr. Hodgson had that object in view ever since the Society was started.

The President fully endorsed all Mr. Hayes and the Vice-President had said as to the time and attention that Mr. Hodgson had given to the accounts. They were deeply indebted to him for having looked after their monetary interests for so many consecutive years.

The motion for the adoption of the treasurer's report was then put and unanimously carried.

The next business was the presentation of two illuminated addresses to the President and Vice-President, prepared by a Committee consisting of Messrs. E. M. Hodgson, William Hayes, C. R. C. Tichborne, Alexander E. Doran, James N. Hardy, and Michael

F. O'Donnell, with Messrs. George L. McCormack and Rodolph A. Burnes, M.D., as Secretaries.

Mr. Hodgson having been called to the chair,

Dr. Burnes then read the address, and said the thought of presenting it to their President emanated from a remote district in the south, but had been most heartily responded to by the north, east, and west. They hoped he would accept it as an assurance of their good will and appreciation of his services during the last twelve months.

The Chairman said he was very pleased to have been asked to assist in making the presentation. It was a graceful tribute to Mr. Evans on the occasion of the completion of those labours which had been going on for some considerable time, and of the termination of a great deal of anxiety to the Society.

The President, in responding, said: It is with a feeling of considerable embarrassment that I address you, for I was quite unaware that you meditated presenting me with anything. You have overestimated my poor services in deeming them worthy of such a magnificent address. I beg to thank you very sincerely for your kindness.

Mr. McCormack then read the address to the Vice-President, and the Chairman in presenting it said the remarks he had made in reference to the President were quite applicable to Mr. Wells. Whilst they might not always agree on some minor points, on the whole he (Mr. Hodgson) and Mr. Wells were in accord as to the interests of the Pharmaceutical Society; both had its welfare at heart and desired to do their best for it and render it successful. He believed they had not on the board a man more energetic and more anxious to benefit the Society according to his lights than Mr. Wells, and he thoroughly deserved the testimonial, which he (Mr. Hodgson) had great pleasure in presenting to him on behalf of the Society.

The Vice-President said he could hardly find words to express his feelings. When he came there that evening he did not know what was in store for him; and he certainly should prize the address which had been presented to him. When he became Vice-President a year ago he did not think that the year upon which they were then entering would bring such an amount of care and anxiety as it did to the officers of the Society. The present expression of gratitude from the members of the Society, however, amply repaid the President and himself for what they went through. Mr. Hayes and he had no doubt differed in opinion, but they could debate matters and be none the worse friends because each of them tried to be honest according to their lights. The testimonial to him was the more valuable from its being signed by members of the Council with whom he had differed during the year. He believed it was the earnest desire of every member of the Council to work harmoniously with the druggists for the good of pharmacy generally in Ireland. Some members of the Society wrote and spoke as if they thought they could not agree at all, but he (the Vice-President) did not think it necessary that they should fight in future. He did not think words could express how much the Society owed to the Marquis of Waterford. If his lordship had been paid a fee he could not have worked up the case better than he did. Mr. Hayes had very modestly awarded all the praise to the President and himself (Mr. Wells), but the fact was that Mr. Hayes was with them for a fortnight and worked night and day. He (the Vice-President) begged to thank the meeting sincerely for their kind address.

The President: Allow me to endorse everything that has been said by the Vice-President of Mr. Hayes. He worked indefatigably for your interests.

Dr. Burnes proposed a vote of thanks to Mr. Hayes for his energetic services in connection with the amendment of the Bill, and expressed regret that Mr. Hayes would not permit his name to be included in the addresses.

Mr. Beggs said he had great pleasure in seconding the motion. Since the inception of the Pharmacy Act Mr. Hayes had given his time and talents to the advancement of pharmacy in all its branches.

The Chairman in putting the motion said that Mr. Hayes with his usual modesty had declined the testimonial which it would have been pleasing to so many members of the Society to have awarded him. There was no doubt that he worked most assiduously along with the President and Vice-President. He tried as far as he could to bring about compromises which to a certain extent failed in being accomplished.

The motion was unanimously carried.

Mr. Hayes in responding said he felt very grateful to the proposer and seconder of the resolution and to the members of the Society for the kindly feeling shown towards him. Any little thing he had done had given him great pleasure and without feeling that he deserved any credit. He had always felt the greatest interest in the Society ever since he trudged about London with Mr. Hodgson in order to get the first Act passed, and he felt sad when there was a prospect of the Society being swamped. When the President and Vice-President asked him to assist them, he would have been greatly to blame if he had not endeavoured to do what he could. He felt greatly indebted to the gentlemen who accorded to him this vote, for all their kind forbearance towards him, notwithstanding that he was so little deserving of it in many respects. His great desire had always been to see a united Society; and that desire was to a large extent accomplished that evening. Many who had been opponents heretofore, though no doubt acting as each thought right, were all agreed now; would try to do their duty and look on those who differed from them as also doing their duty the best way they could.

On the motion of Mr. John Evans, L.A.H., seconded by Mr. Beggs, thanks were then voted to Mr. Hodgson for his conduct while presiding, and the proceedings terminated.

OCTOBER EXAMINATIONS.

Preliminary—Messrs. J. Moore, W. J. Galbraith, J. McM. Cole and A. W. Mann have passed. Two were rejected.

Licence—Messrs. V. G. L. Fielden, F. Harley, F. J. Martin, W. A. Lynass, A. Watterson, J. A. Woodside, H. A. Gray, R. L. Thompson, W. P. Ryan, V. Carney, B. Cunningham and J. S. Gilbert have passed. One was rejected.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first meeting of the above Association for the new session was held on Thursday evening, the 9th of October, at the rooms, Great Russell Street, when the President, Mr. A. Campbell Stark, delivered the following—

INAUGURAL ADDRESS.

Gentlemen,—One of the most serious duties incumbent upon a newly elected president, is the composition and delivery of what is known as an inaugural address, and although it is impossible to say anything on pharmaceutical topics, which has not been said before, in a manner of quite sufficient merit for practical purposes, yet I do not wish to disparage an institution of such respectable antiquity as the inaugural address.

You have a claim to acquaintance with the views of the man whom you have honoured by choosing as your president, and, on the other hand, the demonstration of his pet ideas to, as it were, a compulsorily well-behaved and attentive audience, cannot fail to be gratifying to an individual with pronounced opinions. On referring to the addresses delivered by the gentlemen, whose unworthy successor I am, I found that their remarks might be included under two heads:—On pharmaceutical affairs in general, and on those of the Association in particular. Following this procedure, and observing the axiom that, "The whole is greater than its part," I will ask you to bear with me, whilst I unburden myself of one view of the aspect and portent of pharmaceutical affairs.

In doing this, I am most anxious to avoid passing in the character of "Sir Oracle," and so arousing that species of irritation which the utterance of dogmatic opinion nearly always engenders. Opinion, after all, is a tentative possession, and the only fact of which my experience of life hitherto has made me absolutely certain is, that the truth on any matter never lies in extremes, and the whole of it is not to be contained in a single proposition.

Opinions, I have noticed, are of three kinds:—

1. Those based on external and experimental evidence.
2. Those based on internal and evolved convictions.
3. Those based on the evidence afforded by strong desires.

I am not quite certain, in which of these classes my own may be placed, but I ask you to believe that the views I express have been arrived at with considerable reluctance, and have their basis in experience and comparison.

Having thus cleared the way, and induced in you, I hope, an attitude of tolerant expectation, let us proceed to discuss the affairs of English pharmacy from a business point of view.

It is obvious that, since it takes two parties to conduct a bargain, there are two distinct coigns of vantage from which we may view the trade aspect of pharmacy. We may regard it from our own point of view as spectators whose interests are vitally affected by the conclusion we arrive at, or we may, at second hand or so, regard it from the point of view of an outside spectator whose interests are affected in quite a different way. This may appear to you too obvious to be worth mentioning, but I lay stress upon it because we are naturally apt to forget it in the heat engendered by contemplating our own wrongs and desires, and moreover, I believe, that until the conclusions arrived at from both the standpoints absolutely coincide, the condition of pharmacy in this country, as a trade, will remain in an unsatisfactory state.

Let us then examine our affairs from both these standpoints, and in doing this we must exempt from the inquiry those historic houses, and isolated instances the circumstances of which are unfortunately by no means typical of those of the rank and file of English pharmacy.

It is often said that our affairs are in a state of transition, and although I am unacquainted with anything whatever to which the same remark could not be applied, still perhaps the word is of especial significance, in its application to pharmaceutical affairs. When I mentally review the state of our calling as it was when I first entered it, twelve years ago, I am inclined to think that its main characters, notwithstanding the transitory tendency, have not materially changed since I was an apprentice.

Then, as now, the bulk of the profit of a pharmacist's business was derived from the sale of things of a description, in which to expect a monopoly any longer, were more sanguine than reasonable. But there was this noticeable difference, the public was then accustomed to supply their need for these kinds of things from our shops, and it had not so completely grasped the fact that they could be obtained cheaper elsewhere. It appeared to me then that the domestic authorities did not regard the chemist and druggist as an individual who required an exorbitant profit and whose claims in that respect must be combated by all sensible householders.

In a word, the business of a chemist and druggist had not then been found out to be the anomaly that it is now, and it is an unfortunate fact that our customers have discovered that the great bulk of the chemist's business of these days can be carried on more successfully by someone else, before we have realised this fact ourselves. But while we have been regarding with feelings of natural indignation the gradual withdrawal from us of a monopoly to which we had no sound claim, and the loss of which we might have foreseen to be inevitable, we have, as a body, been neglecting much that was ours by training if not by right. The trade, for instance, in photographic chemicals and apparatus, in electrical appliances, and in a variety of things used in the various branches of applied science, and which the pharmacist is unquestionably the fittest person to conduct, has been generally ignored, and thus a large source of revenue, equal perhaps to the loss we have sustained elsewhere, is daily lost to us.

It is natural that under the present conditions should have arisen the intense desire for protective legislation which is continually uppermost in the pharmacist's mind, and although it seems to me most strenuously agitated for by those whose business it could least affect, still it is a demand with which one can easily sympathize. No one is more desirous of some protective measure than I, or recognizes the justice of such a demand more fully, but at the same time, I am unable to see that any measure that it is possible to pass, unless, indeed, the Curriculum Bill comes under that category, would materially improve our position, and a measure that would really benefit us is premature and impossible. Not only have we, as I hope to show later on, to educate ourselves first to deserve it, but we have also to educate the public to give it us. How completely the public misunderstand the position of the pharmacist may be seen tolerably plainly in the columns of the contemporary press. In that lively and amusing paper, *The Star*, appeared, at the time that the Curriculum Bill was before the House a paragraph headed "More Protection," in which the writer placed the Curriculum Bill in the category with a now defunct Bill of monopolizing tendency, and foretold the speedy relegation of the measure introduced by Sir Henry Roscoe to the same limbo of impossibilities. No doubt *The Star* does well to object to any monopoly that education may give but still the paragraph is typical of the views held by a large section of politicians.

The opinions held by the public generally on the value of the ordinary pharmacist, were, it seems to me, expressed in an article in *The Daily Telegraph*, on the adulteration of drugs which appeared some time ago. Of course, no one is obliged to take a leading article in *The Daily Telegraph* seriously, but there is little reason to doubt that that ingenious and versatile paper represents the views of the majority of the franchise. The attitude of the opposition to our proposed Bills by various Governments is known to all of you, and much of it was undoubtedly independent. We may gather from it the impression that the parliamentary definition of a chemist is that "he is a man who has passed an examination." A definition which appears to have been adopted by the public generally.

It is obvious that if a Bill on purely educational lines meets such formidable obstacles, and is so completely misunderstood, a Bill embodying any restriction on the sale of drugs is almost impossible, and that is why I have chosen to say that education of the public is as necessary as education of ourselves.

Another most important factor which militates against us is the present trade in patent medicines. Presuming that the sale of drugs was restricted to chemists to-morrow, it would avail us little or nothing while the Patent Medicine Act remains in force. Instead of the few stamped simple drugs that are now sold, a thousand would arise, to the increase of the revenue and the destruction of our trade. Already, that monopoly of ours, the poison schedule, is completely nullified by the irresponsible Government stamp; but this subject has been recently so adequately treated by a more competent authority than I, that I need not furthur dilate upon it. Apart, however, from all these considerations, it has yet to be shown that any Bill hitherto proposed except the Curriculum Bill would be of solid advantage to us if it become law. Supposing, for example, that a Bill restricting dispensing to qualified pharmacists were passed next session, it is questionable whether it would benefit us very highly. The stores would still employ, as they do now, their own qualified men, and the net result would be a slight rise in the demand for qualified men. But granting all the advantages claimed for legislation of this kind, the opposition to be overcome is far greater than is generally supposed, and, paradoxically as it may sound, it is my deliberate opinion that when the opposition is overcome the need for legislation will have vanished.

I point out these things not because I am against legislation, or do not support the proposed Bill, but because I do not regard legislation as the solution of our difficulties, and I believe that the present unsatisfactory condition of the business of a chemist and druggist arises not from our legal position, nor directly from our environments, but simply from the fact that we have not realized that the conditions under which we can be successful, have wholly altered during the last ten years, and that as a body we are not sufficiently educated to cope with these altered conditions.

The fact of the matter is that notwithstanding that political economy, the feeling of the times, and many other factors are dead against him, the ordinary pharmacist of this country still feels himself an injured person because the oilman next door and the grocer opposite are retailing sponges, Pear's soap, and tooth brushes at a lower price than he can buy them for. He has not yet realized the fact that before many years have passed the chemist and druggist, as a tradesman pure and simple, with the lingering exception perhaps of a few "cutters" of colossal size, will be as great an anachronism as a mastodon or an archœopteryx in the 19th century.

It is but necessary to reflect on the circumstances that surround us to discover grounds for this forecast of events. It is absurd to suppose that a man with the capital possessed by the bulk of chemists and druggists can compete on trade lines only, with an individual possessed not only of ten times that amount but with additional means of procuring profit thereon, for whatever may be said of that socialistic gospel "Looking Backward," the centralization of trade is one of the chief features of the age, and the time seems approaching when successful trade on a small scale will be impossible. A pharmacist who decides to "move with the times," and run his business upon "drugs-at-store-prices" lines has also to reckon with the following proposition. It is not to be supposed that the fact of the public being able to procure pills, for example, at half the prices formerly paid will induce it to take double doses of those useful medicines, yet this is apparently the grounds on which "cutting" is recommended as sound commercial policy.

Obviously, if all adopt the same system, and the total amount of business done does not increase, their relative positions are not altered and the general condition is infinitely worse than before. This is exactly what has happened in the majority of districts, and must, I am persuaded, ultimately end in the extinction of those who cling so fondly to the tradition of the old drug trade, and who are least able to cope with modern exigencies.

This seems, perhaps, a gloomy picture to draw of the fate of a calling in which many of us were trained, and which was flourishing when I was an apprentice, but let us remember that it has laid the foundation for better things, and so we will thank it for its services and bury it quickly to hide its further decomposition, raising as its epitaph a description of the modern pharmacist. He is the man who has the pharmacy of the newest remedies at his fingers' ends, and the remedies of the newest pharmacy in his cases, who is the trusted adviser to the medical men of his district on drugs, surgical appliances and instruments, who is the referee on the latest novelty in the processes and apparatus of photography, and the compounder of the newest solutions for the local devotees of that respectable cult, who can repair the domestic Leclanché battery, and advise on the sanitary arrangements of the household, and who, in short, as representing the available scientific authority in the neighbourhood, is a man the use of whose knowledge and skill are worth paying for, and who may be relied upon as an individual whose attainments and knowledge are superior to those of the majority of his neighbours.

Gentlemen,—The business of such a man as this is unassailable by the most unscrupulous cutter existing. He is as much in request in a poor district as in a rich one, in country as in town, and he can find almost anywhere a profitable field for his acquirements.

The ideal I have feebly portrayed is not an imaginary one. I am proud to say I know many originals of it. Most of them started with little or no capital, and are, to put it colloquially "doing well."

There is no calling, it seems to me, except that of the general practitioner of medicine, in which success depends so much upon general education, and the tact generated by it, as that of the pharmacist. All the charters possible, and the passing of the most impossible Pharmacy Bill ever drafted will not prevent the public drawing distinctions between the persons who administers to their needs; and the individual who knows most and is most willing to impart that knowledge will in the long run command the highest price. The times are past, and well past, when charters and monopolies will supply the places of education, skill and competency.

Upon one of the schemes for improving our business advocated by one trade journal at least, that chemists should compete with grocers and oilmen on their own lines, I cannot help commenting. It seems to me a policy of safe and easy suicide. Since the pharmacist has failed to compete successfully in the sale of those things which he has hitherto regarded as his own especial property, it is not likely that he will succeed better with the sale of those which others have already reduced to the lowest limit of profit possible, and the willingness of the public to pay more to a man because of the confidence they have in his skill and in his preparations is not likely to be increased by directing attention to the virtues of his superior tea.

And now, Sirs, I reach what I have (I fear *usque ad nauseam*) often told you is in my opinion the conclusion of the whole matter. It is the necessity for increased education. You have been treated to dissertations on this subject by such a multitude of councillors, and in such a variety of ways, that it is to be presumed you have either attained wisdom or are in the last throes of boredom, but my apology for bringing the matter forward again, is that nothing has been done, and increased education has not even been tried.

When you consider, for example, that a man may become a pharmaceutical chemist absolutely ignorant of mathematics and of the literature of his country, and knowing no modern language save his own, you cannot wonder that the pharmacist occupies in this country the invidious social position which he does. A position the more hateful and ignominious, when it is contrasted with that held by the pharmacist of those countries whose national standard of culture is even as low as that of our own.

The English public as a body are not much interested in technical acquirements, for the simple reason that it does not understand the relative value; the criterion of merit in its eyes is education of the general kind. The syllabus of examinations recently published by the Pharmaceutical Society contains, I am convinced, all that it is necessary for an accomplished pharmacist to know, but I am equally certain that no one can properly understand the subjects it embraces, unless he possesses a better Preliminary education than is at present required. I am not forgetting the fact that increased Preliminary examination is not required by all students of pharmacy, but it must be remembered that as the strength of a chain is that of its weakest link, so the status of a community is frequently the standing of its worst educated members.

I appeal to you who, like myself, are of the coming generation, to do all that lies in your power to raise the level of the pharmacist as an educated man. His position will never, I am persuaded, be permanently improved until that is done. If you raise his educational level, you raise his social, and under the present constitution of society, you raise, in a sense, his legal, and so bring him nearer that desired consummation, never I believe to be fully attained under the present conditions, the recognition, by the State, of pharmacy as a privileged profession. A more liberal education would not only do much to raise the pharmacist in the esteem and respect of the public, but it would cultivate unanimity and *esprit de corps* in his own ranks, for there can, I am sure, be no true unanimity amongst men whose cultivation and educational level are so very diverse as those of the followers of English pharmacy.

These are truisms, but I dwell upon them because, although many pharmacists are agreed upon the matter, yet no action is taken towards enlarging the scope of the Preliminary examination. It is with an amazing disregard of the connection between cause and effect, that we refuse to stiffen the Preliminary examination, because of the alleged difficulty in procuring apprentices, who would be willing to pass it, and bewail at the same time the fact that the ranks of pharmacy are crowded with those unqualified men whose interests the Pharmaceutical Society so generously considers. The power to move in the matter is already in the hands of the Society, and now that the Conjoint Board of Physicians and Surgeons are about to raise the standard of their own examination is the time for action on the part of the Council of the Pharmaceutical Society. For my own part I look forward to the day when the Preliminary examinations for *all* professions shall be the same, when the means to pass it shall be within the reach of everybody, and the parent who neglects to provide his children with that invaluable weapon in the struggle for existence, a good education, shall be deemed to be little short of a criminal.

I know that in advocating increased education I lay myself open to the attacks of those who apparently regard the pharmacist either as a person of abnormally low capacity, not capable of much development, or else as an individual who, upon the whole, prefers to remain in a state of blissful ignorance. "Why," I shall be asked by these philanthropists, "do you want to put all this education on the poor chemist?" and instances will be quoted of ignominious failures on the part of educated men, presumably edifying to the humble pharmacist.

I turn now to a more congenial and less debateable theme, the affairs of our Association, and here let me thank you, gentlemen, for the honour you have done me in electing me your President. It would be absurd for me to say that it is a position that I have not coveted, and the assertion would besides convey but a poor compliment to you, and although I feel that your Council might have made a better choice, still, I will study to deserve the honour you have done me, and will sustain the duties of the position you have raised me to with all the ability I possess. Let me enlist at once your kind indulgence towards my many faults and shortcomings, due always, believe me, to inherent defects rather than to lack of goodwill or inclination to serve you. I take this opportunity of welcoming old friends and members of the Association, and of greeting the owners of those new faces which I am so glad to see amongst us. "And what so poor a man, as Hamlet is, may do to express his goodwill and friending to them, God willing, shall not lack."

On reviewing the Association historically we cannot fail to be struck with the immense vitality it has shown, and to be filled with gratitude towards that little band of energetic men who assisted at its birth and protected its infancy. We may apply to them the eulogium uttered by Lord Rosebery on labours of another kind, "What sustained them in this work was neither fee nor fame nor praise, but a high hope and a generous ideal." The infant of those days, although subject to the dangers and maladies incident to the infantile period, has grown to healthy adolescence, and it now but remains for us to insure its prosperity during its life. Let us take for its motto "progress and mutual toleration." Knowing no policy save that of the majority of its members, the Association gladly welcomes within its ranks all those, eligible by their calling, whatever their opinion. It is the neutral ground where individuals holding all shades of opinion may meet, and in argumentative waters remove each other's angles and present a smooth and harmonious whole.

The Association provides in its programme for tastes of all kinds; the social, scientific, gastronomic, and saltatory desires of its members have all been considered. No institution probably exists which gives so many tangible benefits for such a small subscription as the Chemists' Assistants' Association. By the last balance-sheet I notice that the amount paid in subscriptions by the members amounted to £41, whilst the expenditure on their behalf reached the sum of more than £135. The figures are significant, and I feel sure that his excellent business sense will incline any chemist's assistant to regard the Association as a sound and profitable investment. Like all investments to become known it must be advertised, and it is incumbent, I think, upon every member to spread the fame of the Association far and wide, and enrol within its ranks every eligible candidate possible. The future of the Association, gentlemen, is in your hands. By your aid it can be increased to many times its present size, it can become an organization of greater power and credit in the pharmaceutical world, and a not unimportant social factor. I am the more emphatic in laying stress upon the possibilities, and those immediate, of the Association, because there is an impression abroad that it is declining. Let us show by our increased exertions this session that it is advancing, and by well attended meetings, by a largely increased roll of members, and greater activity and interest in its work, prove to its critics the vitality and vigour of that Association, which many of you have helped to create, and which you have done so much to maintain.

Let us not be satisfied until the Association is thoroughly representative of the Assistants of the Metropolis, until its list of members numbers four times its present size and it is able to maintain its permanent club house. All these objects are I believe not only possible but easy of attainment; the one thing needful, is an individual effort on the part of every member. In individual effort lies the secret of the success of all movements and reforms; concerted action led by the influence and enthusiasm of a single man, has done much, but the efforts of a body of men, each acting independently, yet in a common direction, is irresistible.

The Association is moreover a "mutual improvement society," in the highest and least invidious sense of those terms.

"What a man has in himself is then the chief element in his happiness," says Schopenhauer in his "Wisdom of Life," and it is the high privilege of the Association to contribute to those indestructable, and ever available mental possessions which form for every man his most valuable property, and let us remember, gentlemen, that as we improve ourselves, and gain a victory, however small, in the warfare we must needs all wage within us, we not only elevate ourselves, but we contribute an item towards the consummation of all things, the perfection of humanity, for—

Man's perfection is the crowning flower
Toward which the urgent sap in life's great tree
Is pressing, seen in puny blossoms now
But in the world's great morrow to expand
With broadest petal and with deepest glow.

Mr. Joseph Ince, on rising to propose a cordial vote of thanks to Mr. Stark for his eloquent and practical address, congratulated the Association in that its arrangements were under the direction of so able a President. He could not but think that too gloomy a view had been taken in regard to a large portion of pharmacists. He could remember the time when the chemist lived in an island of his own, without interest in his neighbours, and when he employed those to assist him in an island *not* their own, when strained relations existed, and there was no union between the master and his assistant. But all this had been swept away and a new order of things prevailed. The Chemists' Assistants' Association had sprung up and had done good work in the right direction. Primarily it was only of a social character, and resulted in bringing young men together, but it was ever progressing; the scientific element crept in, and these two essentials—the "social" and the "scientific"—had enabled it to advance and prosper until it had become not a scientific association merely, but a distinct and decidedly acknowledged power in the pharmaceutical world. This prestige it still maintained, as was evidenced by the remarkable character of the papers that have been read at its meetings, many of which have become historical. He hoped for a better position for the pharmacist, and believed that this lay in education, not merely in the gathering of knowledge from books, but in its practical application. Every week he had most devoutedly wished that a higher standard of preliminary education were compulsory. This would exclude much of the drudgery from his own work as a teacher and save much drudgery to the student. The greatest kindness came with benevolence, and the highest form of benevolence for our young men is to compel them to undergo some such preliminary training as would save them from being hampered by having to study that in the lecture hall which they should have mastered in their earlier days at school. He would again congratulate the Association upon the admirable work they had done and were still doing for pharmacy, and on having so energetic a President in the chair.

Mr. T. S. Dymond had much pleasure in seconding the vote of thanks. He could re-echo what Mr. Ince has just said, for he had long been an admirer of the President's ability and was glad to see him in the chair. The address practically consisted of one or two ideas well worked out, and he thoroughly endorsed the subject matter, especially that referring to education. Our only chance of success was "advance," for in relation to us the public were comparatively better educated now than they were thirty or forty years ago. He had heard that another association had recently started, and that the effect would be detrimental to us; but it behoved us all—the President and every member of the Association—to work together, and render mutual help by taking a keen personal interest in the Association, and then the ensuing session would not fail to be one of marked success. He had listened with deep interest to the President's clever and interesting address, and most heartily seconded Mr. Ince's proposition.

Mr. T. A. Ellwood, on behalf of the members of the Association, supported the proposition. Mr. Stark had brought before them in a very lucid way old ideas in a new light. If we are to progress it must be done by helping ourselves, and we must look to education rather than to legislation for the attainment of this end. We have been and still are advancing, but as Mr. Dymond had said, the public showed the better by comparison, for they were relatively better educated now than they were thirty years ago. They had made the greater progress. Mr. Ellwood alluded to the position of the old pharmacists in country districts, when they were regarded as the doctors, lawyers and leaders of the people by whom they were surrounded. But it is different now, and what is the cause of the change in their relative positions?—through the neglect on the part of the pharmacist there has been comparative deterioration on his side. He (Mr. Ellwood) felt that if we would make ourselves a real power in the social world we should aim at a higher standard of general as well as technical education, and, as the President had said, we must keep abreast of the times. Mr. Dymond had mentioned opposition, and he (Mr. Ellwood) maintained that wholesome opposition was good. A club is a social organization, and no club could compete successfully against an association such as this where the social and the educational were so happily combined. Moreover, it would be seen that those of us who were interested in the scientific rather than the mere social aspect of our life could not fail to be those upon whom would devolve the duty of raising the level of the pharmacist.

The President, in acknowledging the vote of thanks, thanked the proposer and seconder for the kind and flattering way in which they had alluded to him. He thanked them on his own behalf, but more on behalf of the Association. The President was necessarily so identified with the Association, that praise of the President meant praise of the Association, and in that way he took their kind remarks, and felt proud and gratified by them. With regard to the views expressed in the address, he might point out that it was merely an expression of individual opinion on the part of the author; not a single member of the Association need endorse them, and the Association as a body did not stand pledged to them in any way, and although he was ready to argue upon his views personally, he (the President) had no desire to use his position to make converts to them.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The sixth session of the school connected with this Society was inaugurated on Thursday evening. The chair was occupied by Mr. J. H. Bradwall (President of the Society) who opened the proceedings by mentioning that the school of pharmacy under the auspices of this Society was established some five years ago. It was then felt by the Council an anomaly that young men engaged in their calling should be obliged in many instances to go up to London and take residence there in order to attend courses of lectures in chemistry, materia medica, botany and pharmacy so as to complete their studies for the examinations they were hoping to pass. It was considered by the Council that such technical instruction ought to be obtainable at home. Of course lectures on chemistry and botany had been delivered in Sheffield for many years, and he knew as an old student that such lectures were very valuable indeed. In this respect the Sheffield young men had a considerable advantage over their brethren in the smaller towns around. But at the same time valuable and instructive as these lectures were—in a town like this they were of a somewhat general character, and if they had any particular bias it was towards the chemistry of iron and steel—it was thought advisable to have lectures on pharmaceutical chemistry. He considered the school was well established now. If there should be a compulsory curriculum, and young men who presented themselves for examination should be required to have attended a course of lectures in these subjects at a recognized school, the great importance of this school must be apparent.

The Secretary next stated that Mr. Michael Carteighe (President of the Pharmaceutical Society of Great Britain), Dr. Symes (Liverpool) and others who were very much interested in pharmaceutical education in Sheffield had written apologizing for absence. He had also received an intimation that the leading members of the medical profession in the town were unable to attend owing to having a gathering of their own the same night.

The Secretary then read his report on the past session and announced the results of the examinations.

The following were the prize winners, and they received their prizes at the hands of Mr. Martindale: Botany, G. Q. Dixon; Materia Medica, John Austen and J. R. Johnson; Chemistry, F. Peet and H. G. Williams; Practical Chemistry, J. Austen and A. Barritt; President's prizes for all subjects, J. Austen and E. F. W. Thorp equal; Mr. Newsholme's Herbarium prizes, J. Austen and G. Q. Dixon. J. Austen was also presented with a certificate of honour for his herbarium. Mr. Martindale also added for some of the first prize winners, a copy of his 'Extra Pharmacopœia.'

Mr. Martindale, who was warmly greeted, then delivered the address published in last week's Journal.

At its conclusion, in moving a vote of thanks to Mr. Martindale, Mr. A. R. Fox expressed a wish that there had been such a school as this in the town twenty years ago. At the same time he was glad to know it was becoming increasingly successful.

Mr. Grierson, F.L.S., in seconding the vote, spoke of the immense popularity of Mr. Martindale's 'Extra Pharmacopœia,' but remarked that those present would remember him more for the valuable and interesting address he had given them.

The vote was enthusiastically adopted.

Mr. Martindale, in acknowledging the compliment, said it had been a great pleasure to come to Sheffield. It was twelve or fourteen years since he was last in the town. He could only hope that his address would prove of value to the students.

The assembly then proceeded to the Cambridge Hall where the annual dinner of the Society took place. The President occupied the chair, and most of those who had been at the school attended. After the loyal toast had been honoured,

Mr. Martindale submitted the toast of the "Sheffield Pharmaceutical and Chemical Society." He said he supposed it had been established, first of all, to advance their general interests. In the second place the Society had wisely taken up the ground of education. He had seen the institution that day the laboratories and class rooms, and had been highly pleased with them. He was glad to see the Society progressing in such a way that it was worthy of imitation by all similar societies throughout the country. It was only a miniature of the national Pharmaceutical Society in the way of education. It had an advantage over the national Society in this way; it got hold of youths, and was thus able to "bend the twig" before the legal examinations were approached. The Society was an aid in another respect, it helped to form public opinion. The Council of the national Society wanted help in stating what was thought to be required. The Society was also calculated to benefit and elevate the pharmacist in making him a more useful member of society than he had been. He wished to point out that the pharmaceutical chemist should be a dispenser of medicines for the public. He and his colleagues looked upon this as the art of the pharmacist, but yet sufficient progress had not been made in it. Pharmacists had supplemented to some extent the apothecary in this respect, but not enough. He hoped as time passed they would more and more take the position of pharmacists pure and simple, and distinct from medical men, whose duty, they thought, was that of doctoring people and not dispensing medicines for them. The art of pharmacy belonged to the pharmacist, and it was the duty of the pharmaceutical chemists in the country to help forward the new Pharmacy Bill. Not only did the Council want their help, but it wanted them to assist to form public opinion in favour of pharmacists (as being well educated and well trained), fulfilling their duties as dispensers of medicines. In this respect he suggested that they should talk to members of allied professions. He spoke to a solicitor, who agreed with him that a compulsory curriculum was a very good thing, but said candidates for the law had no curriculum; they passed through their articled course, then went to London to study, and it all depended on the examination only. He told this friend, "We are in a different position to you; a good deal of our required knowledge is that of chemistry, which can only be taught by professed teachers and in proper laboratories." To a medical friend he mentioned the same, but this gentleman put rather a poser to him. He asked, after hearing about the curriculum, "What have you got to offer them when that's done?" They certainly wanted to train their craft so that they would have a good prospect afterwards, and obtain such a livelihood as would be worthy of the training they had gone through. A good training was given at this school, and he hoped there would be more institutions of the kind established in other large towns.

The President, in responding for the toast, spoke of the organization there had been among Sheffield chemists for the last thirty years, and remarked that the success of this Society showed that it had supplied a want. The Association had been a great boon to the young men of the town, and he knew it had also been useful to the members of the trade in promoting a brotherly spirit, and in placing men who were in the position of trade rivals on one common platform. He believed all the members of the Pharmaceutical Society in Sheffield were members of the Association, and they were personally represented on the Council of the Society for Great Britain. With regard to the future they had heard a great deal lately of trade grievances and the undoubted failure, to some extent, of that protection which was promised to them by the Pharmacy Act of 1868. They had also heard a good deal about proposed amending legislation. He had been very pleased, in reading the discussion on the draft Pharmacy Act Amendment Bill, to see that the whole thing was so thoroughly gone into and that there was such an exhaustive discussion. The Bill was a very fair one, and he thought it deserved their united support. To deal with existing evils, to ameliorate them, devise and carry out remedies, were very desirable objects, but he thought it would be vain to expect them from individual action, or from the Pharmaceutical Society alone. However, he had great confidence in what could be done by the Pharmaceutical Society of Great Britain conjointly with the efforts of the provincial associations.

Mr. Ward proposed "The Pharmaceutical Society of Great Britain." He mentioned that for some years this was a toast he had to respond to, as local secretary. He had been associated with the general Society for 25 years, and he felt proud of what it had done. He was delighted by the eulogy passed upon it by Sir Henry Sieveking before the School of Pharmacy in London last week. If it had not enabled them to amass fortunes it had succeeded in obtaining for them an honourable position. He approved of the proposal that pharmacists should be exempt from jury service and service at inquests, and also of an enforced curriculum. He should, however, like to see a clause in the Bill dealing with companies that sold medicines. He held it was an injustice to men who had passed their examinations at considerable expense to have to compete with men who had neither spent money nor labour nor passed a scientific course in order to carry on their business. He meant the men who combined together and formed a limited liability company to vend their articles at cost price. He knew it would be difficult, but he hoped the Legislature would see some way of dealing with these companies so that if any legal question arose they might have an opportunity to fight them. In conclusion he hoped they would loyally support the present Bill.

Mr. G. T. W. Newsholme, who was enthusiastically greeted, responded for the toast. He said it was a pleasure to do so when the toast was proposed by a gentleman so thoroughly acquainted with the doings of the Society as Mr. Ward, the local secretary. As they knew the provincial officers of the Society were thoroughly in touch with the Council of the Society and knew a great deal of the inner working of the Society. He did not agree with Mr. Ward that the Council might have done more. It had been said that the Council was composed principally of London men, but that was not the case. There were now representatives from various parts of the country. As most of them knew the Pharmacy Act of 1868 was a Poisons Act, but it did not do much for the protection of poisons. So far as the chemist was concerned it was a very small matter to him. Some chemists would say "We would rather be without the poisons altogether; let us have the dispensing of medicines and someone else do the poisons." But the position the Council of the Society had taken up for a considerable number of years was the education of the members of the profession, and the improvement of their social status. Parliament saw in 1868 that the members of the Society were men who were capable of having put into their hands the sale of dangerous poisons. They ought to look upon that as an honour, rather than as an irksome task. He granted that they did not make so much out of the poison clause as they ought to do. They sold poisons at too low a price. It should be remembered that they had the sole right to deal with poisons, and he thought they made the mistake of not charging more for them. Mr. Ward had said he did not know an instance where a chemist drove his carriage and pair; well, that was not the sole ambition of the pharmaceutical chemist. He thought there was more in life than making heaps of money. They were trained in their early days for the profession, and it was a noble profession, and education was better than wealth, for people who were educated could enjoy life. With regard to the Pharmacy Acts Amendment Bill the Council of the Society believed thoroughly in it. At their last meeting Mr. John Harrison brought forward a clause (and did it exceedingly well) to deal with limited liability companies. Mr. Martindale would agree with him that they would all be very glad if they could shut them up, and if Mr. Ward could show the way to do that he would support him. But it should be borne in mind they could only be shut up on the sale of poisons. Could they do that? Limited liability companies had carried out the law which had been laid down during the last eighteen months, in regard to the protection of the public. Their poisons had to be handed over by a duly qualified man. But there were bogus companies, and with these they had a remedy. With reference to clause 7, as to the compounding of medicines, the Council desired every member of the trade to do all he could to get it carried. It was set forth in that clause that the compounder of medicines keeping open shop must be qualified under the Pharmacy Act, and the actual dispenser must be also. That would appear to some to be a little irksome, but if they were to have proper protection, they must do their best to deserve it. So they must put up with some difficulty, and some of them engage more qualified men than they hitherto had done.

Mr. Preston proposed "Kindred Societies," to which Mr. F. W. Branson and Mr. Winder replied.

The "President, Council and School Staff" was given by Mr. Ibbitt, and acknowledged by the President and Messrs. C. O. Morrison, Learoyd, and Worrall.

Mr. R. Watts submitted the toast of "The Visitors."

At intervals during the evening songs and recitations were given by Messrs. R. Watts, Winder, J. A. Rodgers (who also accompanied throughout), J. Mack Clark, A. N. Tucker, C. J. Paul, F. Harrison, and A. R. Fox.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the second session of this Association was held on Thursday, 9th inst., in the Commercial Hall, Dundee. Ex-Bailie Doig occupied the chair, and several of the local chemists were also present, including Messrs. Charles Kerr, D. H. Ferrier, J. W. Russell, J. Braik Mason, John Doig, junr., and Mr. Thomson, Lochee; and Mr. F. W. Young, F.C.S., F.R.S.E., lecturer in chemistry in High School, Dundee. There was also a very large attendance of members.

The Chairman, on rising to introduce the lecturer of the evening, Mr. D. Storrar, pharmaceutical chemist, Kirkcaldy, expressed the great pleasure he felt at seeing such a large meeting, which augured well for the success of the session. He said they were under a deep obligation to Mr. Storrar for coming so far that evening to address them. He referred in fitting terms to the active part Mr. Storrar had always taken in the work of the Pharmaceutical Society. He regretted that the late hours with which they had to contend prevented them from enjoying more of the friendly intercourse which is the rule in other trades, and expressed the hope that by bringing the masters together from time to time the Association would be the means of securing shorter hours, and thus afford the young men opportunities for study. They would thus be able to take advantage of the various classes suitable for them. He hoped the masters would see it to be their duty harmoniously to combine in the endeavour to close a little earlier. He referred in appreciative terms to the syllabus of work which they had prepared. He emphasized the fact that in the future the educated man would be the great force that would shape the conditions of this great country, and counselled the younger members to take full advantage of the privileges afforded them in this way. He instanced the case of Mr. F. W. Young, who by assiduous attention to study, had attained the important position he now occupies. He concluded by expressing the hope that they would accord to Mr. Storrar a hearty welcome and a patient hearing.

Mr. Storrar, who on rising was received with applause, said, Mr. Chairman and gentlemen, I found it a very easy matter to promise that I should be present here to-night and address to you a few words on the occasion of the opening of your second session, but have found it a much more difficult matter to fix upon a subject upon which to speak. Being in no sense of the term a scientist, I am precluded from addressing you upon any science subject, seeing that upon such a subject any of your members could easily trip me up. Then, again, my experience in pharmaceutical work and training is so limited that I could not presume to address you in regard to either of these in the presence of men so much more qualified than I am. I feel, in fact, that over and above the accidental circumstance that I happen to be at the present time Vice-Chairman of the Scottish Executive, my only claim to be heard is that I have lived a little longer in the world than most of you, and should have therefore a little more knowledge of its ways, and some more experience of the manner in which the difficulties which beset us in life may be overcome. I shall therefore, with your leave, limit myself to a few practical and very general remarks suggested by the report of your past session, which has been sent me by your secretary. Allow me to congratulate you upon your pluck in initiating and your perseverance in carrying through successfully a course of weekly meetings extending over six months. These show an energy and interest in the work entirely praiseworthy, and read a lesson to more ambitious societies which might be taken to heart with advantage. You appear to have had no lack of papers nor of members willing to take part in the debates, and I hope the same success will attend you in the coming session. To make the session both successful and profitable every member should prepare himself to add something to the common store and not be simply a receiver. Make yourselves sufficiently masters of at least one or two of the subjects in the syllabus, so as to take part in the debates if you have not undertaken to contribute a paper. More than half the value of membership will be lost if this is not done, as nothing will fix a subject more thoroughly upon your minds than reading it up for the purpose of writing a paper or taking part in a debate upon it. Regarding the subjects of your papers both in last session and this, I am glad to see that in addition to practical and theoretical science you do not neglect the important subject of pharmaceutical politics. It would be entirely out of place on my part to touch upon such subjects here and now; but their intelligent discussion, by such associations as yours, is very desirable. At no period of the history of the trade have more important changes taken place than those which are taking place or are being originated now. It is the chemist of the future not the chemist of to day who will be most affected by these changes, and it is absolutely essential that you should follow their discussion with intelligent interest. Amongst much that is doubtful, one thing is certain, namely, that to hold his own, the chemist of the future must be, speaking generally, a more highly trained and better educated man than his predecessor. A few of us may think that something more might be done than is being done to help those already in business, but there can be no doubt whatever that the best and only true policy of the rising generation of pharmacists is to fit themselves for their work, make themselves indispensable to the public, and command its confidence. Next year the Pharmaceutical Society will celebrate its jubilee, and it must be a source of great satisfaction to us all to think how much good work it has done for the benefit of its members and for the welfare of the public. Thanks very greatly to its efforts, the trade during the past fifty years has made great strides in organization, in efficiency, and in public confidence, and it lies with you and those composing such associations as yours to say whether the next fifty years will show a proportionate advance. If you act upon the old Highland motto, "Stand shoulder to shoulder," there is no reason why an even greater advance should not be made. Another feature in your last session's report is the very efficient outside help you have received. An association which can command the services of Frank Young, W. L. Howie and Peter McEwan can have no cause to complain of want of interest in its meetings. All are most attractive lecturers, and although it may seem invidious to single out one from the three I cannot help adding that the Dundee Scientific and Naturalist Societies are to be envied in having in their midst so enthusiastic a worker and able a demonstrator as Mr. F. Young. You evidently mingie a little play with your work, and in addition to evenings devoted to practical and scientific papers you have musical and social evenings. This is quite as it should be; "all work and no play makes Jack a dull boy," and a dull boy can never do the best work. So long as the proper balance is kept up play is quite as important as work. The term work implies all our duty to God and man, and play includes rest, recreation and amusement, without which our capacity for work could not be kept up. The success therefore not only of our own lives but the life of our generation depends upon how we work and how we play. The two things overlap each other. Not only do many people play at work and many more work at play, but we also know from experience that oftentimes the best recreation or rest is a change of work. To those for instance whose work is mainly physical, who come home tired from a day's hard bodily labour it would be absurd to prescribe a game at football or a run with a bicycle, whereas the study of some science would not only help them in their trade but would prove an enjoyable as well as a profitable recreation. On the other hand, a man whose work is entirely mental and who comes home from it with a tired and throbbing brain, could have no better recreation than working in his garden or in becoming an amateur joiner or cabinetmaker. He might prove to be a very bad gardener or a worse joiner, but he would certainly be a better man physically; still, broadly speaking, the two things, work and play, are very different. Both are essential to a happy, healthy, and useful life, which it should be the aim of everyone to lead, and it is of importance, therefore, to know how they should be apportioned. This knowledge was never more required than at the present time, when both are pursued with ever increasing eagerness. Although the wise man tells us that there is a time for everything under the sun, he does not say that everything is of equal importance, and a very little reflection will show that life is given to us for work—work not only for ourselves but for the world—and that the capacity for play has for its main object the fitting us for work. The bow which is always bent soon loses its spring, and the man who takes no relaxation soon unfits himself for his duties. Work and play in fact act and react upon each other, and both are required to ensure a complete and healthy life. This being the case, it is important to consider how best this conception of a complete life can be carried out. If work consisted solely of physical labour and play were nothing more than rest, the decision of the matter would be easy enough. Man would simply have to work until he had provided enough to supply the wants of himself and his household and then sink into idleness. This, however, would be a very poor conception of man's work upon earth, and as poor an appreciation of the capacity for pleasure for which he is endowed. No much higher conception of work is the common one, that its main object should be the earning of money for its own sake, to secure the position and honour which money gives. Such work carries with it no dignity and no lasting satisfaction, and has as its motive pure selfishness. A proper provision for the future, and the glorious privilege of being independent, are certainly legitimate aims, but the highest conception of work leads us beyond all selfish ends, leads us to cultivate all our powers for the general good, induces us to do all work which comes in our way thoroughly and honestly for the work's sake, so that we may leave the world better than we found it. There is not much fear of any of us being tempted by excess of wealth. Our chance of adding house to house and farm to farm is so remote that we need scarcely take it into account. We must remember, however, that we can serve as faithfully in that which is least as well as in that which is greatest, and that the temptations are as great in an obscure as in a more prominent life. I sincerely hope that many of the younger people here may be very successful in life, and that they will use their success to good purpose, but what I wish particularly to say to-night is this, that we have each of us in our own sphere work to do, and it is of the utmost importance it should be done well. There is a fearful amount of bad work done at the present time. I do not refer to that done of set purpose, of which I hope there is no occasion to speak here, but careless, non-conscientious, and, therefore, dishonest work. The tendency is to earn money as easily as possible, to take no pride in work done for its own sake, to make things for *sale* instead of for *use*. Now I have a strong leaning towards *practical* Christianity. I think that we should show our faith by our daily work, and believe that we have in this direction a field of genuine missionary enterprise, which is little taken advantage of, and which it is in the power of everyone of us to take part. If we are masters let us make sure that what we send out is what we say it is and suitable for the purpose for which it is sold. Let us consider the public interest as well as our own, and not make an "alarming sacrifice" of either; if we are servants let us do our work to the best of our ability, taking a pride in doing it well, not for wages only, but for our profit in *every* sense of the term. Work so done brings its own reward. A man with a thorough knowledge of his business—and that is the way to secure that thorough knowledge—is independent of patronage and of joint companies; he is sure to get on. A common complaint of the present day is that of over competition in every sphere of life and that there is no room to get on. This does not apply to the man who has mastered his trade, as Daniel Webster, the American statesman, said to the younger lawyer who complained to him of the over crowded state of his profession, "Young man, there is room enough at the top." There is room enough at the top of every trade and profession, and although we cannot all reach the very top, we can all, if we like, get high enough up to secure plenty of elbow room. And our duty does not end in doing what is called our daily work; we should interest ourselves in public affairs also. We cannot all be M.P.'s or even members of pharmaceutical or trades councils, but we are all or will be all voters very soon, and ought to take an intelligent interest in what is being done by the country and by the trade from which we live. We are ready enough to criticize, but we forget sometimes that we are responsible for what we criticize. If we took care to study and understand imperial trade questions, so as to give intelligent votes upon them, the world would soon wag a great deal better than ever it has yet done. I have said enough, I should fancy, to show how the busiest life may be filled up, leaving little enough room for play, and yet I should like to reiterate that play is not only a desirable but an essential element in every healthy life. We should try to secure a reasonable time for recreation, and having secured it use it in the most enjoyable, profitable way. I have tired you already, I am afraid, by my sermon, but let me notice one or two points as to the way in which recreation should be taken. 1. It should be appropriate to the work in which a man is engaged. 2. It should be a part of every day life. There can be no greater mistake than saving up all our holidays to one time—working hard at business for fifty or fifty-one weeks in the year, and then working equally hard at pleasure making for the remaining fortnight. Play is the spice of work, and should be mixed with our daily fare. 3. Recreation should be recreation, and therefore have rest and pleasure for its first and main objects. When play for itself becomes the main object in life, it ceases to be play and becomes a toil. There is a tendency to this in the present day. Every pursuit is taken up so keenly that playing a game is apt to become a profession. Lads take up football, cricket, bicycling, swimming, etc., with so much zeal that the breaking of the record is more to them than the learning of their trade, and when that is the result of a game it ceases to be play or recreation, and becomes, as I said, a toil. I am afraid that the introduction of musical and social evenings into your programmes has led me rather far afield. You are thinking, no doubt, that all this talk about play and recreation has little to do with a Chemists' Assistants and Apprentices' Association, and still less with a trade in which weekly half-holidays are unknown, and in which the day of rest is a "*Dies non.*' It will be time enough, I think I hear some of you say, to tell us how to spend our leisure time when we get it, and it would be more to the purpose to assist us in securing it. Well, there is some truth in that, and I cannot well see how in most chemists' shops shorter hours could not be introduced, if there were more unanimity in the trade. Still from its nature the chemist's must always be a trade in which longer hours are required than in most others, although in this respect we in Scotland are better off than those in England. Here the system of outdoor assistants and apprentices ensures at least a couple of hours' freedom during the day and a fairly long evening to the employees; whilst there an hour's outing daily and one evening a week is considered a liberal allowance. At the best, however, our leisure time is limited, and that is all the more reason why the few hours we have to spare should be used well. Take full advantage of the time at your disposal. By all means spend some of it in the open air, and if your taste lies that way, in outdoor games; but do not forget that change of occupation is in itself recreation; that you have chosen a profession honourable in itself and which opens up many fields of study interesting in themselves and eminently useful from a business point of view. You who are members of this Association, whose second session we are inaugurating, do not forget that its success depends not upon the office bearers but upon the enthusiasm of its members and their regular attendance at the meetings, not forgetting the musical and social evenings. I had the honour, sir, of being present last week at the opening of the forty-ninth session of the School of Pharmacy in Bloomsbury Square, and had the pleasure of listening to the inaugural address which was then delivered by Sir Edward Sieveking. I can assure you that to any one who is interested in the progress of pharmacy the ceremony was a most enjoyable and encouraging one. The lecture hall was crowded, the great bulk of the audience being the students and their friends, and as one successful student after another came forward to receive his prize, accompanied in all cases by a few kindly and encouraging words from the President, and as one studied the bright and intelligent faces of the lads who came forward, and who are no doubt destined to be the future leaders of pharmacy, and heard from the dean of the school the course of instruction through which they had passed, I at least felt that there was little fear of the future of pharmacy. The only regret I felt was that so few of the students were Scotchmen. One medallist, Mr. John Lothian, is a Scotchman, and all honour to him for keeping up the credit of the old country; but why are there not more? No doubt the fact of our having a Scottish examining board and many centres at home, where university and other efficient training can be got, prevents our students going to Bloomsbury Square, but it is a pity all the same. Not only is the education to be got there the best of its kind and specially adapted for our wants; not only is the blue ribbon of pharmacy and many other pharmaceutical honours and bursaries only to be won there, but there can be no manner of doubt that there only can be implanted that "*esprit de corps*" which as a profession we so much lack. The new atmosphere and surroundings of the place promote its growth. The School of Pharmacy, equipped as it is and with its surroundings, forms an institution of which we as members and associates of the Society ought to be proud, and we Scotchmen ought to take more advantage of it. I sincerely wish for your Society every success and prosperity and hope that it will grow year by year in numbers and usefulness. The students of Dundee have great advantages, no other city in Scotland being better equipped educationally than Dundee is. Seeing that this is the case, and that we may make up our minds to having a compulsory curriculum in the near future, I trust that the members of your Society will avail themselves of their exceptional advantages, so that your Society will develop into a strong and vigorous Association. Let me add that I hope one result of the formation of this Association will be that stimulated by your meetings one after another of your members will be induced to make a raid across the border and do his best to carry off a few of the pharmaceutical honours to be won there.

The Chairman said they were indebted to Mr. Storrar for his admirable address, in which he had laid before them many practical points which they should try and profit by. He then called upon—

Mr. D. H. Ferrier, who expressed the pleasure it had afforded him to listen to Mr. Storrar's address, and trusted they would all be stimulated to do their duty better and more efficiently. He had often regretted their hours were so long, although he remembered when they were much longer. Referring to the Pharmaceutical Council, he regretted that body was so much out of touch with Scotch chemists, and trusted that an improvement would take place in this respect. He hoped that Mr. Storrar would see his way to come again on some future occasion.

Mr. J. W. Young was the next speaker. While concurring in the opinion of Mr. Storrar that some of the Scotch students should find their way south, where classes specially suited for pharmaceutical students were provided, he at the same time thought it was possible for a chemist's assistant to obtain in Dundee a thorough knowledge of really all the subjects required to qualify for the Minor or even Major examination. He suggested a course of study which if properly carried out would he thought meet all their requirements. He referred to the relation which used to exist between master and servant, when the former almost took up the position of a parent to the latter, as it is necessary that the masters should give the needful time to young lads to study and thus enable them to advance the higher interests of their profession, and give it that position among educated professions which it has to some extent had in the past, and he hoped would continue to maintain in the future.

Mr. J. W. Russell expressed the hope that the Association would be as successful this session as it had been hitherto, and that it would be a means of bringing the masters together to show their interest in the budding pharmacists of the city.

Mr. Charles Kerr also expressed the pleasure he had in listening to Mr. Storrar's address. He was very much pleased to see such a large assembly. Regarding the hours, if anything like unanimity could be arrived at, he would go in heartily with the movement.

Mr. W. Edwards, the President, proposed in the name of the Association, a hearty vote of thanks to Mr. Storrar for coming to deliver the address. They had expected something good and had not been disappointed.

Mr. R. M. Lindsay, the Secretary, in seconding the motion, said he heartily concurred with what the President had said. He ventured to say that the Association had already done some good in the advancement of pharmacy.

Mr. Doig conveyed to Mr. Storrar, in the name of the chemists who were present, their thanks for his valuable address.

Mr. Storrar, in replying, thanked them very sincerely for the kind reception and patient hearing they had extended to him. He expressed the pleasure and honour he felt in being asked to come, and if anything he had said would help the Association that was to him sufficient reward in itself. Regarding Mr. Ferrier's remarks about the Pharmaceutical Council he quite agreed that that body was slightly out of touch with Scotch chemists, but they were greatly to blame in not joining the Society and taking an active interest in the election of their representatives. The Council was what the members liked to make it, and they must either elect men who would look after their interests or take the consequences. He concluded by proposing a vote of thanks to the Chairman.

The next meeting of the Association will be held on Thursday evening next, 23rd inst., when Mr. T. C. Henderson, chemist, Stornoway, will give an address on "Profitable Extras, as seen in the life of a Country Chemist."

EXETER ASSOCIATION OF CHEMISTS AND DRUGGISTS.

A well attended meeting of the Exeter Association of Chemists and Druggists was held on Wednesday last at Messrs. Holman, Ham and Co's., 187, High Street, at 9.0 p.m. Mr. J. H. Lake in the Chair. After some preliminary business had been transacted the following paper on "Prices Charged for Poisons" was read by the Chairman.

PRICES CHARGED FOR POISONS.

The Pharmacy Act of 1868 with its Amendments of 1869 is at best but a "Poisons Bill," the ground for its enactment being, as stated in the text of the Act, "for the safety of the public" and as such it benefits but little, if at all, those engaged in the calling of pharmacy. The sale of poisons can only be regarded as a necessary evil, and in my opinion the profit derived from such sale is not worth the risk incurred.

It is necessary that the public should be supplied with poisons, and the Legislature thought fit, and rightly so, to entrust pharmacists and chemists and druggists with this important and responsible function, but in no other sense than that of obliging our customers can it be possibly entertained, except perhaps by a few producers of vermin poisons.

You have requested me to introduce the subject of the prices of poisons, which I attempt with much diffidence, as it opens up questions which are at present receiving the greatest possible attention both of the Council of the Pharmaceutical Society, as well as of every member of the craft throughout the country, and of the Legislature, I mean the questions involved in the new Pharmacy Bill.

The object of our meeting this evening is to discuss the sale of poisons in such a manner as to tend, so far as possible, to uniform remuneration for the necessary qualification, trouble, expense and anxiety incurred by the sale of poisons, and having succeeded thus far, to increase mutual confidence and subsequently advocate more important reforms, which shall benefit our little community.

Before treating of the sale of poisons it will not be amiss to review very briefly the Pharmacy, or, if you please, the Poisons Act.

1st. As to who shall sell poisons. Schedule A, Part 1. In sec. 1 it is clearly defined that "no one shall keep open shop for the sale of poisons but a pharmaceutical chemist or chemist and druggist," or, in other words, a qualified man.

In sec. 17 it states "that for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed the seller." In the Wheeldon Case, however, in spite of these clauses, it was decided that the servant was the seller and was responsible for his own act, not his master. It is very difficult to reconcile these two positions, but in which ever way we regard them it is perfectly clear that grave moral responsibility rests on both master and servant. On the master, in taking due care that the servant is duly conscious of the nature of the duty imposed and is fitted for such duty, and in the servant in observing the necessary legal precautions required, and carefully avoiding error. A rule I always insist on is that no sale of poison in Part 1 shall be made except personally, or by a qualified assistant, and with a few exceptions this also applies to Part 2.

Next as to the poisons themselves. Passing over arsenic, which we are aware has to be coloured with soot or indigo unless in large wholesale quantities, and has to be entered in a poison book, we come to aconite and its preparations. Why are not belladonna and its preparations in Part 1? We presently come to all poisonous vegetable alkaloids and their salts. Atropine and strychnine follow separately. Why are they not included with poisonous vegetable alkaloids? Then follow other poisons, but it is the word "preparations" to which I wish to draw attention. Now a preparation of a poison clearly means not only the official preparations, but any other preparation, such as a pill, solution, powder, mixture or draught containing such poison, and must include solution of cyanide of potassium or corrosive sublimate, such as are required for scientific purposes or photography as well as proprietary medicines containing poisons. I mean there is no distinction drawn between the strong poisonous preparations and those which are harmless in proper doses.

With regard to vermin killer in closed packages, makers should clearly state on the outside wrapper, when such is the case, "that the contents of this package is a poison under Part 1, Schedule A, of the Pharmacy Act, and requires to be duly registered, and so on."

It seems difficult to reconcile the interests of the manufacturer of vermin destroyers and those of the retail chemists. In Part 2, Schedule A, the word "preparation" occurs several times. It is not clear to what extent of dilution the word "preparation" can refer, perhaps to that of homœopathic dilution.

With regard to dispensing prescriptions containing poisons, I shall refer but very briefly, but am strongly of opinion that this should be performed by qualified persons only, or under the immediate supervision of a qualified person. We should then no longer hear of housekeepers and footmen performing the functions of dispensers in surgeries, &c.

The sale of patent or other proprietary medicines containing poisons, if the idea of dilution be adopted, would them be made by registered men.

Lastly, taking into consideration the dangerous character of poisons both to the buyer and seller, the necessary qualifications, and of course education and its cost as regards time and money, and the restrictions imposed upon the seller, I am of opinion that no paltry fee such as 6*d*. per entry is at all adequate to the service performed. Every hindrance should be placed in the way of the sale of poisons for poisoning purposes. It is constantly noticed by medical men, juries and the press, how readily poisons can be obtained, greatly prejudicing our reputation. The law should be rigidly complied with in every case, and an inclusive charge of say 6*d*., at least, made for any quantity of poison less than 6*d*. worth, or a fee of say 3*d*. for each entry, exclusive of the price of the poison. Due regard must of course be paid to districts where the poorer class reside, who can afford only a few pence. Personally I should like to name a higher figure, but have suggested so low a charge hoping it will meet the views of chemists in different districts, and perhaps be generally adopted in other towns. I should think every chemist could get 3*d*. for making an entry; the Council would certainly sanction such an act. The sale of poison under Schedule A, Part 2 must still be made subject to the discretion of the seller.

The Pharmacy Act should be extended in such a manner that not only poisons but drugs and pharmaceutical preparations should neither be sold nor dispensed by any but duly qualified men. To support the Council of the Society in such a course would be one way of rallying our scattered fortunes and materially advancing our position socially and pecuniarily. It should receive the co-operation of medical men and the public at large, *vide* Dr. Sieveking's inaugural address. Let us look to ourselves and we shall certainly not be thought less of. Let us adopt the motto "one and all."

Mr. Lemmon said he fully endorsed the points brought forward by Mr. Lake in his paper, and gladly moved "that a minimum charge of 6*d*. be made for all poisons contained in Schedule A, Part I." This was seconded by Mr. Reid. Some discussion arose as to the sale of vermin killers, and as an amendment Mr. George Stocker moved, and Mr. Milton seconded, that the foregoing resolution be adopted with the provision that 3*d*. be the smallest charge for vermin killers. The resolution was then carried unanimously in its amended form.

The subject of "Early Closing" was next introduced by Mr. Reid, who in the course of a vigorous speech strongly urged that earlier closing than is at present practiced was most desirable, both from a professional standpoint and also from the claims which a chemist's health has upon him. He also spoke of the chemist's need of time for recreation, and said that the general tendency both up and down the country, and locally, was in favour of earlier closing. He concluded by moving "That on and after November 1 all the shops shall be closed at 8.0 p.m., and on Saturdays at 10 p.m." Mr. Stocker seconded. Mr. P. F. Rowsell (Holman, Ham and Co.) said as far as he was personally concerned he fully endorsed Mr. Reid's views, but there were he thought some obstacles in the way of the 8 o'clock movement. It must not be forgotten, he said, that this Association was but in its infancy, and it was therefore desirable that whatever action was taken it should be with the view of securing the utmost unanimity. He therefore suggested that "not later than 8.30 p.m." be substituted for 8 p.m.

Mr. Fouraker seconded, and the resolution, having been so amended, was unanimously agreed to.

Messrs. H. W. Harris and Bartlett also took part in the discussions.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Interests.

Sir,—I read with interest Sir Edward Sieveking's address, and also the report of the Law and Parliamentary Committee.

The tenor of Sir E. Sieveking's address pointing out the important duties which the pharmacist owes to medicine, and necessarily to mankind, must appeal to all thoughtful pharmacists, the more so as his views are shared by many leaders of the medical profession, but alas! there is the dark side of the picture, *i.e.*, in Sir E. Sieveking's words, "That there is room for more energy and perseverance in research on our part than has hitherto been exhibited."

Let us try to trace the primary cause for this lack of energy. I have little doubt that it may be found in the present position of our calling in this country. I allude to the fact that excepting in a few well favoured situations, medicines in this country have become degraded into ordinary articles of commerce. This partly by the direct encouragement given by the patent medicine laws, and partly by the refusal of the legislature to recognize the necessity for entrusting the entire control of the sale of medicines, and the manufacture of all medicinal compounds, to men properly trained in pharmacy.

Now, sir, what is the position in which the bulk of pharmacists find themselves?

They find themselves in the position of business men with the responsible, but more troublesome than profitable duty of regulating the sale of poisons, and with the duty of dispensing the smaller proportion of medicines, that is, such medicines as the medical profession do not themselves dispense. This latter is in most cases almost an unimportant branch of their business, owing to the fact that the great bulk of medicines are sold either from bulk or still more in the form of patent medicines.

I think I am justified in saying that the majority of pharmacists depend for their success not so much upon the care they exercise in seeing that the medicines they sell are as perfect as they can be made, but rather upon how far they can succeed in selling at as low or lower prices than others, and yet have a balance of profit.

I will ask your readers how can men placed under these conditions devote time to research with a view of supplying as high a standard of pharmaceutical products as is attainable. No man can serve two masters. A man cannot strive to perfect his art of pharmacy and yet supply medicines at practically unremunerative prices.

I have always personally recognized that medicines should stand apart from ordinary commerce, but that the question of prices should be subordinated to the care and skill in their preparation. For these reasons I have always supported our Society in its efforts to educate skilful pharmacists, but I have now no hopes of any advance in pharmacy until the State places the entire control of pharmacy in the hands of pharmacists. On the contrary, I am persuaded that until then retrogression, and not progression, will be the order of the day.

The time has come in my opinion when those leaders in the medical profession who see how dependent their profession is upon pharmacy, should actively assist to free pharmacy from its present moribund conditions, which if continued, will, curriculum or no curriculum, sap the life-blood from it.

The measures I would press for are—

1. No medicines should be sold in this country excepting under the immediate responsibility of a qualified pharmacist.

2. No medicinal compound should be sold wholesale excepting bearing the name of the qualified pharmacist who is responsible for its careful preparation.

3. No proprietary article should be sold unless its most active ingredients are duly registered by some properly constituted authority, and no recommendations should be allowed upon the advertisements or printed matter of the preparation, inconsistent with the action of those ingredients. In all other respects proprietary medicines should be under the same regulations as other medicines.

I am aware that the first two propositions will be met by the old argument that they are framed in favour of the pharmacist, but I maintain that they are nothing more than a necessary protection to the public in these times when little understood medicines are so much in favour. Whilst should they also raise pharmacy to a higher level the public will be the chief gainers.

I know of one establishment where morphia lozenges are manufactured, yet not one man in the whole concern has any knowledge of pharmacy; in fact, not one even knows the dose of morphia, the firm relies for its recipes upon the first friendly pharmacist they come across. Can this be safe for the public?

With regard to my third proposal, speaking as one who derives considerable profit from proprietary medicines, I contend that legitimate proprietors would not suffer, but only those men who have deliberately invested their capital in culpably misleading the public would suffer, and justly so.

You will observe that I do not allude to the company or co-operative systems. I regard these things as an important part of our commercial system. No doubt there has been much abuse accompanying them, but the tendency, I think, will be for the abuse to cure itself as time goes on. I think it would be unwise to interfere with those organizations beyond placing them under the same regulations as individuals, for if pharmacy was under the control of trained men individually responsible, it appears to me to matter little to the public who supplies the capital; but I would also place the dispensing of medicines at all public institutions under the same regulations as in retail establishments.

Please do not gather from this letter that I have joined the army of vain grumblers. I do not despair of well educated pharmacists turning their technical training and their capital to profitable account in some branch of work, though not in pharmacy proper, but I do, in common with, I believe, most of our ranks, find the pharmaceutical branch of my business increasingly impossible, owing to the public insisting upon having drugs at unremunerative prices, thus rendering high pharmacy more and more out of the question, and I am beginning to regard the education question as of secondary importance when compared with the larger questions which I have dealt with. What chance has the man, specially trained in order that he may feel the responsibility of his calling, in competing against the sharp commercial man free from any responsibility to the public, unless he sinks that conscience which it was the object of his training to cultivate.

To raise the standard of education, unless followed by an effort to protect us from ignorant outside "competition," would be, in my opinion, futile. The medical profession, the dental profession and the legal profession are all protected, why not pharmacy?

J. C. Shenstone.

J. Porter.—We believe that in certain cases the Inland Revenue authorities allow chemists to sell the contents of packetted proprietary articles in small quantities. According to the newspaper reports the fines to which you refer as having been inflicted have reference to the sale of articles under a false description.

R. Fisher.—The prosecutions to which you refer appear to have been directed against practices that it would be impossible to defend and probably your letter was written under a misconception of that fact.

TOXIC PROTEIDS.

(*Concluded from page 294.*)

Of vegetable poisons which have been examined, the most important in this connection is the so-called jequirity, yielded by the seeds of *Abrus precatorius.* This plant belongs to the natural order Leguminosæ and was originally a native of India. It now occurs also in the West Indies, Mauritius, and other tropical regions. The poison is located in the seeds of the plant, which are small ovoid bodies of a brilliant scarlet colour, with a black scar at the hilum. The plant is of a twining habit, with pinnate leaves, and bears a pale purple corolla and an oblong compressed pod containing four to five seeds.

In a paper recently read before the Royal Society by Dr. Sidney Martin, the author describes the proteids which are found in these seeds. He freed them from their husks and extracted them with a solution containing 15 per cent. of chloride of sodium. Filtering the extract, he next saturated it with neutral ammonium sulphate. The resulting precipitate was dissolved in water and subjected to dialysis, when a globulin was thrown down in granular form. Upon separating this by filtration the remaining proteids were precipitated by alcohol and allowed to remain under the spirit for two months. Water extracted an albumose from this residue. Both albumose and globulin gave the reactions described above as being characteristic of their several classes.

Jequirity poison when applied to the conjunctiva, the delicate lining of the eyelid, causes severe inflammation, leading to ophthalmia. When injected under the skin of an animal it produces fatal effects.

Experimenting with the purified globulin of the seeds Dr. Martin found the same results follow the application of it to the conjunctiva. A minute trace placed on the inner surface of the eyelid of a rabbit, caused a reddening and swelling in eighteen hours. The injured part began to show a serous discharge, and twenty-four hours later purulent ophthalmia had developed. The animal died in less than four days. When the globulin was injected subcutaneously, the vessels of the part became congested and a considerable effusion of lymph into the tissue took place. Besides this local effect the animal was affected as with the poison; it became languid and sleepy, failed gradually to respond to slight external stimuli; its breathing became rapid and death ensued in about twenty-four hours. The toxic effect here resembles that described as attending other poisonous proteids, narcosis and respiratory troubles preceding the actual death. There were, however, no convulsions and no definite paralysis, as in the case of the viper venom. There seemed to be rather a general weakening till death supervened.

As in the case of the venom of the American snakes, heating the globulin solution to about 75°–80° C. (*i.e.*, to its coagulation point, at which it was converted into an inert form of proteid), did away with the toxic effect.

The albumose behaves similarly to the globulin, the symptoms following its injection being a gradually increasing weakness with rapid breathing, but no convulsions or paralysis. The toxic effect is weakened if the albumose be heated to 70°–80° C., but the poisonous power is not destroyed until the temperature is raised to 85° C.

There is, it may be noted, a great similarity between the proteids of abrus and those of American snake venom as investigated by Weir Mitchell and Reichert.

Besides this class of poison, recent work has made us familiar with a great variety of diseases resulting from the presence in the body of various micro-organisms. These diseases are really as much the result of poisoning as the more rapidly fatal seizures resulting from snake-bite. Without going into the great question of how far the germ theory of disease may be pushed, at present we have undoubted cases where particular symptoms, usually terminating fatally, are the result of the presence of particular bacilli in the body. Of these the best known is the disorder termed anthrax or splenic fever. This has a great interest also from another point of view, being a disease which has been successfully guarded against by a particular vaccination or inoculation.

It has long been known that when an animal has died from the disease of anthrax its blood has been found to swarm with the little organisms named *Bacillus anthracis.* These, like all similar developments, are small plants belonging to a particular division of the fungi known as the Schizomycetes. It has lately been established that these minute plants do not work in any special manner, but produce their fatal results by the formation and excretion of toxic proteids. The most complete account of these latter bodies has recently been communicated to the Royal Society by Dr. Martin. Cultivating *Bacillus anthracis* in a proper nutrient solution for a certain time, and then separating the latter from the organisms, he discovered it to contain two albumoses, differing slightly in properties from each other, but agreeing in producing fatal effects when administered to an animal. The symptoms following the administration were precisely those produced by *Bacillus anthracis* itself. The animal became dull and sleepy; the sluggishness led on to stupor, which deepened into coma, and death followed in a varying time, generally about 24 hours. There was found after death a subcutaneous œdema, with congestion of the small veins, sometimes peritoneal effusion, and usually the enlargement of the spleen, which was much congested. The symptoms were not due to any infection of the animal with the bacillus, carried into its tissues with the solution of the albumoses, for the blood was found to be free from the organism.

Besides anthrax other diseases have been found to be caused by the production of poisonous proteids by bacteria. Brieger and Fränkel, working in Dr. Koch's laboratory at Berlin, carried out a research on the poison of diphtheria and found that the toxic agent is a proteid body giving all the reactions of albumoses. Babes, besides confirming other workers on the nature of the anthrax poison, has found another pathogenic albumose associated with the bacillus of glanders. He also obtained two substances which appear to be of the nature of albumoses from cultures of the microbe of pigeon diphtheria, which have intensely poisonous properties. Bodies of a similar nature have been found in cultures of the microbes of tetanus and typhoid fever.

The albumoses of *Abrus precatorius*, Martin says, are associated with an alkaloid of peculiar behaviour, which is itself poisonous, giving rise to symptoms similar to those following the injection of the albumoses themselves. He suggests that the bacillus in digesting the nutrient material with which it is supplied forms the two albumoses and the alkaloid. The albumoses are peculiar in being strongly alkaline, which he thinks is due to the alkaloid being in a nascent condition in the albumose molecule. The bacillus liberates the alkaloid from the albumose, and hence the toxic action of the latter. In the absence of the bacillus, as when the albumose is administered alone to an animal, he suggests that the living tissue with which the albumose is brought into contact has a similar action to the bacillus. In this way the ultimate agent in anthrax poisoning would seem to be alkaloidal in nature.

This raises the question whether all the toxic proteids described bring about their fatal results in a similar way. Are the results due to the action of alkaloids or ptomaines resulting from the decomposition of the proteids or from their interaction with the tissues of the body? This seems hardly likely when we remember the rapidity with which the symptoms in many cases manifest themselves. In the first case mentioned, the injection of albumoses, or so-called peptone formed during digestion, the respiratory troubles are seen within a minute of the injection; the blood pressure falls at once, and the blood if shed after only a minute's interval has lost its coagulability.

The view that even this is really caused by a ptomaine has been put forward by Brieger, to whom we owe most of our knowledge about the latter class of bodies. He claims to have obtained from the so-called peptone used in his experiments a substance to which he has given the name of *peptotoxine*, but there is great doubt about this body being the toxic agent. Indeed Pollitzer treated the peptones according to the method suggested by Brieger to extract the peptotoxine, and found that an injection of the peptone that had thus been freed from the ptomaine produced precisely the same symptoms as before.

Certain of the symptoms of cobra poisoning are rather suggestive of the presence of some alkaloidal body in the venom. Fayrer and Brunton, in the report of the commission on India and Australian snake poisoning issued in 1874, compare the action of cobra poison to that of the alkaloid *conia*. Gautier states that he has extracted two ptomaines from the venom of *Naja tripudians* and *Trigonocephalus*. Winter Blyth has described at some length a body which he claims to have separated in crystalline form from cobra venom, to which he attributes the toxic properties. On the other hand Woolfinden, who has examined the venom with great care, denies the toxic power of the crystals, which he says are nothing more than sulphate of lime. He fails to find any alkaloid or ptomaine and says definitely that "the toxic power of cobra venom resides in the proteid constituents of the secretion, and is lost when the proteids are removed, and diminished as these are diminished." Professor Wolcott Gibbs has also failed to discover any body resembling a ptomaine in the venom.

A further peculiarity of some of these toxic proteids is that the organism can become gradually so accustomed to their presence that they lose their poisonous power. This has for some time been known to be the case with certain of the snake venoms, though no statement has been made as to what constituent of the latter the immunity is due to.

Sewall in 1887 published some experiments with the poison of one of the rattlesnakes, in which he showed that by giving at intervals during a month small doses to a pigeon, the bird at the end of that time was enabled to survive a dose containing seven times the amount that was fatal to a non-protected one.

Many observers have noted that immunity against various diseases can be produced by the injection of the soluble products of the life of micro-organisms. The same immunity Pasteur has demonstrated can be obtained by injections of attenuated virus. Recently some valuable work has been done upon the subject of this immunity by Hankin, who has communicated his results to the Royal Society, and to the *British Medical Journal*, during the present year. He prepared the albumose in a way somewhat similar to that of Martin, cultivating the anthrax in a solution of Liebig's Extract of Meat, to which some fibrin was added, each culture lasting for a week. The albumose was then separated from the liquid by saturating the latter with ammonium sulphate. The excess of salt adhering to the precipitate he removed by dialysis. The albumose was found to be poisonous, but by injecting minute traces into an animal at short intervals, he succeeded in procuring immunity from the administration of a large dose, and even from the bacillus itself. He was by this means enabled to produce immunity in mice, which are animals most sensitive to anthrax.

It is interesting to note in this connection that an injection of peptone or albumose into a dog in quantity not sufficient to cause death, confers a similar immunity lasting for a short time. A subsequent injection administered shortly after the first, is not followed by a recurrence of the symptoms of poisoning, though the total quantity administered in this way may be more than a lethal dose.

It is difficult at present to explain this singular property. The fact recalls the power which the organism has to harden itself to resist the influence of many drugs, notably arsenic and morphia. Doses of these which if taken at first would be fatal, can be taken without injury after a period during which small but increasing doses have been administered. Whatever be the nature of the conflict between the organism and the deleterious proteid, which ends in the death of the former, it can be prepared to carry it out with immunity by securing that the fight shall be urged under conditions most favourable to the organism; that is, by permitting the latter to deal with the smallest quantities at first and so gradually to be able to resist more and more of it, till at last it can overcome what would be at first many times a lethal dose. The organism indeed may be said to acquire a tolerance of the presence of the toxic proteid.

POISONING BY MALE FERN.

The *Wiener klin. Wochensch.* reports the case of a child 5½ years old, to whom two drachms of the oleoresin was given in three doses within one hundred minutes. In an hour and a half part of the tapeworm was expelled, then vomiting occurred, and somnolence, followed by twitching, sopor, and trismus of ten minutes' duration, ending in death five hours after the last dose of the extract.—*Am. Jour. Pharm.*

The Pharmaceutical Journal.

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PHARMACEUTICAL EDUCATION.

IT is an encouraging feature of the addresses that have recently been delivered at the opening of the session in the various Associations throughout the country that in all of them there is evidence of considerable advance in the appreciation of the needs of pharmacy as a calling. This is especially noticeable in the recognition of the fact that one thing essential for the welfare of the pharmacist of the future is that he shall be better educated than has generally been the case hitherto. For some length of time this opinion has been held and expressed by the Associations of assistants and apprentices, and quite recently it has been urged by Mr. STARK in a manner that cannot fail to carry conviction to those who consider the matter with attention. But, unfortunately, these Associations represent only a small fraction of the assistants and apprentices engaged in the business, and good as their influence may be within the range to which it extends, it really affects only the fringe of the large body whose interests are concerned. Nor is it only among the more thoughtful and cultivated of the younger members of the craft that this advanced appreciation of systematic education is met with. In the addresses delivered by its senior members it is also insisted upon, or at least admitted, that improved education is indispensable.

This view has been forcibly put by Mr. STORRAR, in his recent address at Dundee, where in speaking of the altered conditions of the chemists' business and their effects he says that amongst much that is doubtful the one thing certain is that to hold his own the chemist of the future must be a more highly trained and better educated man than his predecessor. We thoroughly endorse this view of the matter, but if that be the correct estimate of the situation two things follow as necessary consequences. In the first place it is essential that the means of education shall no longer remain, as is now the case, to a great extent matter of accident, or that the taking advantage of those means when offered shall be dependent upon inclination and voluntary effort on the part of apprentices. It is in the interest of all of them that a system of educational training should be established, which all must pass through. No room must be left for the question to be asked, What is the use of this or that branch of study? If it can be shown that botany or any other subject is superfluous, let that subject be excluded altogether, but otherwise there must be no option on the part of the student. And if systematic educational training during the period of apprenticeship be necessary for each individual apprentice, it is not less the interest of those who benefit from such training and become fully competent to obtain the legal qualification to carry on their business, that a strict control should be exercised over admission to the ranks of the qualified. Herein lies the real source of any possible protection of the interests of the craft, the only means of advancing its status, for, as Mr. STARK well remarked, the status of a community is frequently the standing of its worst educated members, just as the strength of a chain is measured by its weakest link.

While speaking of the necessity of systematic education, reference may be made to the letter at page 352 in which Mr. MARTINDALE suggests that the meaning of his remarks at Sheffield was misunderstood. Without accepting that suggestion, or supposing that as an accomplished and deservedly successful pharmacist he would be disposed to disparage any subject of importance to the pharmaceutical student, it may be maintained that his apparently apologetic recommendation of botany was at least liable to be misconstrued by his hearers. Nor does the recommendation to learn a number of "dry facts" appear less objectionable. Under existing conditions it is unfortunately too often found necessary for the candidates for examination to learn a number of dry facts; but that necessity arises from the lack of systematic education. The various data to which Mr. MARTINDALE refers require to be known whether they relate to chemistry and pharmacy or to botany, the knowledge of them, however, should be acquired not by learning them as dry facts, but as the result of practical experience in the performance of the work to which they relate and of intelligent appreciation of their subject matter. Acquaintance with these data that extends no further than a knowledge of them "as dry facts" may well be sneered at without indulging in too lofty aspirations. A candidate who presents himself for examination with his mind promiscuously filled with such "dry facts" will probably find them dropping out of his memory more easily than they were crammed in.

The Council of the Manchester Pharmaceutical Association have made arrangements for a special meeting, which will be held next Tuesday, at the Grand Hotel, Aytoun Street, at half-past three o'clock in the afternoon, as an opportunity for the Chemists of the Manchester district to meet the President of the Pharmaceutical Society for the discussion of matters affecting the relations of the Society to the trade. It is thought that the afternoon is probably the time most convenient to the majority of chemists and the Council hopes there will be a large attendance. The meeting will be open to all chemists' assistants and apprentices, and we have been requested to draw attention to it in case there may have been any omissions in sending out circulars of invitation.

* * *

We understand that at a meeting of the chemists of Bournemouth held to consider the Pharmacy Acts Amendment Bill, a resolution was passed that it meets with their entire approval, and that if passed it will be for the advancement and general good of pharmacy. A memorial to that effect has been sent to the President and Council of the Pharmaceutical Society, bearing the signature of all the qualified chemists in Bournemouth, who pledge themselves to support the measure to the utmost of their ability.

* * *

We are informed that the energetic endeavours to promote friendly association of the chemists in different divisions of London have recently been attended with considerable success. In the western districts Mr. H. Long has taken a prominent part in this work, and now, with the assistance of Messrs. J. H. and H. Mathews, Mr. R. H. Parker, and Mr. F. Andrews, a Western Chemists' Association (of London) has been formed to represent the four districts in which they reside. The object of the Association is to promote social intercourse amongst members of the business, with the hope of overcoming the apathy and antagonism that have hitherto prevailed so much to their disadvantage. The Association proposes to hold periodical meetings to consider and discuss matters of general interest. Scientific subjects will not be excluded, but affairs of trade and business will have prominent attention. Mr. F. Andrews acts as Honorary Secretary, and at a preliminary meeting, when the members and their friends dined together, last Wednesday evening, there was evidence of very considerable interest being taken in the Association, which we trust will be sustained in such a manner as to be conducive to the beneficial results it would be capable of producing. Mr. Long has been elected the first President, Mr. R. H. Parker Vice-President, Mr. J. H. Mathews Honorary Treasurer, and the committee of management consists of Messrs. Allden, Garner, Knight, Marsh, Martindale, H. Mathews and Sugden. Any divisional secretary of the Pharmaceutical Society joining the Association is to be a member of the Committee.

* * *

A notice signed by Sir John Monckton, the Town Clerk of the Corporation of London, is now appearing in the *Times* and other papers, directing attention to the provisions of the Weights and Measures Acts, 1878 and 1889, and intimating on behalf of the Committee of the Corporation of London that in any case of contravention of those Acts proceedings will be forthwith taken to enforce the penalties under them. According to a letter in the *Times* of 20th inst., from a member of the firm of De Grave, Short, Fanner and Co., the difficulty to be overcome in order to comply with the Act arises from the impossibility on the part of scale-makers to do in the time the work that is necessary before weighing instruments can be stamped. According to the writer that work would probably occupy two years, and therefore he thinks serious undeserved hardship would be inflicted upon many if the law were put into force next January. The Editor of the *British Trade Journal* has replied to this letter that in very many instances, probably nine out of ten, it is unnecessary that the inspector should require scale beams to be sent to a scale maker, and that if found accurate they can be stamped by the inspectors without being adjusted or repaired. He thinks that if this were more generally known there ought not to be any difficulty in getting the Act fully carried out in London by the time it is to come into force.

* * *

The *Times* of Thursday last contains an advertisement of the Agent General for the Cape of Good Hope, inviting applications for two appointments in that colony: the one of a Bacteriologist, to investigate the diseases of domestic animals supposed to be caused by germs; the other of a Toxicologist, to attend chiefly to forensic cases and to investigate South African native plants having medicinal properties. The salaries offered are £500 and £400 a year respectively. Applications are to be addressed to the Agent General, 112, Victoria Street, S.W., before the 15th November.

* * *

We much regret having to record the death, at the age of seventy-eight, of Professor Dr. Heinrich Will, who has filled the chair of chemistry in the University of Giessen since its vacation by Justus von Liebig. The name of Professor Will is well known from his having been the joint author with Fresenius of standard works on analysis, and from the numerous chemical researches carried out by him.

* * *

The first meeting of the School of Pharmacy Students' Association for the ensuing session will be held on Monday, November 3, when an introductory address will be delivered by Mr. N. H. Martin, F.L.S., F.R.M.S. The chair will be taken at 7 p.m. by the President, Professor Attfield, F.R.S.

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At the next meeting of the Chemists' Assistants' Association, on Thursday, the 30th inst., a paper will be read by Mr. John Woodland on "Fungi."

* * *

The Session of the Midland Counties Chemists' Association commences on Tuesday evening, 28th inst., with a Conversazione and Inaugural Address by the President, Mr. Southall, at the Midland Hotel, New Street, Birmingham, at 8 o'clock.

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A meeting of the Dundee Chemists' Assistants and Apprentices' Association will be held on Wednesday, the 29th inst., when Mr. Laing will read an essay on "The Charms of Science."

British Pharmaceutical Conference.

MEETING AT LEEDS.

(*Continued from page* 317.)

On reassembling the first paper read was a—

Note on a Sample of Adulterated Saffron.

BY WILLIAM KIRKBY, F.L.S.,

Pharmaceutical Chemist.

The appearance of saffron is so distinctive that it is not an easy matter to sophisticate it so as to deceive a person having a moderate acquaintance with it. Hence it is that a great variety of substances have been used for the purpose, and, although it is probable that the different substances thus used have been ultimately detected and described, it is to be feared that large quantities of adulterated saffron are sold in this country.

The substances used for fraudulent admixture are obtained from both the vegetable and mineral kingdoms. Those of vegetable origin may be divided into two classes, namely, those yielded by the saffron crocus (*Crocus sativus*, L.), and those yielded by other plants. The former class comprises the stamens, the corolla tubes,[*] and an undue quantity of the yellow styles. The structures obtained from other plants include florets of the marigold[†] (*Calendula officinalis*, L.), florets of the safflower[‡] (*Carthamus tinctoria*, L.), young stems and radicles of a dicotyledonous plant,[§] small splinters of sandal wood,[||] fragments of red poppy petals,[¶] petals of pomegranate and *Saponaria*,[**] and also a species of grass[††]. When necessary these have been dyed by means of red sandal wood, Brazil wood, or dinitrocresylate of sodium.

The inorganic adulterants are likewise very numerous; and, in order to ensure the fulfilment of their purpose, together with them is usually added honey, glycerine or glucose.

It is evident, therefore, that a large amount of ingenuity is exerted to defraud the buyer of saffron, and notwithstanding the distinctive appearance of the genuine article, this ingenuity appears to be fairly successful. The vegetable sophistications are fortunately not difficult of detection.

At the beginning of the year two samples of saffron were sent to me with the request that I would report upon the quality of them. One of them contained, in addition to true saffron, about 2 per cent. of foreign matter consisting principally of stamens and fragments of the petals of the saffron crocus; besides these there was an excessive quantity of the yellow styles. The other sample proved to be of far inferior quality. It occurred to me that a description of it might prove interesting to the members of the Conference.

The paper in which this second sample of saffron was contained indicated by its greasy appearance that the drug had been dressed with oil. The specimen at first sight appeared clean and satisfactory. On closer examination it was seen to be of a somewhat different colour from good saffron. The cause of this difference was detected in the presence of a large number of fibres totally unlike the stigmas of *Crocus sativus.* They were of a turkey-red colour, flattened and nearly uniform in width; the width varying in different pieces from ·5 mm. to ·75 mm. ($\frac{1}{50}$ inch to $\frac{1}{30}$ inch). In length they measured from 13 mm. to 42 mm. (·5 inch to 1·6 inch); the greater number, however, were from 23 mm. to 30 mm. (·9 inch to 1·1 inch). They had a much more rigid appearance than the genuine drug, but when taken between the fingers were found to be more flexible than their appearance suggested, this being no doubt due to the oil adhering to them. Some of the fragments exhibited minute swellings, the significance of which we will consider shortly.

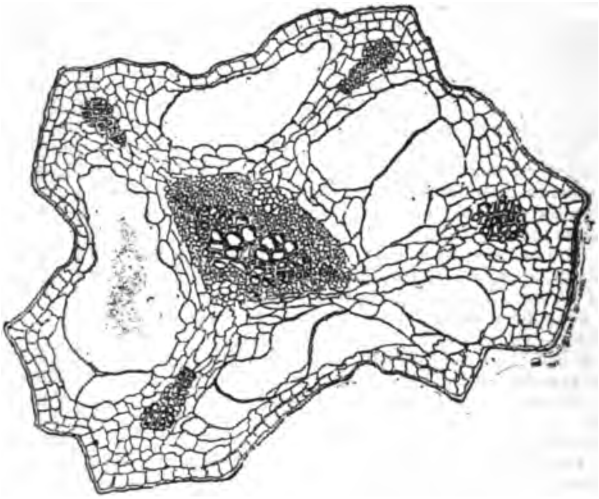

Fig. 1.—Transverse Section of Fibre found in Adulterated Saffron.

In order to calculate the proportion of the adulterant the fibres were completely separated and weighed, and it was found that they were present to the extent of 41 per cent.

The fibres were then submitted to microscopical examination with the object of ascertaining, if possible, their origin.

The transverse section, which is irregularly angular (fig. 1), exhibits a central vascular column surrounded by a zone of irregular thin walled parenchyma, from which four rays of similar tissue proceed to the periphery. In each ray a little within the epidermis is developed a solitary vascular bundle. The tissue surrounding these bundles is in connection with a narrow layer which lines the inner side of the epidermis.

The central vascular strand is extended radially in two opposite directions, and is bilaterally constricted. At each of the two opposite ends, which contain acute angles, is a narrow strand of hard bast fibres. The xylem has narrow spiral vessels (protoxylem) situated at the acute angles and separated from the hard bast fibres by a small quantity of soft bast tissue. The median portion of the xylem is occupied by pitted vessels; these extend across it in the constricted portion. The immediate line of constriction is marked by one or two rows of compressed thin-walled tissue, the components being vessels in process of formation.

The whole of the xylem is surrounded by the phloem in such a manner as to produce a rhomboidal figure, in the acute angles of which the bast is but feebly developed, but more strongly so in the obtuse angles opposite to the depressions in the xylem. In these latter portions the lumen of the elements is somewhat increased. In the rows immediately in contact with the wood the cells are of smaller size.

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[*] J. M. Maisch, *Pharm. Journ.*, [3], xvi., 663.

[†] Greenish, *Pharm. Journ.*, [3], xi., 379; J. Biel, *Pharm. Journ.*, [3], xiii., 879; "The Month," *Pharm. Journ.*, [3], xiv., 324; J. M. Maisch, *l.c.*; Flückiger and Hanbury, 'Pharmacographia,' 2nd. ed., 668.

[‡] Flückiger and Hanbury, *l.c.*; C. Bernbeck, 'Year-Book of Pharmacy,' 1882, 205, [from *Amer. Journ. of Pharm.*]; J. M. Maisch, *l.c.*

[§] M. G. Boutet, *Répert de Pharm.*, tome 7me, 468.

[||] Niederstadt, *Pharm. Journ.*, [3], xvii., 688 [from *Archiv. der Pharm.*].

[¶] Bernbeck, *l.c.*

[**] J. M. Maisch, *l.c.*

[††] "The Month," *Pharm. Journ.*, [3], xx., 504.

The parenchymatous tissue on the outside of the central vascular bundle is composed of two or three rows of tangentially extended thin-walled cells. The rays proceeding from this are three, four, or five cells wide, the cells being extended radially, except in the broader portions, where they include the cortical bundles; there they are nearly iso-diametrical. The cortical bundles are readily seen by reason of their conspicuous groups of bast fibres. A string of xylem, consisting of two or three narrow spiral vessels, is usually present on the inner side of these fibres, and is separated from them by a small quantity of soft phloem. With the exception of the parenchymatous rays the outer portion of the cortex is reduced to one or two rows of loose parenchyma. This arrangement of the tissues results from the presence of four air canals which alternate with the cellular rays. These canals are generally divided into two or more chambers either by strings of parenchyma or by fine threads consisting of cells whose opposite walls are in close contact. The lysigenetic origin of the canals is shown by the presence in them of fragments of cell walls.

The epidermis is composed of a row of prismatic cells having a square cross section. The outer walls of the cells are considerably thickened, as are also, but to a less extent, the inner tangential walls. The radial walls are very thin and undulated.

The anatomical characters are evidently those of a plant belonging to the *Cyperaceæ*, probably a species of *Carex*. The essential peculiarities leading to such a conclusion being the large chambered air canals, and the system of cortical vascular bundles. These latter are leaf-trace bundles which pass through one or more internodes and anastamose with the central bundle at the nodes, as is seen when a section is taken at one of the swellings already mentioned. The swellings are therefore the nodes.

On making a careful search for further evidence I was successful in finding two fragments bearing leaves, one of them also bearing part of an inflorescence (fig. 2). The vascular system of the leaves is seen under the microscope to be united with the cortical bundles both above and below the point of insertion as well as with the axial bundle. There seems to be little doubt that the fibres have been obtained from a species of sedge.

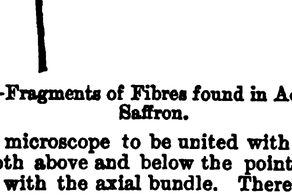

Fig. 2.—Fragments of Fibres found in Adulterated Saffron.

A little prior to the time of receiving this adulterated saffron Mr. E. M. Holmes, F.L.S., sent me some fibres picked out of a sample of saffron. These were found to have the same characters as those described.

That such an admixture is not unknown may be gathered from a remark in M. Boutet's paper ("Falsification du Safran")[*] to the effect that the fibres he had found were "not, however, the young shoots of *Carex*." Beyond this I have not been able to find any mention of this particular sophistication, although it is not improbable that the grass fragments alluded to by two recent writers may be derived from the same source.

In conclusion I may point out that this adulterant can be detected by the fibres having a turkey-red colour, a uniform width, and by their rigid appearance. It may be identified by the characteristic transverse section of the fibres.

The PRESIDENT said that purity of saffron was a matter of great importance. It had been always more or less subject to adulteration, and the late Daniel Hanbury had called attention to an adulteration with sulphate of baryta or chalk made adherent by oil or glycerine. The subject of the present paper seemed quite a new form of adulteration, and the Conference was obliged to Mr. Kirkby for calling attention to it. Those who handled saffron largely and imported it themselves must look to it that they were not importing saffron plus 40 per cent. of something else.

Mr. LONG asked if anyone knew what was the use of saffron as medicine, and what good was it to retain in the Pharmacopœia such an obsolete article. If it were abolished altogether there would be no anxiety about its adulteration.

The next paper read was on—

THE SOLVENT ACTION OF ALCOHOL OF DIFFERENT DEGREES OF STRENGTH ON SOME OF THE DRUGS USED IN MAKING PHARMACOPŒIAL TINCTURES.

BY R. WRIGHT,

Pharmaceutical Chemist.

Considering the importance of the tinctures as a class of therapeutic remedies, it is rather remarkable that they have not occupied a more prominent position in the experimental work done by practical pharmacists. It is true that an occasional paper on the subject has been read at meetings similar to this, notably by Mr. W. D. Savage, the late Mr. Stoddart and others; but so far as I am aware no attempt has hitherto been made to ascertain the comparative value of menstrua containing varying proportions of alcohol, for the extraction of the more important drugs in the materia medica. It was in the hope that such an investigation would serve to throw a little light upon the subject that about three years ago a series of experiments was set on foot, the results of which are embodied in this paper.

The original idea was, to prepare such of the Pharmacopœial tinctures as lend themselves most readily to such a form of treatment, with alcohol of three or four different degrees of strength, by the same process, and then to estimate the quantity of solid matter taken up by each, by ascertaining the amount of extract left when a given volume was evaporated until the weight of the residue was constant.

In the case of the tinctures representing drugs, the medicinal activity of which is supposed to be due to the presence of one or more alkaloids, it was further proposed to attempt the comparative estimation of the amount of alkaloid in each; and this was done by processes to be described later on in the paper.

The standard tinctures were prepared in the following way:—

The B.P. quantity of the drug ordered for each half-pint of tincture was taken, and where necessary reduced to powder of the requisite degree of fineness. It was then introduced into a well-corked wide-mouthed bottle into which the spirit had been previously measured, and allowed to macerate for ten days, the bottles being shaken daily. At the end of that time the clear portion of the tincture was poured away, the marc strained and pressed, the expressed tincture added to that which had been poured off, and the whole filtered.

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[*] *Réper. de Pharm.*, tome 7me, 1879, 468, *vide supra.*

In the preparation of menstrua it was thought to be most convenient to use the B.P. rectified spirit, sp. gr. 838, and containing 84 per cent. absolute alcohol as the basis.

The rule followed in the selection of menstrua was to prepare each rectified spirit tincture with alcohol of the following degrees of strength:—

No. 1 with rectified spirit.
No. 2 with 4 vols. s.v. rect. and 1 vol. water.
No. 3 with 3 vols. s.v. rect. and 1 vol. water.
No. 4 with proof spirit.

In the case of the proof spirit tinctures the rule was to make each tincture with alcohol of the following degrees of strength:—

No. 1 with rectified spirit.
No. 2 with 3 vols. s.v. rect. and 1 vol. water.
No. 3 with proof spirit.
No. 4 with s.v. rect. and water, equal volumes.

In the case of the compound tinctures, *e.g.*, aloes, catechu, gentian, rhubarb and senna, the principal ingredient only was taken, being used in the proportion ordered in the British Pharmacopœia.

Of the seventy-two tinctures contained in the B.P. forty-eight were prepared, the following twenty-four being eliminated:—

Tinctura aurantii recentis.
Tinctura benzoini composita.
Tinctura camphora composita.
Tinctura cannabis indicæ.
Tinctura cardamomi composita.
Tinctura chloroformi composita.
Tinctura chloroformi et morphinæ.
Tinctura cinchonæ composita.
Tinctura ergotæ.
Tinctura ferri acetatis.
Tinctura ferri perchloridi.
Tinctura iodi.
Tinctura lavandulæ composita.
Tinctura limonis.
Tinctura lobeliæ ætherea.
Tinctura nucis vomicæ.
Tinctura opii ammoniata.
Tinctura podophylli.
Tinctura quininæ.
Tinctura quininæ ammoniata.
Tinctura tolutani.
Tinctura valerianæ ammoniata.
Tinctura zingiberis fortior.
Tinctura kino.

Another tincture which was subjected to special treatment was tinctura guaiaci ammoniata. It is a well known fact that the menstruum at present official, viz., aromatic spirit of ammonia, is not well adapted for the purpose, on account of the excessive amount of water which it contains. Two samples of this tincture were prepared, one according to the B.P. formula, the other with an ammoniated menstruum made by mixing 18 fluid ounces of rectified spirit with 2 fluid ounces of strong liquor of ammonia.

Of the tinctures thus prepared, a fluid ounce of the first yielded on evaporation 62 grains of dry extract, whilst the same volume of the second gave 82 grains. With regard to tinctura cocci and tinctura croci, which are almost exclusively employed as colouring agents, it was thought well to test the colouring powers of each of the tinctures. It was found that cochineal yielded its colouring principle almost equally well to proof spirit, or to a rather stronger or slightly weaker spirit than that. Saffron, however, only yields its most powerful colouring principle to a spirit which is over-proof—a menstruum composed of three volumes of rectified spirit and one volume of water, giving the best results. This yields a tincture having from forty to fifty times the colouring power of the B. P. proof spirit tincture.

The tinctures which are supposed to owe their medicinal properties to the presence of one or more alkaloids are those of aconite, belladonna, cinchona, colchicum, conium, hyoscyamus, opium, stramonium and veratrum viride.

The general process adopted for the estimation of the alkaloids in these tinctures was as follows:—A fluid ounce of the tincture was introduced into a porcelain dish; twenty drops of dilute sulphuric acid added; and the spirit driven off by the heat of a water-bath. The residual liquid was allowed to cool and then filtered through a plug of cotton wool placed in the neck of a small funnel. The dish and funnel were then rinsed with a little distilled water, and the whole run into a separating funnel. The colouring matter in the tincture was removed by agitation with two successive 10 c.c. chloroform; the liquid rendered alkaline by the addition of ammonia in slight excess; and the alkaloids taken out by shaking first with 20 c.c. and then with another 10 c.c. chloroform. The chloroformic solutions were drawn off into a tared platinum dish and evaporated to dryness over a water-bath, the alkaloidal residue being reheated until it ceased to lose weight.

The above process was applied to all the alkaloidal tinctures except those of cinchona, conium and opium. For those of conium, a modification of the above was employed, the alkaloids being shaken out with chloroform, and the chloroformic solutions run into a platinum dish containing 20 c.c. of a saturated solution of HCl gas in chloroform. Care must be taken that the end of the funnel tube passes beneath the surface of the acid chloroform or loss of alkaloid by volatilization takes place. The chloroform was allowed to evaporate in a current of air; the residue heated at a temperature not exceeding 80° C. until it ceased to lose weight and the alkaloids weighed and estimated as hydrochlorates.

The alkaloids in the cinchona tinctures were estimated as follows:—A fluid ounce of the sample to be estimated was placed in a porcelain dish: 20 grains of freshly prepared slaked lime added and the mixture evaporated to dryness. The dry residue was reduced to powder, mixed with a little fine washed sand, placed in an extraction apparatus, and extracted with boiling chloroform, 40 c.c. being used for that purpose. When the process was complete, the chloroformic solution was filtered to separate the particles of lime which had washed through, the filter washed with a little chloroform, the chloroform driven off by evaporation and the residue weighed.

For the estimation of the opium alkaloids the following process was used:—A fluid ounce of the tincture was evaporated to small bulk, the residual liquid allowed to cool, and then filtered through cotton wool into a separating funnel, the dish and funnel being rinsed with a little distilled water, and the rinsings run into the separating funnel. Ten drops of B.P. liquor ammoniæ was added, and the separated alkaloids shaken out with two successive 40 c.c. of a mixture of equal volumes of chloroform and acetic ether. The alkaloidal solutions were then evaporated to dryness over a water-bath and the residue heated until it ceased to lose weight.

The general result of these experiments, as exhibited on the tables, is to show that some at least of the menstrua for B.P. tinctures might be modified with advantage. It is quite true that as a rule tinctures made with a strong spirit keep better than those made with a weaker one.

In order to test the effect of keeping upon the stability of tinctures made during the course of these experiments, a sample of each has been kept for a period varying from 2 to 3 years.

Of these, the only tinctures made with rectified spirit which show much deposit, are cinchona, cocci, and aloes. On the other hand, tincture of conium and tincture of galls made with proof spirit have deposited to a very considerable extent. Tincture of conium made with proof spirit invariably becomes turbid when kept, but a tincture of the same drug made with mixture of 3 vols. rectified spirit and 1 vol. water will remain clear and free from deposit for an indefinite period. As for tincture of galls the three weaker samples have all thrown down copious deposits, that made with rectified spirit alone remaining clear. As rectified spirit exhausts the drug more perfectly than a weaker spirit it would apparently be advisable to make this tincture with a stronger menstruum than the proof spirit now ordered.

Table I.

Showing amount of Extract (in grains) yielded by 1 fluid ounce of each Tincture.

Tincture.	Menstruum employed		S. V. R. 8 vols. water 1 vol.	Proof Spt.
	S. V. Rect.	S. V. R. 4 vols. water 1 vol.		
Aconiti . .	4·5	8·0	10·0	10·0
Arnicæ. . .	2.5	4·0	4·0	4·0
Asafœtidæ .	31·0	32·0	29·0	14·5
Capsici. . .	2·5	3·5	3·5	3·0
Cinchonæ. .	19·0	22·0	22·0	23·0
Cinnamomi .	7·0	9·0	9·0	6·0
Cubebæ . .	8·0	8·5	8·5	8·5
Laricis. . .	7·5	7·5	8·0	7·5
Myrrhæ . .	19·0	14·5	9·5	*nil*
Pyrethri . .	7·0	10·5	10·5	12·0
Sumbul. . .	13·0	15·0	15·0	15·0
Veratri viridis	5·0	6·5	7·0	7·0
Zingiberis. .	2·0	3·5	3·5	3·5
	S. V. Rect.	S. V. R. 8 vols. water 1 vol.	Proof Spt.	S. V. R. = water volumes.
Aloes . . .	10·5	11·5	12·0	12·0
Aurantii . .	9·0	13·0	14·0	15·0
Belladonnæ .	3·0	5·0	6·0	6·0
Buchu . . .	6·0	11·5	11·5	12·5
Calumbæ . .	3·0	7·0	8·0	8·0
Cantharidis .	·5	·5	7·5	1·0
Cascarillæ. .	6·5	8·0	8·0	8·0
Catechu . .	45·0	49·0	50·0	50·0
Chiratæ . .	6·0	8·0	8·0	8·0
Cimicifugæ .	8·0	12·0	15·0	13·0
Cocci . . .	7·5	15·0	15·0	15·5
Colchici. . .	9·0	11·0	12·0	10·0
Conii . . .	6·0	6·0	6·5	8·0
Croci . . .	7·0	11·0	11·5	10·5
Digitalis . .	11·0	17·0	22·0	22·0
Gallæ . . .	44.0	44·0	41·0	40·0
Gelsemii . .	4·5	7·0	7·0	7·0
Gentianæ. .	10·5	16·5	17·0	17·0
Hyoscyami .	18·0	16·0	20·0	19·0
Jaborandi. .	12·0	16·0	18·0	20·0
Jalapæ. . .	9·0	14·5	16·0	16·5
Krameriæ. .	21·0	20·0	20·5	19·5
Lobeliæ . .	7·0	10·5	11·5	14·5
Lupuli. . .	7·0	8·5	9·5	10·0
Opii. . . .	16·0	18·0	18·0	18·0
Quassiæ . .	—	·5	·5	·5
Rhei. . . .	14·5	17·5	18·0	18·5
Sabinæ. . .	14·0	15·0	14·0	14·0
Scillæ . . .	5·5	38·0	42·0	42·0
Senegæ. . .	16·0	18·0	18·5	18·0
Sennæ . . .	7·5	12·5	14·0	15·0
Serpentariæ .	3·5	4·5	4·5	4·0
Stramonii. .	2·5	2·5	3·0	3·0
Valerianæ. .	5·0	9·0	9·0	10·0

Of tinctures made with rectified spirit which are equally well made with a slightly weaker menstruum are pyrethrum, cinnamon, asafœtida, and sumbul. Of tinctures now directed to be made with proof spirit, which yield an equally good or better product when prepared with a menstruum consisting of equal volumes rectified spirit and water, are quassia, krameria, senna, catechu, digitalis, opium, aloes, cascarilla and senega.

Table II.

Showing amount of Alkaloid (in Grams) yielded by 1 Fluid Ounce of each of the Alkaloidal Tinctures.

Tincture.	S. V. rect.	Menstruum employed.		Proof spirit.	S. V. R. = water volumes.
		S. V. R. 4 vols., water 1 vols.	S. V. R. 8 vols., water 1 vol.		
Aconiti . .	·0185	·0246	·0246	·0244	—
Belladonnæ .	·0082	—	·0079	·0068	·0069
Cinchonæ. .	·1560	·1596	·1588	·1590	—
Colchici . .	·0036	—	·0030	·0032	·0034
Conii . . .	·0375	—	·0477	·0465	·0471
Hyoscyami .	·0059	—	·0053	·0060	·0062
Jaborandi. .	·0198	—	·0360	·0454	·0516
Opii . . .	·3374	—	·3884	·4068	·4252
Stramonii. .	·0077	—	·0104	·0091	·0052
Veratri viridis	·0229	·0294	·0311	·0360	—

The **President** said it was only needful to refer to the tables on the wall to show that the work done on this matter had been enormous. The figures there put together represented a vast amount of labour, and this subject was one which it was high time should be dealt with. Pharmacists had been accustomed to work either with rectified spirit or proof spirit; but there was no reason for throwing away alcohol unnecessarily, more especially as it did not tend to cheapen, and the special object was to find a suitable solvent for the active principle of the drug to be treated. Mr. Wright had been watching this subject for some years, and Mr. Farr had also sent a contribution, which Mr. Naylor would read.

Notes on Certain Alkaloidal Tinctures.

BY E. H. FARR.

The experiments described in the following notes were undertaken with a view to discover if the official alcoholic menstrua for certain tinctures were those best suited to extract the medicinal properties from the drugs operated upon. A number of preliminary experiments on various drugs tended to show that in many cases the alcoholic menstruum might with advantage be modified in strength.

The present notes are confined to tincture of digitalis and the alkaloidal tinctures of the Pharmacopœia.

In making the tinctures, alcohol of various strengths was employed, and in describing the results the numbers prefixed to the tinctures indicate the number of volumes of absolute alcohol contained in 10 of the menstruum. The drugs in powder were macerated and percolated, the last portions being displaced by more of the menstruum until the desired volume of product was attained, expression being out of the question on such small quantities.

The tinctures when made were examined (i.) as to percentage of alkaloid contained; (ii.) amount of extractive; (iii.) miscibility with water as indicating presence or absence of resinous, oily, or waxy bodies and the like; (iv.) miscibility with alcohol as indicating presence or absence of albuminous or mucilaginous bodies; (and lastly) as to appearance after being kept for a few months.

In the assay of the tinctures it was thought that titration with Mayer's reagent might be the simplest and best method, but a trial of that method showed that in the case of aconite, belladonna and henbane at least the results were not reliable as applied to the extract left on evaporation of the spirit when dissolved in acidulated water.

The following results on aconite tinctures will illustrate this:—

		Mayer.
A yielding	·038 alkaloid to chloroform required	2·0 c.c.
B „	·046 „ „ „	2·8 c.c.
C „	·038 „ „ „	2·9 c.c.
D „	·036 „ „ „	2·9 c.c.

To test if the manipulation was at fault, a quantity of ·040 aconitine dissolved in 1 per cent. H_2SO_4 was titrated with Mayer's reagent, and required 1·55 c.c. for complete precipitation (1·55 c.c. Mayer's reagent = ·0417 aconitine). After these indications the use of Mayer's reagent was abandoned and the alkaloids estimated by weighing.

For the estimation of the tinctures of aconite the following process was adopted, also for belladonna, henbane and stramonium. A volume of 50 c.c. of tincture was evaporated on a water-bath to expel the spirit, the bulk being kept at about 20 c.c. by adding water. A little dilute H_2SO_4 was then added and the whole shaken with chloroform to remove colouring matter, etc. Excess of K_2CO_3 was next added and the alkaline fluid shaken with two successive portions of chloroform, which after being mixed were well washed with water and evaporated.

The tinctures of colchicum, gelsemium, jaborandi and veratrum were estimated in a similar manner, only in their case ammonia was used to liberate the alkaloid. On account of the excess of mucilage in 5 and 3 of jaborandi, and to a certain extent in 7 also, on shaking with chloroform, or even with chloroform mixed with ether, an almost inseparable jelly was formed and the results were rather uncertain. The plan adopted finally consisted in precipitating the mucilage from the tincture after evaporation to low bulk by the addition of alcohol, and then proceeding as with the others.

Cinchona.—Four tinctures were made 9, 7, 7 with 1 per cent. tartaric acid and 5; 50 c.c. of tincture were acidulated with a little sulphuric acid and evaporated to expel spirit, adding a little water from time to time to keep the bulk above 20 c.c. When the spirit was expelled the residual liquid was treated with excess of caustic soda solution and exhausted with benzolated amylic alcohol. The benzolated solution was washed with water until the washings came away colourless, then shaken with one per cent. sulphuric acid in two successive portions. The acid solution of sulphates was then treated with excess of soda and shaken with chloroform mixed with a small proportion of ether (to facilitate separation). After being washed the chloroformic solution was evaporated in a tared dish until constant at 100° C. The alkaloidal residues were dark in colour but showed most distinct crystalline structure. The alkaloidal and other results will be found below in tabulated form.

	Alkaloid from 50 c.c.	Extractive from 5 c.c.	1 vol. tincture mixed with 2 vols. water.	1 vol. tincture mixed with 3 vols. alcohol.	Appearances of fresh tincture.	Appearance after keeping 4 to 6 months.	Remarks.
Aconite 9. . .	·019	·098	opalescent	bright	bright	bright, no dep.	No. 7 appears to be the best menstruum.
7. . .	·023	·144	slightly opal.	bright	bright	bright, no dep.	
5. . .	·019	·156	bright	cloudy	bright	bright, no dep.	
3. . .	·018	·163	bright	cloudy	bright	bright dep. a little.	
Belladonna 9 .	·015	·032	slightly opal.	bright	green	bright, sl. dep.	No. 9 may be a little better though there does not appear a lot of difference allowing for experimental error.
7 .	·013	·067	slightly opal.	opalescent	green	bright, no dep.	
5 .	·013	·072	bright	turbid	brownish yel.	bright, sl. dep.	
3 .	·012	·073	bright	turbid	brownish yel.	bright, copious deposit	
Henbane 7 . .	·012	·158	turbid	sl. cloudy	green, bright	bright, no dep.	No. 7 appears best, but little difference.
Proof.	·010	·166	turbid	turbid	green, bright	bright, sl. dep.	
3 . .	·010	·162		turbid	brownish, not bright	thick, with dep.	
2 . .	·006	·177		turbid	pale brown'sh cloudy	thick, more dep.	
Stramonium 9 .	·012	·029	sl. cloudy	bright	bright pale and fluores.	bright, no dep.	No. 7 appears best menstruum; 9 and 7 were distinctly fluores. 6 months after they were made.
7 .	·014	·029	bright	bright	darkest most fluorescent	bright, no dep.	
5 .	·012	·028	bright	bright	dark fluores.	cloudy and dep.	
3 .	·008	·025	bright	bright	pale, slightly fluorescent	cloudy and dep.	

Conium.—Four tinctures were made with 9, 7, 5 and 3 spirits. For estimation 50 c.c. of tincture were acidulated with 1 c.c. normal H_2SO_4 and evaporated on water-bath with constant stirring and occasional additions of water until the spirit was expelled. The acid solution was next treated with chloroform to remove colouring matter, etc., then made alkaline with excess of ammonia and shaken with chloroform in two successive portions. The chloroform after being well washed with water to remove all traces of ammonia was next well agitated with 3 drops of strong hydrochloric acid and transferred to a tared beaker. It was allowed to evaporate spontaneously until all chloroform was dissipated, then transferred to bell jar over H_2SO_4 and weighed each day, until constant for 48 hours. The hydrochlorate seems permanent in bell-jar over acid, though exposed to the air it rapidly develops the characteristic odour of conia. The resulting salt was almost white, and crystalline, the crystals polarizing.

Digitalis.—For the estimation of these tinctures the following process was employed:—The tincture was evaporated to consistence of soft extract, and this was dissolved in 10 per cent. acetic acid whilst still warm.

	Alkaloid from 50 cc.	Extract 5 c.c.	1 vol. tincture mixed with 2 vols. water.	1 vol. tincture with 3 alcohol.	Appearance of fresh tincture and colour.	Appearance after keeping 4 to 6 months.	Remarks.
Colchicum 9 . .	·004	·054	sl. cloudy	all remained clear	pale straw bright	bright no dep.	What slight difference exists seems in favour of No. 5.
7 . .	·004	·085	bright	all remained clear	straw bright	bright no dep.	
5 . .	·005	·094	,,	all remained clear	dark straw bright	bright no dep.	
3 . .	·004	·101	,,	all remained clear	brownish straw bright	bright no dep.	
Gelsemium 9 . .	·012	·040	sl. cloudy	all clear	not fluorescent	bright sl. deposit	No. 7 seems as good as No. 9.
7 . .	·012	·052	,,	,,	bluish fluores.	bright sl. deposit	
5 . .	·009	·057	opalescent	,,	,,	bright sl. deposit	
3 . .	·008	·049	bright	,,	,,	bright sl. deposit	
Jaborandi 9 . .	·008	·104	cloudy	bright	dark green	bright	No. 3 would appear to be best menstruum.
7 . .	·009	·166	less cloudy	sl. flocc. precipitate	,,	,,	
5 . .	·020	·200	opalescent	flocc. precp.	brown red	,,	
3 . .	·028	·207	sc. opalest.	dense precp.	pale brown red	dep. slightly	
Veratrum 9 . .	·036	·098	milky	bright	bright	bright	No. 5 is the best in this case.
7 . .	·034	·147	,,	,,	,,	,,	
5 . .	·038	·154	sl. cloudy	sl. cloudy	,,	bright sl. deposit	
3 . .	·034	·175	,,	,,	cloudy	copious dep.	

	Alkaloid etc. 50 c.c.	Extract 5 c.c.	Tincture 1 with water 2.	Tincture 1 with alcohol 3.	Appearance after keeping.	Remarks.
Cinchona 9 .	·314	·232	turbid	—	bright with slight deposit	In the case of this particular bark No. 7 is certainly the best menstruum.
7 .	·426	·283	turbid	—	bright no deposit	
7 .	·332	·250	turbid	—	—	
5 .	·396	·275	turbid	—	bright with slight deposit	
Conium 9 .	·044	·028	cloudy	bright	bright	
7 .	·043	·058	opalescent	opalescent	bright	No. 5 tincture would probably be as active as No. 9 taking account of experimental error and volatilization during evaporation which would be less with 9 and 7.
5 .	·040	·072	bright	slight flocculent precip.	nearly bright	
3 .	·028	·065	bright	flocc. precip.	cloudy but no deposit	
Digitalin ?						
Digitalis 7 .	·024	·225	opalescent	precipitate	bright no deposit	No. 7 tincture is best in this instance.
proof	·021	·237	less so	,,	bright slt. dep.	
4 .	·016	·238	faintly so	,,	bright more deposit	
2 .	·012	·213	clear	,,	bright more dep.	
Morphia						
Opium powder A proof	·327	·177	morphia present in the opium which thus represents ·431	—	—	—
4 .	·354	·214		—	—	—
3 .	·325	·213		—	—	—
2 .	·350	·198		—	—	—
Opium moist B proof	·450	·184	morphia present in opium which thus represents ·575	—	—	—
2 .	·459	·160		—	—	—
				—	—	—

The resulting solution was shaken with petroleum ether 1 part, ether 2 parts, until these ceased to remove colouring matter and then made alkaline with slight excess of normal soda solution and shaken with chloroform. The chloroform on evaporation left an almost white granular residue, which in the case of No. 7 and proof tinctures had a faint greenish shade. This residue was weighed, then treated with 1·75 phosphoric acid and the colours compared by dilution in Nessler glasses. This showed that the residues were of similar composition.

Opium.—One set of tinctures was made from powdered opium having an assay of 11·5 per cent. morphia, and another from moist opium containing 10·7 per cent. morphia (as assayed by B.P. method).

In making the latter the opium was rubbed smooth with some water and macerated two hours with the rest of it before adding the spirit.

The resulting tinctures were assayed by a slight modification of the B.P. process.

The results showed that in no case was the opium exhausted in making the tincture. The tinctures made with the lower strength menstrua are on the whole richer in alkaloid (morphia), but the difference is not so apparent as it would otherwise be on account of the varying amount of colouring matter which accompanies the morphia. In the case of the lower ones (2 and 3) the morphia is very pale, whilst in proof and 4 it is dark.

The colouring matter in some instances amounts to nearly 10 per cent. of the morphia weight, and this must be taken into account in forming an opinion on the results.

The tincture No. 2, as compared with a proof one, is paler in colour (2 : 5 ratio) and contains less resinous matter. It does not possess the peculiar heavy odour of laudanum to such a marked degree, and probably would not produce the nausea following a dose of the latter to such a degree. (This was the case with one person—a laudanum drinker—but might not be so in all cases).

All weights are taken on alkaloid or extract dried until constant at 100° C.

Mr. Abraham remarked that it might be useful to bear in mind during the discussion of the paper that 90 per cent. of alcohol by volume was about equivalent to rectified spirit, and 60 per cent. to proof spirit.

Mr. Allen said Mr. Abraham's reminder was very *à propos*. Some pharmacists, he believed, considered proof spirit consisted of equal measures of rectified spirit and water and practised accordingly; whereas the fact was that proof spirit approximately resulted from the mixture of three measures of water with five of rectified spirit.

Dr. Symes said this subject was not a new one, but the Conference was much indebted to these gentlemen for bringing forward definite results. Many years ago there was an opinion expressed that there ought to be a greater variety of strength of solvent for the various drugs, and he believed that a menstruum containing three volumes of rectified spirit to one of water would be on the whole far more useful than either rectified or proof spirit. Mr. Farr stated that a menstruum consisting of 30 per cent. of absolute alcohol was the best for jaborandi leaves, but manufacturers found that rectified spirit gave them the best results as regarded the quantity of pilocarpine they were able to obtain; at least that was the opinion some time ago. As that gentleman had estimated the alkaloids, not merely the extractive, it was rather remarkable that his experiments should be so much at variance with the practical result on the manufacturing scale.

Mr. Cripps, referring to the great amount of work these gentlemen had done, said it could scarcely be appreciated even after an examination of the tables. With regard to some proof spirit tinctures, of jalap, for instance, they were apt to consider these owed their activity to resinous substances. The table showed in the case of jalap only 9 per cent. of extractive with rectified spirit, and 16·5 with proof spirit. One would think from that that the proof spirit tincture was the better; but as it was a resin that was the active principle, the rectified spirit tincture would be quite as active, although the solid matter was very much less. The other solid matter would no doubt be of a saccharine nature. This must be borne in mind in all experiments in which the total solids only were given. Messrs. Farr and Wright had both estimated the amount of total alkaloids in certain tinctures, and in some cases this was of great importance. Some drugs, however, contained two or more alkaloids, which might be active or not; for example, *Veratrum viride* contained two alkaloids, veratroidine and jervine, and he believed that their action was antagonistic; so that the amount of total alkaloids would not assist them much, unless they knew the proportion of each. It would be a good thing also if another series of experiments were made dealing with another set of samples altogether, or three or four sets, for he had met with drugs which yielded a similar amount of extractives, although the active principle might be considerably more or less. Again, one aconite or cinchona might yield more to proof spirit than another, but not any more to rectified spirit.

Mr. Martindale said the Conference was much indebted to these gentlemen for these results. They were almost beginning a new pharmacopœia in this direction, and it was quite evident that this work was most valuable. The homeopaths took up the subject from another point of view. They went on the decimal system, using for the mother tincture 1 in 10, and that opened up the question, not only of strength of spirit, but the amount of ingredient which should be used to produce tinctures. Many tinctures he considered much too weak—there was too much alcohol used, making the tinctures too dilute. In America they had gone to the other extreme in preparing fluid extracts, which were first introduced with the intention of introducing a preparation of which one fluid part should represent one part of the solid. But these extracts would not keep, or represent anything like the amount of drug they were supposed to; they always deposited a considerable quantity, in some cases of the active principles, in others merely resinous or inert matters. Pharmacists ought to use the least solvent which was convenient, so as to produce a fluid preparation which could be used in medicine; one extreme was the dilute tinctures, and the other was the one in one fluid extract. Something intermediate was being attempted by the American Association, who were following his advice and recommending preparations of which two fluid parts should represent one solid part of the drug used. Something of that kind would be valuable in many cases, but they need not all be the same. What was required was a stable and clear liquid,—a *liquor*, in fact, minus woody fibre and inert matter,—which would represent the drug in as little bulk as possible, which could be prepared with the least loss of labour and material, and in the concentration of which not much heat was employed. It should not be overcooked, and it should not be called a tincture, or great confusion would be introduced. He thought these tables would well repay careful study.

Mr. Conroy said the Conference was very much indebted to these gentlemen for the elaborate and extensive work they had done, but it was a subject which could not be discussed without having carefully studied the papers, and unfortunately the tables were constructed on different principles, and defied easy comparison.

Mr. Wright said his three tables showed the results he had obtained. He estimated the amount of extract and also the amount of alkaloid as grams yielded by each fluid ounce.

Mr. Conroy said, as Mr. Cripps had pointed out, one might be easily misled in this matter in the case of resinous drugs, from which the resin would not be extracted by proof spirit, and therefore the preparation would be almost inert.

Mr. Gerrard said the result of these experiments was deeply interesting, and in many respects altogether unexpected. It appeared that colchicum tincture with rectified spirit yielded for each ounce 9 grains; whereas with water and rectified spirit equal volumes yielded only 10 grains. He should never have expected such a result as that knowing the nature of the colchicum corm.

Mr. **Wright** said the extract was from the seeds.

Mr. **Gerrard** said even from the seeds he should not have expected such a result. The same remark applied to some extent to jalap, and more especially to belladonna, hyoscyamus and stramonium. It would be found that belladonna with rectified spirit yielded three grains, hyoscyamus 18 and stramonium 2·5. Then with water and rectified spirit in equal volumes belladonna only yielded 6 grains, and hyoscyamus 19. One would expect from the amount of gummy albuminous matter, and specially soluble matter present in the henbane leaf that more than 19 grains would be obtained using such a dilute spirit. He did not question the results for a moment, but they were altogether different to what he should have expected. Stramonium showed 2·5 with rectified spirit, and only 3 when mixed with water. With reference to the preparation of pilocarpine from jaborandi which had been mentioned by Dr. Symes he might state that manufacturers for some years had always found it necessary to use rectified spirit as a solvent of that alkaloid, and obtained better results than with a mixture of spirit and water. That was chiefly due to the fact not only that rectified spirit yielded an extract rich in pilocarpine, but that the volume of extract was small, so that they had not to deal with such a large amount of inert extractive; still he was surprised to find so much difference as ·019 and ·015. He knew from experience that proof spirit would take out the active principle of jaborandi quite as well as rectified spirit, although for manufacturing purposes the latter was the better. As had been mentioned by Mr. Cripps, the yield of extractive was not much guide to the therapeutic value of these preparations. He hoped the authors would continue their experiments, for their labours conferred a boon, not only on chemists and druggists, but on hospital and public institutions, who used tinctures to a large extent; the main object was to obtain economy with efficiency.

Mr. **Morris** (Coventry) desired to thank the authors of these papers, which would lead to a great saving both of time and money. In one tincture, myrrh, he noticed the word "*nil*" under the heading "proof spirit." It had been said more than once that tincture of myrrh should be made with proof spirit, as it contained a gum.

Mr. **John Barclay** said Mr. Wright's results for tincture of cinchona were rather low, being only about 0·5 per cent. He had done work on cinchona bark somewhat in the same direction, and had found standard official bark would yield 0·8 to 0·9 per cent. of alkaloid. He was inclined to think this was to some extent due to Mr. Wright's method of assay, for it seemed somewhat dangerous to evaporate a solution of the alkaloid to dryness with slaked lime.

Mr. **Hasselby** drew attention to the remarkable agreement between the two papers, and he thought the tendency was too much for chemists to confine themselves to rectified spirit and proof spirit. The time was coming when the Pharmacopœia Committee ought to consider the suitability of certain mixtures and give a little more room, which was required in more ways than one. Methylated spirit was allowed to be used for liniment for external use, and when he had lately dispensed a belladonna liniment with pure spirit, his customer sent back a note telling him the charge was an extortionate one, which he could not afford to pay, that he had had it made up in two respectable places, and had not been charged more than half. He tried to explain the cause of the difference, but without much success. If the Pharmacopœia Committee would sanction the addition of a little acid to proof spirit in the case of belladonna and aconite, as they did in the case of cinchona in a fluid extract, all the valuable constituents might be obtained from the roots, and they need not resort to methylated tinctures at all. He hoped a little more attention would be given to the question of menstrua.

The **President** said Mr. Ransom had worked a good deal on the exhaustion of belladonna and other roots, and no doubt he would give Mr. Hasselby any information he might require on the subject.

Mr. **Linford** said according to the table jaborandi apparently gave more alkaloid to weaker spirit than to the stronger, but if the tincture were made with 30 per cent. alcohol as in the other table it would be an exceeding brown tincture and many people would return it.

Mr. **MacEwan** said some years ago in conjunction with Mr. Gibson he did some work on calabar bean, and their experience was that a more aqueous menstruum than rectified spirit extracted the alkaloid more efficiently. He would also remind the meeting of Professor Dunstan's experiments with nux vomica, which were entirely in the same direction. The more aqueous the menstruum the more active it was in extracting alkaloids.

The **President** remarked that the strength of alcohol mentioned in the Pharmacopœia for extracting nux vomica had been altered in consequence of the paper to which Mr. MacEwan referred.

Mr. **Wright**, in reply, said those who referred to the smaller amount of extract in tinctures made with rectified spirit than in those for which more dilute spirit was used should bear in mind another fact, that a dilute spirit presented the advantage in the case of tinctures made from leaves that it did not take out the chlorophyll, and sometimes in diluting a rectified spirit tincture containing chlorophyll with water a very awkward and unsightly separation took place. That would apply to jaborandi leaves amongst others. On the general question of the extraction of alkaloids he would say that they existed usually in combination with some acid, such as malic, and consequently one would expect an aqueous or weak alcoholic menstruum to extract the alkaloid better. He was fully aware of the work Mr. Gerrard had done on the subject of jaborandi, and had read his results very carefully. So far as the total alkaloids were concerned, in the case of proof spirit the yield was twice as much as Mr. Gerrard obtained from the leaves, but in connection with that subject he should say that Mr. Gerrard's experiments had reference to the quantity of pilocarpine and not to the total amount of alkaloid. He agreed with Mr. Cripps's observation as to the importance of repeating the experiments with fresh samples of drugs. It was a very common experience in the case of drugs containing alkaloids to find a drug inferior in other respects which would nevertheless give a greater yield of alkaloid, although one would never think of using it for the preparation of tincture, if judged only by its physical characteristics. In reply to Mr. Morris, who had drawn attention to the word "*nil*" in connection with myrrh, he could only say that he was not bold enough to attempt to make a tincture of myrrh with proof spirit, because they knew very well that the principal constituents were of a resinous nature, therefore he thought it hopeless to expect to get anything like a good result. Mr. Barclay thought his results were too low with reference to the yield of alkaloid by the tinctures of cinchona. He had had a letter on the subject the other day from Mr. Farr, to whom he had sent a copy of his tables, as they had arranged to compare results. Mr. Farr in reply said the only tinctures in which there was any considerable difference between them were conium, colchicum and cinchona. With respect to conium, he (Mr. Wright) got a greater yield of alkaloid than Mr. Farr, though not greater than Mr. Cripps found the fruits to yield when he made his experiments on the subject some time ago. He was, therefore, justified in thinking that his results with that tincture were correct. With regard to cinchona also, Mr. Farr had made the same remark as Mr. Barclay had just made, viz., that his results had come out considerably higher than Mr. Wright's had done. Six years ago Mr. Braithwaite read a paper on that subject (*Pharm. Journ.*, [3], xiv., 445) and stated that he had found that rectified spirit extracted the alkaloid better than proof spirit, but as far as the quantity of alkaloid was concerned his results came out slightly lower than his own, although Mr. Braithwaite stated that he found the bark from which his samples were made contained rather more than 5 per cent. total alkaloids. It was quite evident, therefore, that further experiment was wanted on that subject. It was a common experience, he believed, with manufacturers, to find that a cinchona bark which contained a large amount of alkaloids did not always yield the best fluid extract. A good specimen of cinchona bark might yield a poor extract. The only other tincture which Mr. Farr found to differ considerably from his own was tincture of colchicum, but there he should not rely very much on the yield of alkaloid, because colchicum was one of those drugs the active principle of which was not definitely settled. With regard to the effect of lime on the alkaloid in cinchona bark, the process he had employed was pretty well known; it was described in Attfield's 'Chemistry,' and he had tried it side by side with the process of extraction by means of acid, and had always found the yield come out tolerably correct.

(*To be continued.*)

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

At the meeting on Thursday evening, the 16th inst., the President, Dr. C. Symes, in the chair. The following donations were announced, viz., 'The Proceedings of the Liverpool Geological Society,' 1889—1890, from the Society; 'Transactions of the Liverpool Engineering Society,' vol. xi.; 'Bulletin of the Chemical Society of Washington,' No. 5; 'Smithsonian Report,' Part II., 1886, and Parts I. and II., 1887; *Pharmaceutical Journal* (current numbers) from the Society; a sample of genuine Goa powder, from Dr. Cameron, for the Museum. A vote of thanks was accorded to the respective donors. Mr. Everett Evans, Mr. F. Cole, and Mr. T. W. Sergeant were elected members of the Association.

The President said he had seen it stated that fluid extract of cascara sagrada loses its bitterness on keeping. He was not prepared to deny that, but he had a sample seven years old which still retained its stringency and bitterness.

Mr. Conroy said he had never perceived any such change in the fluid extract, but had observed that a tincture made with proof spirit very soon lost its bitterness.

Mr. A. C. Abraham said he had no doubt that the boiling in the preparation of the fluid extract destroyed to some extent its bitterness.

In reference to the "New Pharmacy Bill" the President said he thought it would be better that he should first point out the changes that would result if it became law, and answer, as far as he could, any questions. Then if the members would give the Bill a careful consideration, a deliberate decision could be arrived at on a subsequent occasion.

Dr. Symes was unanimously re-elected President for the next session.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

On Friday evening, October 10, a social meeting of this Association was held at the Sunday School Institute, to inaugurate the work of the present session. A number of specimens of general and pharmaceutical interest were exhibited, including some rare and curious drugs, metallic ores and metals, the process of yarn-making, microscopical objects, etc.

In the course of the evening Mr. Councillor Fitz-Hugh, President of the Association, congratulated the students on the many advantages they now possessed for acquiring a thoroughly good pharmaceutical education in Nottingham, and hoped they would not be slow to utilize them; he announced that during the winter, classes on botany and dispensing will be held at University College, and a pharmacy class and mutual improvement class on alternate Friday evenings in the Sunday School Institute.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The first meeting of the session was held in the Waterloo Rooms on Wednesday evening, the 15th inst. The President occupied the chair and briefly introduced Dr. J. McGregor-Robertson, who had consented to open the session.

Dr. McGregor-Robertson then gave an interesting description of the development of the chemist and druggist, commencing with the time when his representative, the apothecary, was simply an assistant to the physician, employed in compounding and delivering the medicines ordered by his master. When the apothecaries began to practise medicine on their own account, the druggists, who had become sellers of the raw material, began to encroach upon the province of the apothecaries by dispensing medicines. The result was a three-cornered fight between the physician, the apothecary and the druggist. Meanwhile the state of pharmacy was deplorable. Eventually a more complete separation took place between those who studied disease and those who dispensed medicine, and from that time and the formation of the Pharmaceutical Society pure pharmacy became established as a science. Dr. Robertson then proceeded to give a number of illustrations of the way in which the pharmacist is a necessary worker within the region of medical science.

At the conclusion of the address, the President expressed the indebtedness of the meeting, and on the motion of Mr. Gilmour a hearty vote of thanks was accorded to Dr. Robertson.

INVERNESS CHEMISTS' ASSISTANTS' ASSOCIATION.

The inaugural meeting of the present session of the Inverness Chemists' Assistants' and Apprentices' Association was held on Tuesday night in the Y.M.C. Association Rooms. Mr. Macritchie occupied the chair, and there was a good attendance.

Dr. Chapman read a highly interesting paper on "The Healing of Wounds," in the course of which he said the functions of prescriber and dispenser were sufficiently distinct, and it was no part of the function of the latter to dabble in the practice of medicine, or practically to test the therapeutic action of the drugs he handles. But when he considered how frequently it happened that cases of accidents were carried into the nearest druggist's shop, he thought that a few words on the principles of wound-healing might not be inappropriate.

At the close of the lecture Dr. Chapman was accorded a very hearty vote of thanks.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The opening meeting of the thirteenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, October 15, at 9.15, Mr. Donald McEwan, President, in the chair. There was a large attendance.

The minutes of last meeting having been read and approved, apologies for unavoidable absence were read from Mr. William Gilmour, Chairman of the Executive of the North British Branch, Mr. J. B. Stephenson, Chairman of the Scotch Board of Examiners, and others.

The President then proceeded to deliver the following—

Inaugural Address.

Gentlemen,—To-night we enter on the active exercise of our thirteenth session. I thank you for the honour conferred upon me in asking me to fill this honourable position. I have doubts as to the wisdom of your choice, but I promise to do the best I can, and I trust the fulfilment may bear out the promise. Coming as I do so far down in the list of presidents, the range of subjects on which an inaugural address is possible is somewhat curtailed. Indeed I am somewhat perplexed as to what I can speak about at all. Pharmaceutical politics we steer clear of in our Association work (rightly so, I think), but perhaps you will allow me on this special occasion to make a few remarks on the draft Pharmacy Bill which has been recently adopted by the Council.

My first remark is that I hope the exigencies of party strife will allow the Bill, which is certainly of a non-party character, to have some chance of becoming a part of the law of the land. I think that were all the members of the trade throughout the country to borrow for the nonce the character of the importunate widow and pester their representatives with requests to give the matter consideration and support, backing up the request with information, we might then have some chance of seeing it passed. All things may come to those who watch and wait, but those who work together have a better chance of seeing their desires fulfilled.

We are all agreed as to some amendment of the Pharmacy Act, though we differ, perhaps, in regard to the nature of the amendment required and the means by which it is to be obtained. I think that had it been made compulsory at first that all passing the qualifying examination should become members of the Society, either by payment of a life or annual subscription, it would have been much better for the Society to-day, and we should not have had to struggle against ignorance outside the trade or indifferentism within.

The vested interests of those now outside the Society who are content to enjoy the fruits of the harvest without taking part in the toil of either sowing the seed or reaping are, I am afraid, too strong to allow us to hope that this principle of all qualified men being members will become law at present. The privilege now offered Minor men may help a little towards this desirable end. In time it may come to pass, that we will show a united front, and speaking boldly in the name of all who are in the trade, or shall I say profession, declare what is to be done by those entering it. Besides this indifference inside, the appalling ignorance of the public, and also the newspaper press, on all questions, even the laws, affecting pharmacy, is a great hindrance to anything being done. The public will not believe that we are actuated by any higher motive than a desire to keep to ourselves the traditional thirteen pence in the shilling. Could we only persuade them that it is in the interests of public safety and for the public benefit that our Bill should be passed then we would not probably have long to wait for it.

Let us consider how we will be affected by the proposed Bill. The first clause is merely a defining one, and I pass it over. Coming to the second, we see that it is proposed to divide the qualifying examination into two parts, and to enforce a curriculum. With regard to the first proposal I think I may speak with some little confidence. I have now had the privilege and pleasure of examining a number of apprentices' papers, written in connection with our prize schemes, on the very subjects embraced in the first part of the examination. Though our candidates are not so numerous as they might be they show what can be done in the way of studying during apprenticeship. I have no hesitation in declaring, after seeing these papers, that the young men who wrote them are quite capable of giving a good account of themselves in the subjects of pharmacy, posology and prescription reading. Why should they not be allowed to pass an examination in these subjects, and then be free to apply themselves to their further studies, without having their brains taxed and their memories muddled with such a multiplicity of subjects as we have at present.

On the second point as to a curriculum we have already as an Association decided more than once. The debate on the subject which we had last session will, I doubt not, be fresh in your memories. The fact that the great majority of those presenting themselves for examination have undergone a voluntary curriculum shows that it is either a necessity or, at least, an almost universally felt want.

We may put out of court at once those who say that further education is unnecessary, and consider rather other arguments that have been urged against a curriculum. One I have heard frequently adduced is that hardship will probably be inflicted on country youths and additional expense entailed on all, through having to attend courses of instruction in chemistry, botany, and materia medica. It seems to be taken for granted that it will be possible to have classes only in large towns and in specially provided schools. Certainly it will be desirable to have every facility provided for imparting instruction. But the power to make byelaws regulating these matters lies with the Society, subject to the approval of the Privy Council. I can see nothing to prevent any country town which can boast of two or three chemists, with half-a-dozen apprentices, having courses for itself. "Full many a flower is born to blush unseen," and full many a learned man quite able, and, I have no doubt, quite willing also, to act as a lecturer, is to be found among the ranks of our country chemists. Safety they say lies in numbers, but I, for one, do not know that a teacher requires a large audience to be able to impart instruction. Is it not rather the contrary, and do not small classes succeed better than large ones. Clause 4 repeals certain sections of the 1868 Act, and Clause 5 gives a new title to those passing the Preliminary examination. It is to be hoped that all who pass the Preliminary will become student associates in reality as well as in name.

The sixth clause gives those chemists and druggists who are not in business, but who have reached the age of twenty-five, the power of becoming members of the Society, with all the rights and privileges from which they are at present debarred. There must be many chemists and druggists throughout the country to whom this privilege will be a boon, and it seems to me a little invidious that they should even have been kept out so long. To those who have a higher ambition the honour of being a pharmaceutical chemist, and of forming, perhaps, one of the majority on the Council, is still open as a reward for passing the Major, besides which he has the credit of bearing the hall mark of a higher standard of education than those who are content to remain as chemists and druggists. We will still have the two Registers, but I think the Society's Calendar should only show the three classes of members, associates, and student associates. Add another column, if you will to show the qualification, which gives the membership, but have the members all arranged in one list.

Another small matter is the fact that the subscription will be raised, I suppose, to one guinea. Even though it is, we get value for our money in the Journal alone, whether we consider it as a journal of passing events or a work of reference for consultation. "The Month," for instance, keeps us well up to date on the scientific side of those new remedies which are in one sense the bane of the chemist's existence. The age limit has been put in, perhaps, to save the pockets of the younger members, or perhaps to have them past that stage "when ginger is hot in the mouth," when they have those upsetting radical tendencies most strongly, when they are most impressed with the idea that they know all that is most worth knowing. In short, to let them have some time in which to learn that the wisdom of the age is not centred in its young men, but that those who are fewer in number but riper in experience have also some right to be heard and have their views considered.

The 7th clause is an important one, proposing to restrict the right of compounding prescriptions to qualified men or to those acting under the immediate supervision of qualified men. The question arises how many unqualified men can be acting under the immediate supervision of one qualified man. To criticize is much easier than to draft a Bill beyond the reach of criticism. It is difficult to see how else it could have been put, but it does seem to me as if this were the gate left open for the entrance of the traditional coach and six. Put a dozen unqualified men in a shop or store, with one qualified man to be walking around amongst them and you fulfil the letter of the Bill, though you are far from what I conceive to be the spirit of it. I must confess that I would like to see what are popularly known as stores put down. But on the other hand I cannot see how we can hope, in these days of free trading, to put down the trading of Limited Companies in drugs. Educate the public up to know that its safety lies in the personal qualification of the man whom they trust to dispense their medicines and that I think will solve the question. Teach them to take it, not as a matter of £ *s. d.*, but as a matter of life and death. But the fact is the money spent on drugs and especially on prescriptions is always grudged. You scarcely ever find a person who grudges a physician's fee, but, alas! you find plenty who grudge the poor chemist his bare remuneration for the trouble of making their first expenditure profitable to them.

The next clause deals with pains and penalties, and I pass it over as not likely to affect any of us.

The 9th clause deals with exemption from jury service. I daresay you are all acquainted with the Bardell *v.* Pickwick case, and the poor chemist on that jury. This desire for exemption, therefore, is no new thing. We do not seem to suffer from the grievance so much in Scotland as our brethren do in England, a fact due, perhaps, to the superiority of our laws. But we sympathize with them, and hope they may be able to obtain release from this unpleasant duty.

Then we have a new clause dealing with the election of the Council. Ireland has Home Rule in pharmaceutical affairs already, and so this Act does not apply there, and finally it is provided that though the Bill may become law on January 1, 1891, no byelaws regarding the examinations are to come into force before 1895.

Such is my running commentary on the Pharmacy Bill. I wish it God speed, and trust that it will be all that its promoters desire. I have only to press once more the desirability of your doing all in your power to aid the measure, and I would suggest that we might get up a petition in favour of it when it comes before Parliament. And now I desire to address my remarks more especially to the younger members of our Association. The new examination schedules which come into force in the course of next year will assist you materially in forming an idea of the exact scope of the examination and the extent of knowledge demanded. Working with the present schedule one is kept wandering in a tangled maze of doubt as to what is actually wanted. Indeed from my own experience, and that of others, I know that a great deal of valuable time is lost in getting up information which is of no earthly use to anyone. I have known young men who could say by heart the official descriptions of important drugs and give verbatim the processes of manufacturing alkaloids. Others again can give the exact quantities of ingredients in, say, confectio sennæ. After grinding for some time in this manner is it any wonder that they give themselves over to that grim giant Despair, and remain contented in the large army of the unqualified. It is from consideration of instances such as these that I welcome this very much enlarged and certainly much needed schedule. I confine myself for the present to the Minor schedule.

In the department of prescriptions candidates will be required to calculate the percentages and other quantities occurring in prescriptions, but otherwise the schedule remains the same, and no alteration is made in practical dispensing.

In pharmacy the schedule has been greatly enlarged. A much more extensive theoretical knowledge regarding the operations of pharmacy will be required, but, perhaps, the chief alteration is that which says the candidate (or rather "he," for it seems as if lady candidates are not expected) must be able to conduct such operations or parts thereof as the examiner may require. The questions as to the proportions of active ingredients are simplified by giving a list of those those which may be asked.

In materia medica instead of requiring a knowledge of "any drug used in medicine," a list is given of those required in addition to the official drugs.

In botany you will be required to know something of vegetable physiology, and the different kinds of fruits, and the use of the microscope in the recognition of sections of stems and other vegetable structures. You may keep your minds at ease, however, as to the plants you may be called upon to recognize, for instead of the very indefinite statement in the old schedule, "the more important indigenous plants used in medicine," a list is now provided. If you use your privileges aright you need not fear this particular branch, for in our herbarium, which is open for your inspection at any time, you will find most of the plants named, and perhaps some member will take the hint and supply any deficiency that may exist. Whilst on this subject might I throw out the hint that the Association might consider the ways and means of providing a microscope, so that those who have not otherwise got the opportunity might have some practice in the use of it.

It is in the department of chemistry and physics and principally in practical chemistry that the schedule has been most seriously altered. Candidates will be required to conduct volumetric estimations, assay cinchona bark, the tincture and extract of nux vomica and opium, and to explain and perform the processes or some part thereof, for preparing certain inorganic and organic substances.

Such are the more outstanding features of the new schedule. Some may think it is too great an advance, but you must remember that year by year the facilities for acquiring knowledge are increasing, and very shortly you will have to spend a considerable time doing practical work under a practical teacher, before you can present yourselves for examination. I intended to have advocated the addition of toxicology, and a knowledge of the Pharmacy Acts to the subjects of examination, but time forbids and I forbear.

Let me counsel you as far as possible to acquire sound practical information for the mere love of it. Do not study for the sake of passing examinations, or that you may have the reputation of being learned above your fellows, but study rather from the love of knowledge, and so that you may have that satisfaction which comes from the consciousness that you have diligently tried to acquire all the knowledge that your opportunities may have brought within your reach. Learn to do a thing well for the sake of doing it well. The late Sir William Gull was a man who believed in this principle, and one of his favourite quotations was:—

"If I were a tailor
I'd make it my pride
The best of all tailors to be;
If I were a tinker
No tinker beside
Should mend an old kettle like me."

And now, in conclusion, let me express the hope that this session is to be a successful one. Your committee, you will see, has provided an interesting syllabus. Let me invite those who have not heretofore been members to become so now. I could not wish to hold out to you any inducement to join us higher than the testimonial which Mr. Gilmour gave us in Dundee last year. With all modesty let me repeat it: "Never in all my experience have I known a superior class of young men either morally, intellectually and I think I may also add physically than is now to be found in Edinburgh, and this I ascribe in a very great degree to the Association which has flourished there for so many years. The reason is obvious. There is a healthy *esprit de corps* engendered; the young men get to know and respect each other; friendships are formed; information is given and received, and, above all, a centre is formed, which draws and retains young men with aspirations, probably indefinable in their very immaturity, but aspirations which under the maturing influence of such associations may develope in the future into any possibility." I hope, gentlemen, we will long deserve such an encomium, but the fulfilment of that hope depends on you. We cannot have all our old members back; by death and by removal we have lost active members, but we trust that the recruits we are enrolling this session will nobly carry on the work. It has come down to us in a vigorous state. Let us hand it on to our successors in undiminished strength. It rests with you to do it. Let each add his brick, remembering that:—

"All are architects of fate
  Working in these walls of time,
Some with massive deeds and great,
  Some with ornaments of rhyme.
Build to-day, then, strong and sure,
  With a firm and ample base,
And ascending and secure
  Shall to-morrow find its place."

In the absence of Mr. Blenkiron, Vice-President, a cordial vote of thanks to the President was moved by Mr. A. R. Bennet, Ex-President.

Dr. Inglis Clark, in seconding the motion, said it was an honour and a pleasure to him to perform this duty in the absence of Mr. Gilmour. This was his first visit to their Association, and he could not help contrasting the present state of affairs as compared with the position of matters seventeen years ago, when he first read a paper at an evening meeting in Edinburgh, and he had to congratulate them on the great improvement that had taken place. The President had, he thought, been happy in his selection of a subject and had treated it in a wise and moderate and reasonable way. He believed it was quite impossible, at this time of day, to suppress trading in drugs by co-operative stores and such like, and it seemed to him the best way in which to combat the evil was to aim at being complete men themselves. Let them not despise any knowledge or accomplishment by too rashly concluding that it was of no use. The man most completely furnished with armour was the most likely to succeed in the business of life. With regard to examinations a curriculum was, he thought, essential, and one great desideratum was common sense. They should try to grasp the principles rather than the details of the subjects studied, for the great object of education was to train the understanding rather than the memory. They would find that by acquiring knowledge now they would be able to utilize it later on in a great variety of ways in the successful prosecution of their calling. He had much pleasure in seconding the vote of thanks.

Mr. W. Cowie was elected Assistant Secretary in place of Mr. A. Leys, resigned.

The meeting then closed.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the second session of this Association was held in Lockhart's Café, St. Nicholas Square, on Wednesday evening, October 22, at a quarter past eight o'clock. Mr. Frederick Park, President, in the chair. There was a good attendance. The Secretary having read the minutes of the previous meeting, which were adopted, Mr. Park proceeded to deliver his Inaugural Address.

In the course of his remarks Mr. Park said that the Association had been last year quite a success, both from the range of competent papers and discussions as well as from a financial point of view. He thought all the members might derive great benefit from such an Association, as apart from the pleasure of hearing the opinions of other pharmacists, they were enabled to discuss pharmaceutical politics when occasion arose, and to establish a union, which was desirable in order that trade interests might be efficiently safeguarded. Especially those who were students ought to reap benefit from the Association, by attending the meetings and hearing the papers and discussions. Each student ought to take up one particular branch of science as a hobby. An assistant, or even an apprentice, had excellent opportunities afforded him of engaging in a hobby, he being in a position to understand and obtain most apparatus of a scientific nature on terms which are not within reach of young men of other businesses. The camera and the microscope, for instance, were admirable instruments, which gave unlimited scope for the mind, and he could speak with pleasure of happy hours spent with them. It mattered little what branch of science was followed so long as it distracted the mind from business and *£ s. d.* Turning his attention to pharmaceutical politics, the speaker said the Council of the Pharmaceutical Society had now definitely set forth the scope of the examination in the Minor and Major subjects. The extended syllabus showed clearly the importance of young men passing the Preliminary or its equivalent before actually commencing their apprenticeships. He was in favour of the Pharmaceutical Society endeavouring to establish a curriculum. It would tend to spread study over a larger space of time, instead of allowing young men to cram up in a few months that which ought to be spread over so many years. In this way their studies might benefit them in their business, whereas under the present system their knowledge had a habit of vanishing before they reached the examination room. The new draft Pharmacy Bill, if it passed, ought to help them considerably, by giving the monopoly of dispensing entirely to qualified men. Without some such compensation where would be the benefit of increasing the stringency of the examination room? It was but just that competent persons only should have the vending of drugs and pharmaceutical preparations. It was also very desirable that dispensing by medical men should be treated in some manner, as it is impossible for a busy medical man to give due attention to his practice and his dispensary both. One thing he regretted had not been attended to, and that was to prevent companies of unqualified persons from having the same privileges as a qualified chemist. The passing of the Bill could only be accomplished by united action, and it behoved all chemists and druggists to do what they could to further the cause and enlist the sympathy of all the trade. They would then have little difficulty in getting a hearing in Parliament, and to that end let them all work to the best of their ability. In closing the speaker touched on the subject of proprietary medicines, wrongly called "patent medicines." He said the trade was flooded with heaps of worthless compounds bearing Government stamps, which gave to a credulous public the idea of genuineness. It was little good trying to discourage the sale of them. The public would have them. But so long as they continued to read the advertisements and saddle themselves with the numerous dire ailments set forth therein, so long would the patent medicine trade be the bugbear of the pharmacist.

Upon the motion of Mr. C. Russell a hearty vote of thanks was accorded Mr. Park for his address.

Mr. B. S. Proctor, F.I.C., then presented the prizes to the successful students of last session, giving them a few words of sound advice and encouragement. He cautioned the students strongly against devoting too much attention to study, and recommended them to devote their attention to the business side of their training as well. He drew a distinct line between a profession and a trade, and advised his hearers to lay aside the false pride of being professional men and be proud to be known as merchant pharmacists.

He was followed by Mr. George Weddell, who strongly endorsed the remarks make by Mr. Proctor.

Parliamentary and Law Proceedings.

IMPORTANT QUESTION REGARDING SALICYLIC ACID IN GLASGOW.

In the Sheriff Court of Glasgow on Thursday, the 16th inst., an important case concerning chemists and druggists came before Sheriff Balfour. It was at the instance of Peter Fife, sanitary inspector of the City, against David Speid Clark Reid, chemist, 156, New City Road, and residing at 20, Scotia St., "he having on July 3, 1890, sold to William Thomas Armstrong, in terms of a demand by him, one ounce weight of salicylic acid, being a drug, not of the nature, substance and quality demanded by him, in respect that it contained 2½ per cent. of cresotic acid and was therefore sold to the prejudice of the purchaser." For the prosecution there appeared Mr. R. G. Ross, writer, and for the defendant Mr. Angus Campbell, writer.

Mr. Angus Campbell said that prior to his lordship proceeding with proof, if that were necessary, he had to take exception to the relevancy of the complaint. The section of the Food and Drugs Act founded upon was section 6, in the following terms:—"No person shall sell to the prejudice of the purchaser any article of food or drug which is not of the nature, substance and quality demanded by him." But there was no penalty, provided that the offence was committed under section 2, sub-section 2:—"Drug or food as a proprietary medicine, or is subject to the patent in force and is supplied in the state required by the specification of the patent." He submitted that to make the complaint relevant under this section the complaint should not only set forth the violation of the section but exclusion from the exemption. He meant that the complaint should set forth that the article was not subject to a patent and was not a proprietary medicine. If so the complaint would be completely answered. A complaint established and founded on statute must be so specific as to exclude innocence, and where the statute created an exemption in favour of the person accused, that person came within the qualified exemptions.

The Sheriff: Do you say that this salicylic acid is a patent medicine?

Mr. Campbell: I would say it was a subject of patent.

The Sheriff: That is for you to prove.

Mr. Campbell: The prosecution must state their case in such terms as to exclude my innocence.

The Sheriff: I will allow you to prove that it is a subject of patent or proprietary medicine.

Mr. Campbell: My friend Mr. Ross will not dispute that it is a subject matter of patent (quoting): "John Henry Johnston, date, February 17, 1874 (No. 595)." A copy of the patent deed was here handed in.

The Sheriff: When does it expire?

Mr. Campbell: It is given to some foreign gentleman, and I believe it expires next year. As to the article sold, were one to travel from John O'Groat's House to Land's End I am told you will not find a single specimen which is free of cresotic acid.

Mr. Ross: This prosecution has been raised not for the purpose of exacting a heavy penalty. It is rather for a conviction to let the public know the nature of this acid.

Mr. Campbell: What we have sold here is an article commercially known as salicylic acid. In consequence of some recent discoveries by Professor Charteris means have been taken of still further purifying the drug, but what we have sold is in universal use. In fact, we have done what has been done universally.

The Sheriff: Do you maintain that the article you sold contains no poison?

Mr. Campbell: It includes cresotic acid, which is almost part of salicylic itself. The Pharmacopœia which is in operation adopts the article which we sold. The article which we sold is the article recommended by the standard of the Pharmacopœia, whereas the article according to Professor Charteris will be a purer article, and which no doubt will in future be generally used.

The Sheriff: Do you say that the article which I understand Professor Charteris, according to your allegations, defines as containing cresotic acid—your commercial article does not contain cresotic acid?

Mr. Campbell: Our commercial article does contain cresotic acid, and it has been inseparable from the formula down to the discoveries of Professor Charteris. It is the article which has been sold universally throughout the country.

Mr. Ross: It depends very much upon the quality of the raw material sold.

Mr. Campbell: The article which the Professor has discovered would not be according to the Pharmacopœia, whereas our article is.

The Sheriff here decided to proceed with evidence.

Dr. Matthew Charteris was first called. In answer to Mr. Ross he said he was Professor of Materia Medica in the University of Glasgow.

Do you know this drug called salicylic acid?—Yes.

What is it principally used for?—For acute rheumatism. It is taken inwardly.

There are, I think, two kinds of salicylic acid?—Yes, there is one which is called natural, prepared from salicin or oil of wintergreen. There is another called artificial, but that is got from carbolic acid and carbonic acid. Prior to 1880 I used artificial salicylic acid for rheumatism. I found it created bad symptoms, such as delirium, restlessness, and a desire to get out of bed. Afterwards I found that these symptoms did not occur from the use of natural acid.

When you found out that the symptoms arising from the use of the artificial acid were bad you tried the other acid?—Yes. The natural gave no bad results.

Did you in 1880 stop the use of the artificial?—Certainly, and from that time I have used the natural.

Have you known of some serious results in consequence of the use of the artificial salicylic?—Yes.

In the summer of last year I think you made some researches as to what this artificial acid consisted of?—We made an experimental research testing the result of the natural acid and the artificial acid.

Before going into that, what is the appearance of the artificial acid as used in 1880?—It is a powdery substance like quinine.

And the natural?—Crystals, something like strychnine, clear crystals, well defined.

These are the differences in the look of the artificial and the natural?—Yes, in regard to appearance.

What was the result of your researches?—Briefly stated we found that the artificial acid in the form of powder, as shown here, a ten grain dose was fatal when administered to a rabbit two and a half pounds weight. It killed it—convulsions and death.

Did you administer the same quantity of the natural to a rabbit?—Yes, and it had no bad results.

You experimented on the artificial and tried to take out the impurities?—The detection of the impurities was mainly due to Mr. G. G. Henderson.

After you did purify the article did you experiment with the purified?—Yes.

After the artificial was purified?—Just so.

The Sheriff: Will you tell me the impurities.

Witness: It is probably some form of impure salicylic—cresotic acid. Probably some form of cresotic.

The Sheriff: Should it not be "creosotic?"

Witness: Oh, no; "cresotic."

Mr. Ross, continuing: What is the appearance of the impurities brought out of the artificial?—Witness: A sort of dun brown powder.

Have you made experiments with the impurities on rabbits?—Yes, with the result that a grain was fatal to a rabbit weighing two and a half pounds.

The Sheriff: That is one grain of this dun or buff powder?

Witness: Yes.

Mr. Ross: Is this cresotic acid, this impurity, poisonous?

Witness: Certainly. The impurity taken from the salicylic acid was distinctly poisonous. It must be so if one grain kills a rabbit.

Do you think it dangerous to the public to use this artificial salicylic acid?—I think it is; that is my experience and the experience of physicians.

That is to say that in cases of rheumatism you give large and repeated doses, these large and repeated doses create on the patient the bad symptoms you described?—Yes, the artificial; the unpurified creates restlessness and delirium; with the natural there are no such results.

What is the price of the natural as compared with the artificial?—I should think the natural would cost four or five times as much as the artificial.

Can you tell us the difference in price between the purified artificial and the artificial unpurified?—I should say about a penny the ounce. I think the one is 9*d*. and the other 10*d*.

Do you know that this is a patent medicine?—It was till about two years ago, but it is not now, for the patent has expired. Kolbe's patent has expired. It was a patent in connection with artificial salicylic acid.

Cross-examined by Mr. Angus Campbell: Experts have differed from you, Mr. Charteris, in the conclusions at which you arrived? Witness: Since when?

I show you a copy of the *Lancet* of February 15, 1890. There are differences of opinion there regarding the facts?—But they do not differ as to the results.

Are there not differences of opinion as to results?—I scarcely think so.

What is the standard of purity required in salicylic acid by the Pharmacopœia?—The Pharmacopœia states the principal point is the melting point. It melts at 155 centigrade.

About that?—Yes.

Did you apply the melting point in this case?—No.

Do you know that the melting test was applied to the salicylic in this case?—I suppose it would be.

Have you seen the specification of the patent?—The patent has expired. The patent is dated 1874.

But have you seen the specification?—No.

Then you cannot say if the sample in this case does not exactly conform to it?—No; it has been in pretty constant use because it was cheaper than the natural salicylic.

The Sheriff: Then there would be an article known as artificial salicylic acid?

Witness: No doubt about it.

Mr. Campbell: And it has had a monopoly?

Witness: Yes.

And since the date of the expiration of the patent, as you say it has expired, chemists and druggists have dealt in this article?—I presume so.

Then in Kolbe's article cresotic acid was present?—I presume so.

Would the presence of cresotic acid to the extent of 2½ per cent. in Kolbe's article be extraordinary?—Not extraordinary.

Usual, I presume?—Even more; probable.

Suppose you wrote a prescription for rheumatism, what would you put in that prescription if you wanted salicylic acid supplied?

The Sheriff having been here informed that the patent extended to fourteen years from 1874 said it was obvious it had expired two years ago unless there had been a prolongation.

Mr. Campbell here repeated his question.

Witness replied that he would just express his want without giving the name in Latin. He would just write "salicylic acid." If he wanted natural, he would put in "natural" below it. Chemists would supply the artificial article as being cheaper; but if one wanted natural he generally gave expression to that.

So that the Pharmacopœia recognizes natural salicylic acid as distinct from the artificial acid?—It is rather vague.

At all events the medical profession recognizes the distinction?—They do.

And when you want the natural article you expressly ask for it?—If I was wanting it I would certainly do so; but I do not know that it is done.

Supposing you wanted natural salicylic acid and was sending a messenger for it how would you express your message?—Well, if I was sending a prescription I would put "natural" below it.

That would be to secure the natural in preference to the commercial?—I presume so.

Could you, according to the formula in use down to your valuable discovery, get artificial free from its impurity?—That is a personal question.

As far as your experience goes?—I think not. You can now.

You say natural salicylic acid is compounded of salicin and oil of wintergreen?—There are some substances in it. You get the pure article from salicin without regard to oil of wintergreen.

But I want to know if salicylic acid is the product of salicin distinct from wintergreen, and also the product of wintergreen as distinct from salicin?—It comes to the same in the long run.

Do you profess to decide this question at all?—I decide it from my experience, and entirely as a physician.

From your extended and varied experience will you tell me what would have been expected on the 3rd of July had you sent a messenger with an order for salicylic acid?—I am not conversant with chemist's shops.

But what would you expect?—I would expect a good thing; the natural, or the purified.

With reference to your experiments on rabbits; I suppose you experiment on various animals?—Yes.

Is it not the case that some animals can take more poison than others?—Yes, some poisons.

Would you be surprised to know that for every 1 ounce of this natural acid there are 40 ounces of artificial acid sold?—I have made a public statement to that effect. I am glad you told me so.

Well, that is the case. What you wish is to revolutionize use and wont in a chemist and druggist's business in relation to salicylic acid?—I simply state facts. Harm has been pointed out in case after case, but the cheapness of the one in comparison with the other has interfered.

The difference you told us was a 1*d.* an ounce?—Oh, no; that is the purified artificial as compared with the artificial.

There are two forms of salicylic acid, one known as the natural and the other as the artificial. The latter has from year to year been sold unless the other was specially asked for. Is that so?—Yes, that is so.

Mr. Ross again informed his lordship that this complaint had been raised simply to point out to the public the danger of using impure artificial acid. Handing to Professor Charteris a pamphlet he asked if that was an article by Mr. G. G. Henderson in connection with salicylic acid, and having been replied to in the affirmative, he read as follows: "It is therefore a comparatively simple matter to manufacture a pure salicylic acid; indeed, I understand that this is now being done, and in view of the dangers attending the use of an impure acid it seems reasonable that some measures should be taken to ensure the purity of the acid used for pharmaceutical purposes or in the preparation of preservatives of different kinds."

Witness having agreed with the statement, Mr. Campbell said Mr. Henderson was present to speak for himself and added that that gentleman might take out letters patent for that very valuable stuff.

Professor Charteris: We are above that sort of thing.

The Sheriff at this stage interposed and addressing counsel said they were much indebted to Professor Charteris for his evidence, but he wanted to make a suggestion which would do no harm even if it were not entertained. One of his difficulties in the solution of this case was that the inspector went into a chemist's shop and asked for an article called salicylic acid. Now that was a commercial article and the subject of a patent which had so recently expired as two years ago. He apprehended that the object of the prosecution was to let the public know that this acid contained poisonous properties and that taken in large doses it would lead to convulsions, restlessness, etc. That had nothing to do with a man's going into a shop and getting what the chemist would supply him with. If the object of this prosecution was to let the public know that this article was poisonous, then the better way was to let it be dispensed as being a poison. Then it could be brought under the Poisons Act. He believed in the actual results of the experiments of Professor Charteris, and that the artificial salicylic contained poison, but it had been sold for fourteen years from the year 1874 to 1888 under a patent, and therefore he would advise the prosecutor to withdraw the charge, the public and chemists being now quite aware of the poisonous nature of the artificial salicylic acid.

Mr. Campbell said he never disputed the impurity.

Mr. Ross said his lordship might just hear a statement from Dr. Clark, who differed from Professor Charteris on a point.

Dr. John Clark was then examined by Mr. Ross. He said: I examined this sample of salicylic acid and sent in a certificate that it contained 2½ per cent. of cresotic acid; 156·8° C. is the proper melting point of the pure; the Pharmacopœia says "about 155."

What was the melting point here?—A little under 154·7. That is an indication of impurity.

Then with 155 you would have still impurity?—It should be 156 before you get the pure acid.

So that the sample in question was below the Pharmacopœia?—It depends upon the interpretation you put upon the word "about."

You have something to explain?—It has been assumed here that all artificial salicylic acid under Kolbe's process or patent would contain cresotic acid. That altogether depends upon the purity or quality of the carbolic acid or phenol used, the presence of cresotic acid in the salicylic acid being due to an impurity in the raw material or carbolic acid, from which the salicylic acid is made. As a matter of fact Fischer, in examining a number of commercial samples of salicylic acid made on Kolbe's process, found no cresotic in it. It is due to impurity in the carbolic acid.

The Sheriff: But carbolic acid is in this patent.

Witness: Yes. The commercial carbolic acid contains cresol; and it is due to the impurity in the commercial carbolic acid that cresotic acid gets into the substance.

Cross-examined by Mr. Campbell: Is there anything known as pure carbolic acid?—There is a thing commercially known as carbolic acid.

Is impurity not always present in carbolic acid unless it goes through a special process of purification?—All carbolic acid must go through purifying.

Do you know that the carbolic acid used in Kolbe's was pure?—I assume he used the purest he could get.

Have you any reason for assuming that?—I think he would do that, for all chemists in making a new substance start from the pure. When a chemist speaks of the substance as carbolic acid, he means the purest he can possibly get. I mean scientific chemists.

Had you submitted to you many samples of Kolbe's preparation?—Several.

Did you always find impurity there?—I think for three samples which I examined one contained only traces; that is to say it was above 156° melting point.

What would you think might be considered about 155° C?—I think a variation of 0·5° C. would be "about." The different samples of Kolbe's preparation would vary from 154° C. to 157·6° C.

You do not speak from a medical point of view?—No.

Mr. Ross addressing the sheriff said that after what had taken place he would withdraw the complaint.

The Sheriff said that notwithstanding the complaint had been withdrawn he thought it had been a most useful prosecution, as showing to the profession and the public the results of Professor Charteris's valuable experiments, and that this article really contained poison.

Mr. Campbell said: As to the general results of these discoveries he had to express on behalf of his client and those who were associated with him their desire to avail themselves to the fullest degree of their importance and effect.

The proceedings, which lasted forty minutes, then terminated.

PROSECUTIONS FOR SELLING "PRECIPITATED SULPHUR" CONTAINING SULPHATE OF LIME.

At the Westminster Police Court on Wednesday, Mr. William Beaton, chemist, of 20, Sussex Street, Pimlico, and Mr. Edward John Wall, chemist, of 44, Hugh Street, Pimlico, were summoned by the St. George's, Hanover Square, Vestry for selling a drug not of the nature and substance demanded.

Mr. Hitchens prosecuted for the parish.

Mr. Dyke, the inspector under the Food and Drugs Act, proved asking at the respective shops of the defendants for precipitated sulphur.

Mr. Charles Edward Cassel, the public analyst, said the sample from Mr. Beaton's place was adulterated with 43·8 per cent. of sulphate of lime (plaster of Paris); and that from Mr. Wall's shop with 39½ per cent. Such a quantity of lime sulphate, which was a non-volatile mineral matter, was decidedly injurious to health if taken internally, and if the sulphur was used externally, for skin disease, its beneficial action would be lessened by the addition, even if the foreign substance did not have an irritating effect.

Mr. Hugh Beaton, who represented his brother, one of the defendants, said that a strange manager was in the shop as it was vacation time, and milk of sulphur was served by mistake.

Mr. Wall's excuse was that he served some of an old stock which he took over from a former proprietor, believing it to be genuine.

Mr. Cassel, replying to Mr. de Rutzen, said that there was no such thing as milk of sulphur recognized in the British Pharmacopœia. When people asked for it they should be supplied either with pure sublimed sulphur or with precipitated sulphur, but if they got an adulterated article there might be difficulties in the way of a prosecution.

Mr. de Rutzen said that it was of the utmost importance that the public should be supplied with pure drugs, and fined each of the defendants £5 and one guinea costs. The penalties were paid.—*Times.*

Obituary.

Notice has been received of the death of the following:

On the 28th of September, Mr. Robert Mitcheson, Chemist and Druggist, late of Spennymoor, Durham. Aged 47 years.

On the 6th of October, Mr. William Frederick Windle, Chemist and Druggist, Norwood Road, West Norwood, S.E. Aged 50 years.

On the 8th of October, Mr. Ezra Marriott, Chemist and Druggist, Wimbush Grove, Hitchin. Aged 66 years.

On the 18th of October, Mr. John Lily Lewis Woodward, Chemist and Druggist, High Street, Bridgwater. Aged 75 years.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Use of Botany to the Pharmacist.

Sir,—In your excellent article on the above subject, in which you show that the study of botany is now made exceedingly interesting by practical work, you misinterpret the meaning of my remarks at Sheffield. I wished to emphasize the point that the pharmacist's powers of observation require training, especially when young. When I recommended the students to "learn a number of dry facts," I made no reference to botany, but I did to pharmacy and chemistry. I meant such dry facts as the specific gravity and strength of the alcohols, ethers, and nitric acids used in medicine, the neutralizing proportions of citric and tartaric acids with the alkaline bicarbonates, the atomic weights of the more common elements, the chemical formulæ of official compounds, and the doses of pharmacopœial preparations. I know that to those who soar higher, these dry facts are sometimes sneered at; but to the practical pharmacist they are invaluable.

That the study of botany develops the powers of observation, I may illustrate by the following example:—When a youth I was informed that a somewhat rare fern grew in a certain lane along which I was walking with a young farmer. I asked him to carefully watch one side of the road while I observed the other. After walking some distance he gave it up, saying he "wasn't going to spoil his eyesight looking for brackens." The field botanist's eye catches a fresh plant instinctively.

To the agriculturist, botany is even of more importance than to the pharmacist. Yet how few know anything about the grasses they grow, or can distinguish any but rye-grass. They entirely trust to their dealer for their supply of "seeds," as they are called. Thanks to the exertions of the Royal Agricultural Society, this opprobrium is now being removed. Wm. Martindale.

Mathematics and Chemistry.

Sir,—In the course of his address to the Sheffield students, Mr. Martindale made the curious assertion that "without mathematics it is impossible to comprehend simple chemical equations," and he had previously explained that by mathematics he meant euclid and algebra. Now I entirely fail to see how either of these can be utilized for the purpose named. An acquaintance with simple addition in arithmetic is all the mathematical knowledge required and, as a teacher, with some experience of the difficulty of eradicating wrong impressions from the minds of students, I would like to see the error refuted.

The misapprehension doubtless arises from the likeness in name and form between the collections of chemical and algebraic formulæ, but, apart from this outward similarity, there is no relation whatever. True, they both assert that two expressions are equal, but whilst the latter is a brief statement of a mathematical problem in which the value of an *unknown quantity* is to be ascertained, the chemical equation is neither more nor less than a shorthand summary of the results of a chemical reaction where nothing remains to be discovered. In fact it is impossible to write it until we know exactly what is produced when two or more substances react to form different substances.

I am aware that it is possible by means of a simple algebraic equation to calculate the relative numbers of molecules required to complete the reaction, but this is not essential, and the process can be used with advantage in but few cases, the arbitrary method usually adopted being generally speedier. A Teacher.

The Charge for Poison.

Sir,—By a letter in your last we are informed—not for the first time, I think—of Mr. Fitch's method of dealing with poisons, and we have an opportunity of admiring the manly, not to say lordly, independence which characterises that method. But when Mr. Fitch proceeds to assign a position "one remove from madness" to those who do not follow him in detail, the question forces itself, *num sequitur?* Genius is akin to madness. Fine spirits, as of Cowper, Lamb, De Quincey, Irving, Robert Hall, and a host besides, have tenanted that borderland. A chemist need feel no shame. The company is respectable. There may be "method in their madness" not quite divorced from reason. The exclusive right to vend poisons implies an obligation to supply legitimate demand. A peasant has as much right as a prince to kill a mouse, and more necessity. The charge of sixpence to a man earning but a few shillings a week is a consideration. From him it goes with a "bang," and thoughts of how many a clean shave he might have had, what school fees it would pay, how many morning, evening or weekly newspapers it would purchase, or put a patch upon the shoe where the wet comes in. Many buyers are of that class. There may not be much bread on the shelf, but the less there is to share with the mice. The threepenny packet is dear enough to them. The chemist who "considers the poor" is not necessarily mean nor almost mad. The transaction may not pay *per se*. At what price is the dispensing of a prescription for two pills remunerative? The leaven of Mr. Fitch's example might work in its own sphere, and the expression of personal opinion might pass without notice; Mr. Fitch, however, does not write as a private individual, but as "divisional secretary, etc." One dreads the consequences of an official anathema, on the *omne ignotum* principle. Henry H. Pollard.

Communications, Letters, etc., have been received from Messrs. Squire, Preston, Alcock, Flemon, Wilson, Porter, Benger, and Quiscus.

The Pharmaceutical Journal,

SATURDAY, NOVEMBER 1, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF POISON BY THE UNQUALIFIED ASSISTANTS OF MEDICAL MEN.

AMONG the objections which have been raised to the action taken by the Council of the Pharmaceutical Society in the WHEELDON case, that based upon the supposed immunity of medical men keeping open shops has been much dwelt upon, because it was thought to involve a distinct injustice to chemists. When it is remembered that the business carried on by many medical men is to a great extent the same as that of the chemist and druggist, it must, indeed, be admitted that if a medical man were lawfully entitled, when acting in the capacity of a chemist and keeping open shop, to delegate the sale and dispensing of poisons to his unqualified employés, the chemist would be subjected to some hardship in being denied the same latitude. What is requisite for ensuring the public safety may be for the moment left out of consideration in dealing with the relative position of registered chemists and of medical men keeping open shop in virtue of their exemption from the provisions of the first fifteen sections of the Pharmacy Act, 1868. But in regard to this point it has been repeatedly pointed out that there is really no ground for supposing medical men keeping open shop enjoy any greater immunity from the provisions of the Pharmacy Act than registered chemists. There has, however, been an unaccountable reluctance to accept this view of the matter. The result of the prosecution recently instituted in Glasgow will probably be more effectual in correcting the opinions held on this subject, and in showing the real value of the interpretation put upon the Pharmacy Act by Justices HAWKINS and POLLOCK.

The case referred to is fully reported at page 371 and it is here only necessary to say that the seller of poisons who was charged with infringement of the Pharmacy Act on the ground that he was not registered, was alleged to be the assistant of a medical man keeping an open shop for the sale and dispensing of poisons. The defence was in accord with the erroneous opinion above mentioned, that the medical qualification of the proprietor of the shop entitled him to keep a druggist's shop without a qualified assistant. The Sheriff took a totally different view of the exemption of a medical man from the provisions of the Pharmacy Act, and held that it does not in any way entitle him to put an unregistered man into a shop to sell poisons. It is, moreover, worth notice in regard to this contention for the defence that it was not in accord with the declared practice of the proprietor to direct his assistant not on any account to dispense poisons. This direction does not, however, appear to have been much attended to, and on four separate occasions medicine containing poison was dispensed by the unqualified assistant and sold by him. Upon this ground the prosecution was instituted, and though some facts came out in cross-examination to suggest a doubt whether the business really belonged to the medical man or to the defendant—any uncertainty there may be on this point does not detract from the importance of the case in showing that the provisions of the Pharmacy Act are amply sufficient for preventing the sale of poison by unqualified persons, whether or not they be the servants of registered chemists and druggists or of medical men keeping open shop for that purpose. That being the case, the objections to the interpretation of the law in the WHEELDON case lose any force they may have seemed to possess under the erroneous assumption of the unequal operation of the Act.

But there are yet other useful lessons to be learnt from the case, especially in regard to the question that has so often been asked as to what constitutes superintendence in the sale and dispensing of poisons. Sheriff BALFOUR, before whom this case was heard, does not appear to have experienced any great difficulty in answering this question. According to his opinion the gist of the decision in the WHEELDON case is that an unqualified person can sell poison if he acts under the "personal supervision" of a duly qualified employer or his qualified assistant, and he further adds that personal superintendence means not mere presence in the shop where the sale takes place, but actual supervision, so that every individual sale of poison may be guarded by the precautions prescribed in the Act to provide for the safety of the public, so far as the law can accomplish that object. Even the alleged participation of the medical man, who claimed to be the proprietor of the shop, in the dispensing of the poisons for the sale of which the prosecutions were instituted, was held by the Sheriff to be far short of what is requisite to justify the sale of poisons by an unqualified person. Taking the most favourable view of the evidence given on this point, he held that it would not have pointed to such personal supervision as Mr. Justice HAWKINS declared to be essential. The decision in this case ought to disabuse the minds of chemists of the feeling that has prevailed as to the inutility of the Pharmacy Act for the suppression of practices injurious to them and as to the indisposition of the Council of the Pharmaceutical Society to enforce its provisions for their benefit.

ALLEGED IMPENDING POISONS BILL.

The London correspondent of the *Manchester Courier* writes to that paper in reference to some important information he has received, from a source which he thinks must be regarded as absolutely trustworthy, concerning a Bill which is to be introduced into Parliament in relation to the sale of poisons. After premising that this matter is one of much importance to the public, he goes on to say that the present law does not go beyond the requirements that certain specified substances, defined as poisons, shall not be sold at all, except by legally qualified persons, and with the observance of certain precautions as to labelling and in recording the sale. The supply to the public has not been interfered with by Parliament, and it has only enacted how certain poisonous substances may be sold. Then it is stated that in the new Bill three further important suggestions are to be made, to the effect that certain substances should not be supplied except upon the order of a qualified medical practitioner; that not more than a specified quantity of certain substances should be supplied to the same person within a given time; and that the onus of determining the limits of the supply of poisonous substances in each particular instance should be thrown upon the seller, he being held responsible when a proper limit has been exceeded. Lastly, it is stated that it will probably be proposed that the punishment for an offence should be the deprivation of the licence to sell poison. This would be rather startling news if there were reason to accept it as well founded; but it appears more likely that the proposed provisions which have been assumed to form the subject of a Bill to be introduced into Parliament are really taken from a memorandum on the subject of the sale of poisons submitted to the Parliamentary Bills Committee of the British Medical Association by its Chairman, Mr. Ernest Hart, at a meeting which took place on the 14th October. The suggestions put forward in that memorandum are however to be regarded as more of a tentative nature than as material for the drafting of a Bill to be introduced into Parliament, and chiefly intended to raise the discussion of some defective features of the existing law on the subject of poisons, or of its application, such, for instance, as the sale of medicines containing poisons as secret preparations under the Medicine Stamp Act. As space does not admit of further reference to this document in the present number, its consideration must be deferred until next week.

In consequence of the unusual pressure of matter requiring immediate publication, necessitating a supplement to this week's Journal, we are compelled to postpone until next week the usual article on "The Month." This is also the case with the very interesting paper read by Mr. Blunt at the last meeting of the Chemists' Assistants' Association on "Stereo-Chemical Theories," a subject of very great importance, which has not hitherto received in this country the attention it demands.

* * *

It will be seen by reference to an announcement on another page that on Monday evening next, at 9 o'clock, a meeting of gentlemen interested in the Chemists' Ball will be held at 17, Bloomsbury Square, for the purpose of making preliminary arrangements. Any gentleman desirous of becoming a steward, but unable to be present at the meeting, should communicate his wish to the Honorary Secretary, M. W. H. Francis, 38, Southwark Street.

* * *

We are requested by Mr. F. Andrews, the Honorary Secretary of the Western Chemists' Association (London), to state that on Wednesday next, the 5th November, a meeting will be held at Browning's Westbourne Restaurant, Spring Street, Paddington, to consider and discuss the proposed Pharmacy Act Amendment Bill. All chemists and druggists in business are earnestly invited to attend, whether they be members of the Association or not, and the Committee desires to call especial attention to that invitation in case the notices sent out may have been insufficient to make it generally known.

* * *

We are pleased to be able to state that the name of Mr. John Stevenson, chemist and druggist, of Whitby, Local Secretary to the Pharmaceutical Society, has been added to the Commission for the Peace.

* * *

It would appear that as a consequence of the occurrence of some cases of poisoning, the Pharmacy Board of New South Wales has recommended that certain proprietary vermin killers containing strychnine should be treated as "patent" medicines and included under their commercial names in a special schedule to the colonial Poisons Act. The *Australasian Journal of Pharmacy* calls attention to the inadvisability of this course, and points out that if the position were once granted that such compounds do not come under the same regulations as other preparations of scheduled poisons, a vermin killer that was scheduled under a particular name one day might be sold with impunity on the next under a slightly altered designation.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday, November 6, at 9 p.m., when a paper will be read on "The Chemistry of Organic Dyes," by F. W. Passmore, Ph.D., Mr. Alfred H. Allen having been compelled to postpone his paper on "Our Breakfast Beverages," originally fixed for that date. The annual Conversazione of the Association will take place on the 13th November at the Portman Rooms, Baker Street, commencing at 8 p.m. From 8.30 to 10.30 there will be a concert, and after that there will be dancing.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October 15, 16, 17, 22, 23 *and* 24, 1890.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 15th and 22nd on behalf of the Privy Council.

MAJOR EXAMINATION.

15th.—Four candidates were examined. *Two* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Haslitt, Harry Haworth	Bury.
Shrubsole, Alfred	Chester.

16th.—Four candidates were examined. *Two* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Pears, Harry William Kilby	Brighton.
Riding, William John	Ormskirk.

17th.—Four candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Hocking, Francis Almond	London.
Shepheard, Wm. Fredk. John	Chester.
Williams, William George	Hirwain.

MINOR EXAMINATION.

15th. — Twenty-five candidates were examined. *Twelve* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ames, John Charles	Bath.
Anthony, Thomas	St. Austell.
Argles, Woodfield Henry	Aylesbury.
Atkinson, Joseph Andrew	Spilsby.
Banks, Hervey Lowndes	Stockport.
Barrett, Allan Lifton	Hay.
Blissett, Francis Howman	Bristol.
Briggs, Alfred Henry	Blackburn.
Bygott, Walter Frank	Barton-on-Humber.
Cherrett, Ernest Robert	West Hartlepool.
Churchyard, Arthur Ernest I.	Norwich.
Clarkson, Newton	Richmond.
Cooker, Harris	Earlsheaton.

16th. — Twenty-seven candidates were examined. *Sixteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, Arthur Miller	West Malvern.
Crosland, William Howard	Darlington.
Dalton, Robert	Wilmslow.
Darroll, George	Thame.
Davis, Joseph	Birmingham.
Day, William	Hull.
Dean, Thomas Henry	Hemel Hempstead.
Drury, George John	Scarborough.
Edwards, Samuel	Godalming.
Firmin, Harold James Penny	Bromley.
Frowde, John James	Douglas.

17th.—Twenty-five candidates were examined. *Sixteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allen, James	Wrington.
Care, Harry Bristow	London.
Coltman, William Thomas	York.
Davies, Evan Francis	Llanybyther.
Grammer, Frank	Newark.
Griffin, James Frederick	Birmingham.
Hoole, Herbert Edward	Sleaford.
Hopkinson, Joe	Rishworth.
Hulme, Thomas	Manchester.

22nd.—Twenty-six candidates were examined. *Nineteen* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Charlesworth, H. Hodgkinson	Tunstall.
Knott, Herbert	Bolton.
Knowles, Henry Percy	Birstall.
Lee, George West	Melton Mowbray.
Lewis, Samuel Judd	London.
Lucas, Albert	Derby.
Watson, Edward	London.

23rd.—Twenty-nine candidates were examined. *Sixteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Beale, Harry Wilson	London.
Mitchell, Walter Richard	London.
Moir, William Sinclair	Aberdeen.
Pick, Alfred	Chester-le-Street.
Polley, Thomas Edgar	London.
Reay, John	Brampton.
Richardson, Hubert Naylor B.	Leicester.
Riding, John	Preston.
Robbins, Percy John	London.
Rollett, Harry	Lincoln.
Sewell, William John	Barton-on-Humber.
Seymour, William Herbert	London.
Watson, Edwin Joseph	Birmingham.

24th. — Twenty-eight candidates were examined *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Sharland, William Cragg	Auckland.
Spivey, Fred	Huddersfield.
Stanley, John	Goole.
Stockdale, Richard	Skipton-in-Craven.
Temple, Arthur William	Thrapston.
Thomas, William Walter	Aberystwith.
Truscott, William Hearle	Southampton.
Uren, Ernest Frederick	Hayle.
Watson, James Edward Henry	Norwich.

PRELIMINARY EXAMINATION.

Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Barton, Albert Henry	Doncaster.
Brooks, Albert Henry	Swindon.
Cathro, Thomas Gorrie	Dundee.
Coates, Arthur James Wm.	Baslow.
Dyson, Thomas Hatfield	Ilkley.
Fisher, Ernest Hunter	Blackheath.
Gane, Eustace Harold	London.
Gibson, Walter Leonard	Loughborough.
Hales, Walter	Hemel Hempstead.
Hallaway, Robert Railton	Carlisle.
Kellett, Thomas Henry	Bishop Auckland.
Langworthy, George	Kingsbridge.
Leech, Peter	Ulverston.
Musham, John Gilbert	Beverley.
Padley, Gillies	Boston.
Richards, John	London.
Shakespear, William	Birmingham.
Smith, John Henry	London.
Sugden, Henry	New Church.

Thorpe, Albert	Boston.
Wills, Alfred George	London.

The Report of the College of Preceptors on the Examination held on October 14 was received.

Three hundred and eight candidates had presented themselves for examination, of whom *one hundred and seventy-three* had failed.

The following *one hundred and thirty-five* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Allan, William Ditchburn	Dundee.
Allen, Frederick	Clevedon.
Allen, John Harry Stanley	Leicester.
Andrews, Silas Fred	Chatham.
Appleton, George Webster	Attercliffe.
Ashby, Charles Edmund	Weston-super-Mare.
Ault, Percy	Mansfield.
Bain, James	Motherwell.
Ballingall, Andrew Watson	Glasgow.
Barrett, Charles Henry	Sydenham.
Beddard, William Henry	Wolverhampton.
Bell, Arthur Henry	Mansfield.
Bell, Lilian Ambrose	Cambridge.
Bennett, Sidney Bailey	Widnes.
Billings, Sydney James	Cheltenham.
Boulton, Howard	Nottingham.
Bowen, Edgar Cecil	London.
Bray, Edwin John Rogers	Saltash.
Brice, Henry Doyle	Guernsey.
Brown, Herbert	Blackpool.
Brown, Joseph Robert	Oakham.
Bryce, John	Glasgow,
Burnage, William Arthur	Newport (I.W.)
Busby, Henry Lewin	Harpenden.
Buttress, Henry James	Portsmouth.
Cameron, Lewis	Aberdeen.
Carmichael, Duncan	Aberdeen.
Carver, Ernest Wing	London.
Collins, William Hugh	Narberth.
Crofts, John Henry	Douglas.
Curtis, Arthur	Lowestoft.
Davidson, James	Keith.
Davies, Percy	Sheffield.
Davis, Richard Llewellyn	Brecon.
Day, Arthur	Boston.
Dent, John	Manchester.
Duck, Frederick Edwin	Hull.
Dutton, Herbert Goddard	Birkenhead.
Edgar, William Ernest	Southport.
Ellis, Hugh Edward	Aberystwith.
Evans, Ralph James	Croydon.
Ferguson, William	Motherwell.
Ferrier, James	Brechin.
Fidélia, Paul Louis	London.
Fieldhouse, Willie	Bradford.
Fisher, John William	Hugglescote.
Foster, Ernest Upsall	Horncastle.
Fowles, Frederick William	Liverpool.
Fulleylove, George Ernest	Netherton.
Gauld, James	Huntly.
Gibson, George Pittendrigh	Buckie.
Haig, William Nicolson	Edinburgh.
Halford, Robert Sidney	Birmingham.
Halley, Robert	Aberdeen.
Hartness, John Benn	Chester.
Harvey, William Whilton	Derby.
Heddle, James Saml. Baikie	South Ronaldshay.
Heely, John	London.
Hick, William Henry H.	London.
Hodges, Arthur James	Dover.
Hodgson, John Birtwell	Blackburn.
Inns, Sydney Walter	Leighton Buzzard.
Irvine, James	York.
Izon, William	Worcester.
Jennings, Cornelius	Birmingham.
Jesper, Charles Frederick	Manchester.
Johnston, Robert	Longtown.
Jones, Arthur Amos	Carnarvon.
Jones, David Pryce	Chester.
Jones, Ivor John	Blaenau Festiniog.
Jones, Robert Griffith	London.
Kirton, Amy Adeline	Birmingham.
Lane, Herbert	Princes Risborough.
Lassasie, Laura Leonié de	London.
Laurie, James Alexander	Montrose.
Littlefield, Robert Dexter	Ventnor.
Long, James Christmas	Boscombe.
McNaughton, David E. F.	Dundee.
Malins, Templar Edward	Newport (Mon.).
Mayor, Joseph Challoner	Sheffield.
Mercer, James Anderton	Liverpool.
Michie, Lawrence Pithethly	Kinross.
Millar, John	Port Glasgow.
Miller, Thomas	Berwick-on-Tweed.
Milner, Jonah	Consett.
Monk, Alphonso Theodosius	Accrington.
Mortimer, Albert Edward	Liversedge.
Mullord, Charles	London.
Mycock, George Arthur	Sheffield.
Newton, Francis Herbert	Salisbury.
Nicholson, Thomas	Lancaster.
Obrien, Edward	Dundee.
Oliver, Joseph	Hull.
Parry, Lewis	Liverpool.
Payne, Roger	Saffron Walden.
Pilcher, Franklin	Ashford.
Pilkington, John, junr.	Buxton.
Plowman, Charles William	Malton.
Powell, William George	Bristol.
Pratt, Ernest	Leighton Buzzard.
Priestley, Arthur Henry	Burnley.
Proctor, William Turner	Morpeth.
Prophet, William Todd	Forfar.
Purnell, Austin	Clevedon.
Rees, John Melbourne	Swansea.
Robertson, Robert	Edinburgh.
Rogers, Frank	Petworth.
Scott, Philip	Anstruther.
Sholl, John Paul Cock	Penzance.
Siminson, Albert Henry	Warminster.
Simon, Henry	Guernsey.
Simpson, Henry Sheffield	Leeds.
Smith, Philip Sidney	Gainsborough.
Snow, Harris Charles	Maldon.
Taylor, Arthur Frederick	Bradford.
Taylor, James Edward	Neath.
Thomas, Isaac Evan	Llandyssul.
Thomson, Thomas	Lerwick.
Topping, Walter	Platt Bridge.
Trewin, Frederick Thomas	Brandiscorner.
Tucker, Frederick V. George	Pembroke.
Waddington, Fredk. Pollard	Bradford.
Wainwright, Percy	Castleford.
Walker, John Robert	Cockermouth.
Watson, Charles	Boston.
Wells, Robert Joseph	Forest Gate.
White, Gilbert	Litcham.
Wild, Charlie Collins	Manchester.
Wilkes, Tom Wilmot	Ellesmere.
Willford, Harry Edwin	Thorne.
Wilson, John Lochhead	Irvine.
Wishart, John	Insch.
Wright, John Todd	Whitehaven.
Wright, Wilfred Wadkin	Wakefield.
Wyatt, Frank L.	Manchester.

The questions set at this examination were published in the *Pharmaceutical Journal* for October 18, p. 314.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	17	8	9	Jersey	1	0	1
Birmingham	15	5	10	Lancaster	5	2	3
Brighton	2	1	1	Leeds	20	7	13
Bristol	11	5	6	Lincoln	2	2	0
Cambridge	4	2	2	Liverpool	13	8	5
Canterbury	4	2	2	London	44	15	29
Cardiff	10	3	7	Manchester	21	9	12
Carlisle	7	3	4	Newcastle-on-T.	11	2	9
Carmarthen	6	4	2	Northampton	2	1	1
Carnarvon	7	2	5	Norwich	6	2	4
Cheltenham	1	1	0	Nottingham	12	6	6
Darlington	3	0	3	Oxford	1	1	0
Douglas	1	1	0	Peterborough	4	2	2
Dundee	8	6	2	Sheffield	10	5	5
Edinburgh	14	6	8	Shrewsbury	5	2	3
Exeter	4	2	2	Southampton	10	5	5
Glasgow	8	6	2	Truro	4	1	3
Guernsey	2	2	0	Worcester	1	1	0
Hull	8	3	5	York	3	2	1
Inverness	1	0	1				

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

Visit of Mr. Carteighe.

On the invitation of the Manchester Pharmaceutical Association, over 200 chemists of Manchester and district assembled at the Grand Hotel, on Tuesday afternoon last, to hear an address from Mr. Carteighe, the President of the Pharmaceutical Society. Among those present may be mentioned Mr. F. Baden Benger (chairman), Mr. G. S. Woolley, Mr. Hermann Woolley, Mr. C. A. Johnstone, Mr. H. Kemp, Mr. W. Arrandale, Mr. W. Bowden, Mr. G. H. Westmacott, Mr. H. Wilson, Mr. James Hart, Mr. J. W. Pratt, Mr. Charles Swinn, Mr. W. Stones, Mr. W. Bamford (Rochdale), Mr. W. Bostock (Aston), Mr. Thomas Kay (Stockport), Mr. J. Rymer Young (Warrington), and many others from surrounding towns.

Mr. F. Baden Benger (the chairman) called on Mr. H. Wilson, who said he had received letters of apology, expressing inability to be present, from Mr. J. L. Slack (Manchester), Mr. W. Spencer Turner, Mr. W. Kirkby, Mr. W. Wilkinson, and also from Mr. John Laurie, the local secretary for Blackpool, who wrote—"I hope you will have a most successful and representative meeting of the retail druggists of Lancashire, and that the result may be a better support of the Pharmaceutical Society in its labours to improve the position of the pharmacist, and a fuller appreciation of the truth that the lines upon which the Society is trying to benefit the trade are the only ones which can give permanently good results. I think the time is coming when the most valuable commodities which the pharmacist will have to offer to the public for sale or hire will be his education, skill and conscientious appreciation of the responsibility of his calling; these will do more to secure for him a monopoly of the dispensing of medicines than any Act of Parliament will do. I think that pharmacists often estimate their services and responsibilities too cheaply. In many cases they sneer at and carry out the 'poison regulations' in a most perfunctory manner, instead of taking advantage of them to impress the public with the importance of their calling. The day of fancy profits on drugs and druggists' articles is past; in these days the public knows somewhere about the real market value of these. No doubt the fancy price was an indirect method of paying for the pharmacist's time and skill, but I think it would be wiser now to base our charges straightforwardly on time and skill. However, the pharmacist must not expect the public to put a very high money value on his services, or to refuse to have its medicines dispensed by the doctor's groom or cook, so long as he insists on demonstrating to it that his apprentice, of perhaps two years' experience, to whom he pays no wages, and who probably is known to most in his neighbourhood as having repeatedly failed to pass an easy examination in general education, is fit to be left in sole charge of his master's business, to give to the public the same full value for its money, the same safety and efficiency as the pharmacist himself can give."

The Chairman said: Gentlemen, in taking the chair this afternoon I must first of all express my great regret—a regret which I am sure you will all share—that the President of the Manchester Pharmaceutical Association, Mr. W. S. Brown, is prevented by illness from occupying this place. Most of you will remember the kindliness and heartiness with which in former days Mr. Brown was wont to enter into any movement which had for its object the advancement of pharmacy and the welfare of pharmacists, not only when he was well and strong, but at a later period when his attendance at our meetings often caused him much personal inconvenience, and even physical pain. I am sure that though he is absent in the body to-day he is with us in the spirit. And now my duty is a very small and a very pleasant one. I have not to unveil the portrait of the President of the Society, as was lately done in London, but to present the man himself, and of all men in this country there is not one that stands less in need of an introduction to an audience composed of pharmacists than does Mr. Carteighe. I may add there is no one who deserves to be listened to with more attention and respect. It would be a piece of impertinence on my part were I to ask for that which I am sure you are all ready and waiting to give him—a careful and attentive hearing. Mr. Carteighe is going to speak to us on pharmaceutical matters, the policy of the Pharmaceutical Society. This is not a subject to which he has given the mere bits and scraps of his leisure, but it is one which he has latterly made the business of his life. He has not sought cheap popularity by agreeing with everybody, but he has acted on his own convictions, and he has the courage of his opinions. He is able and willing to give us the reasons which induced him to come to certain conclusions, but, like all wise men, he is glad to hear what can be said on the other side, and I have his word for it that after he has briefly addressed us this afternoon he will be glad if this audience will freely express their views on the subject he will introduce. Of course he will be glad to hear those who agree with him, but on the other hand he will be glad to hear those, if there are any present, who entertain opposite or different or modified views on this subject. I will not detain you longer, but will at once call upon Mr. Carteighe to give his address.

Mr. Carteighe: Mr. Chairman and gentlemen, there is just one little exception that I perhaps may take to the observations which you have so kindly made about myself, and that is that I think perhaps, with your permission, it would be better for me to confine my observations in the first place to an explanation of the draft Pharmacy Bill, and then, if it is the pleasure of the meeting, to discuss any of the subjects affecting the trade which are not referred to in this Bill, or not capable of being dealt with in Parliament, I shall be ready and willing, and even delighted, to take part in the discussion. I think you will understand it will perhaps be a little difficult for me to mix up trade matters in connection with this particular Bill. I am not here to-day to ask you to support this Bill, or approve of it, or in fact in any way to influence your judgment beyond this: I am asked, and I consider it a great honour to be asked, to come here to explain its provisions, and at the end of the meeting to take part in any conference amongst ourselves on the Bill itself, or upon any other trade matters that are not dealt with in the Bill. Therefore you will please understand I am your guest at this meeting, that I cannot take part in it beyond explaining, and if I speak either warmly or emphatically it is not that I want to influence you; but rather that I want you to feel the force of my views, and the views of the Council which I represent here to-day. You will all, I hope, believe me when I say that I represent in this meeting in regard to this Bill the Council of the Pharmaceutical Society. That in a body of twenty-one gentlemen there should be differences of opinion as to the extent to which we should go in any Bill asking for increased powers is probably only natural. There was a time when politicians were in the habit of saying that it was better to have half a loaf than no bread at all, but among some of our pharmaceutical friends there seems to be a disposition to lose sight of this fact and to feel that it is of no use to work for half a loaf unless we can get the whole, or, in fact, plenty of bread. It will be my purpose to point out to you in reference to this Bill that it is a Bill of a modest character in many respects, and one which, if passed through the House of Parliament, will confer very great advantages upon every person who is registered as a chemist and druggist. When I say that, I refer to every clause of the Bill. The difficulty in dealing with legislation from a pharmaceutical point of view arises from the fact that those of us who are old enough, and so engaged in business as to feel the pressure of certain forms of competition which are now very prevalent, naturally look at our immediate personal benefit as the first thing to be aimed at in going to Parliament. Now you know that is just one of the things which it is exceedingly difficult to force; for, to take the parallel of the loaf, even in the case of a starving population the people in the neighbourhood do not go to Parliament for relief until after the starvation has been relieved by local measures. You will remember that when the Pharmacy Act of 1868 was passed a very large number of persons were registered who no doubt did sell and dispense poisons; but on the other hand I have no doubt there were many who did this to such a small degree that probably they would hardly be regarded at the present day as having been what we regard as legitimate chemists and druggists. Please do not misunderstand me. I do not want to impute any want of faith on the part of those who applied to us. You must remember the Pharmaceutical Society, in promoting the only Bill it was able to promote, the Poisons Bill, was generous enough, as I think, to register every person engaged as a chemist and druggist throughout Great Britain without the slightest expense to that individual. He was not charged 6*d.* His rights were preserved by statute. He was put upon the register, and that register is kept up by the Pharmaceutical Society without any contribution or any form of monetary payment from that individual. I contend that that was not an ungracious act on the part of the Pharmaceutical Society. I am sure it showed that it was desirous of consulting the feelings and the peace and comfort of every member of the trade, and that it was anxious to show the trade at large that its object in going to Parliament was not to become a rich corporation with exclusive privileges, but to confer benefits without cost to those who were already in the business. I say at that time an enormous number of persons were registered, and since that time, of course, a great many have died. A great many new men, too, have presented themselves for various examinations, and have become registered and are in business, and at this moment we have on the register a very large number of men who have gone through a course of more or less irregular training and have ultimately passed an examination. It has been contended by myself and by many of my predecessors in the presidential chair, that whatever Parliament may do for us, whatever Parliament may be compelled, or squeezed, or coaxed, or cajoled to do for us—because Parliament to some extent is our natural enemy, it represents public opinion—I say whatever we may be able to get out of Parliament by combined action is, of course, desirable, but the weapons of the individual are those which, on the whole, in the battle of life, will do him the most good. Therefore in any future legislation, and in attempts at legislation that have been made during the past six or seven years, the Council of the Pharmaceutical Society has endeavoured to increase what I may call the armaments of the young chemist and druggist, and I am bound to say in doing that it has not proposed to do anything permanently and directly for the chemist and druggist in business. But it may be asked by those who are in business, What is the good of examining a good chemist? My answer is that this is one of the best ways of increasing the respect which the public have for you who have passed an examination, as well as for those who have not been obliged to do it. If we present to the public and to the House of Commons a statement of what we have to do in order to be qualified, we are thereby in a better position to claim exclusive privileges, than if we simply examined men without their being educated men. I hope my friends will understand what I mean by that. I am bound to tell you as an old examiner the results of our work have proved up to the hilt to me that our men are examined men, but as a class are not educated men—not in the sense in which I should wish to see them. That being so, the intelligent public is able to pluck them in a sense and to estimate the value of their services proportionately. A better educated class of chemists and druggists tends at the threshold to restrict the number of incompetent persons who wish to enter the craft. I submit to you that the very object of examination is to restrict—to keep out people—and that during the last twenty-two years the Pharmaceutical Society has practically kept out an enormous number of men, whom for the purposes of law we must call incompetent. Some have gone away entirely. The majority of those who fail one or twice are obliged in the nature of things to go on pegging away and working in various ways, not always the best ways, to pass their examinations, and so they drift away into a class of people represented not only by broken-down chemists and druggists, unqualified, but by broken-down medical men, unqualified, and they constitute the pirates of the drug trade. They become the unseen people who practically sap the foundations of the true business life of a chemist and druggist. They are at the beck and call of any broken-down medical man who is registered, either at a bogus dispensary, or assisting in the formation of a bogus company. The number of those men of course has increased enormously, in proportion as they fail to pass the examinations; and I shudder to think what a residuum there must be at the present moment of men who were ignorant of what was required to become registered. I mean that when they entered the trade they were ignorant. That is a misfortune; but there it is. Ignorant of what was required, and obliged to spend the whole of their time during apprenticeship in trying to pass the Preliminary examination, and then going on working to pass the Minor, sometimes in the one and sometimes in the other, and very often in both they fail over and over again. What is the good of telling these men to go out of the trade? They say, "We have come into it. The capital of our lives is invested in it. We were apprenticed to a master. We paid our premium or gave our services, and we know nothing else. We cannot even become grocers in the sense of being smart men of business. We have not been trained." I think this is a just cause of complaint. As I sit in the chair at the meetings of our Boards of Examiners and hear rejected candidates tell me their experiences, I am ready to cry at two things—first, at the weakness and folly of parents in expecting to get bread out of stones; and secondly, at the want of judgment, not to use a harsher term, of men in business who will have apprentices whether they are fit or not. Because, remember, gentlemen, every apprentice that we take who is unfit to pass the Preliminary examination when he comes to us, who has not had the education needful to become a decent chemist and druggist, is a man who is likely to be our most troublesome neighbour in the town or city in which we live. I want to put it on this ground. The restriction to a certain extent, and the qualification of apprentices is of the highest importance to us as a trade. I hope I have made that point clear. I do not know what the custom is in other towns, but in London the best handicrafts are so arranged that no youth is admitted as an apprentice to that craft if he is over fourteen years of age, and he is not bound, and will not be taken for a shorter period than seven years. I could name, perhaps, the most important handicraftsmen in London, printers—compositors and others. These men will not allow an apprentice except on these terms, and no one can compel them. It is a custom. There is no law about it. They agree amongst themselves that an apprentice shall not be taken over fourteen, and they contend it requires seven years of steady work to acquire a knowledge of their craft. The result is that the man who goes through the mill is a good man, is able to earn good wages, is in the best market, while the man outside is not in it. I leave you to judge whether that is good business on the part of a particular trade or whether it is not. To me it seems good for the public and good for the men themselves. It may be said that it savours a little of trade unionism. It is far better to place difficulties at the threshold of any particular calling requiring technical skill than to let a youth go on until twenty-one before he knows what it is necessary for him to do before he can earn his living. I suppose you agree with me that to all intents and purposes a chemist and druggist cannot obtain his living in this country unless he is registered. For other work we have to do there are plenty of boys who can become errand boys and develope into intelligent porters, but from the point of view of the chemist and druggist we must have a man who can go through the examinations and can comprehend what is required of him, and can at the end of his time pass the examinations and become a registered person, competent to sell and dispense poisons. These remarks are brought to my mind with reference to the first two clauses of this Bill, which are the clauses of a Bill which was popularly called the Curriculum Bill in former years, but which embraced somewhat more than that. The intention of these two clauses—I am sure I need not weary you by reading them, I am quite sure you will take my word for the fact—their intention is to obtain the power to advance the examinations, so that during apprenticeship a man may pass a portion of his qualifying examination and be stimulated to do a little work during apprenticeship before he is twenty-one, and also that there should be power to interpose, by bye-laws to be made hereafter, such a period of time between any parts of the examination —say the Preliminary and qualifying parts—as may be deemed fit. What we mean by that is broadly this. We cannot ask the Legislature to say that all chemists and druggists shall be fined who take an apprentice who has not passed the Preliminary examination. I am afraid no one would listen to that. I am afraid you would not accept it. But we can deal with a candidate and say that no man shall present himself for the qualifying examination before three or four years have expired after he has passed the Preliminary, and, in fact, that will very largely meet the case. We are anxious to put, as far as we can, a little pressure upon the individual, so that if he does not pass his Preliminary examination early his chance of qualification is put back so late that it is hardly worth his while to get it. In fact, our general desire is that we shall be able to hold up to parents and guardians, roughly speaking, a syllabus of what the apprentice has to do, and if, when that apprentice is examined by his future master, or contemplated master, his school education is found to be of such a character that in the opinion of his master he will not do, then the parents take the responsibility if they bind him. Everybody then knows what he is about, and the candidate knows what is before him. If we adopt that plan we shall thereby do what is just. We shall assist the chemists and druggists in obtaining from the public that proper consideration for services rendered which I believe is very often not paid. I mean to say that proper attention on the part of the chemist or druggist paid to the pupil or apprentice means brains and labour on the part of the principal, and should be properly recompensed. Therefore it follows from what I have said that I hold that when a man comes to me with the suggestion that his son should be apprenticed he should be in a position to pay—if the son lives in the house—a certain premium, or that the father should be in a position to keep his boy if he is outdoor. In other words, I claim that it is not to the interest of any one of us to convert a mere errand boy into an apprentice; that it is a most dangerous policy for outsiders and a mistaken kindness to the errand boy. And under these circumstances the Council has proposed to ask Parliament to give it power to make bye-laws. These clauses are very wordy and troublesome reading. They mean nothing more than that we should have power to make bye-laws to meet those particular cases. These bye-laws I need not remind you would have to be considered by the Council three times. They would have to be submitted to a special general meeting of the members and associates of the Pharmaceutical Society in general meeting and approved; and lastly, on the part of the Government and the public, they would have to be approved by the Privy Council. Therefore, I think, I may assume that such bye-laws could never be passed at any future time unless they represented equitably the views of the whole trade. The next clauses refer entirely to a question which has often been raised as to the consolidation of the Pharmaceutical Society itself. We are asked by some of our critics, "Who cares whether we are members or associates of the Pharmaceutical Society? What do we care about these titles?" I do not know what the present generation does care, but I have met with a great many intelligent and intellectual men, who by accident have not been able to present themselves for the Major examinations and to become pharmaceutical chemists, whom I should be very glad to see members of the Pharmaceutical Society. I have met them in actual experience. What do I remember in my young days? The very best Pharmacy Bill ever put in print was ready to be introduced by a minister of the Crown, promoted by the Pharmaceutical Society, and that Bill was wrecked because the members of the trade who did not belong to the Pharmaceutical Society wanted to have all the privileges of membership, wanted to be made pharmaceutical chemists, and the Council of the Pharmaceutical Society at the time could not meet their wishes. The examined men of that time declared that they held a certain position, that it was unjust, and all the rest of it, and practically the Council was unable to accede to the request. Well, the effect of that was that an agitation sprang up, an opposition society was founded, and the result was a sort of internecine war, in which I took a very large share and in which I had much to do in bringing very many excellent members of the trade who did not belong to the Society into close accord with the Society. I say that the result was not a good Pharmacy Bill, but a very indifferent Poisons Bill. Therefore if you tell me now that after twenty-five years titles mean nothing, that the question as to whether a man is to be a member or associate of the Pharmaceutial Society has no effect upon those members of the trade who wish to join it, I will accept it if you say so, but at the same time remind you that on this question of titles the best pharmacy measure ever brought forward was actually rejected by the trade. It was a Bill to limit the compounding of prescriptions and the sale of simple compounded drugs, and that Bill was drafted at the request of the Medical Council, who put pressure on the Government to say that there ought to be legislation in regard to pharmacy, and that there should be none of those curious anomalies which allowed only chemists to sell the poisons in the schedule, but anybody to sell a very potent thing very nearly a poison outside the schedule. If the question of title was enough to cause the trade to oppose the Pharmaceutical Society, and to prevent that unanimity without which no Bill can pass in Parliament, I submit we are justified in considering the terms under which the various grades of our body shall be admitted in future into the Society. And we propose that inasmuch as the qualification for keeping open a shop is now the Minor examination—that is 'the chemist and druggist's examination—whereas in the early days of the Society, and after the Act of 1852, the Major examination was the only qualifying examination (because some of you who are old enough will remember the Minor examination was called the assistants' examination); seeing that it was the pleasure of Parliament to knock away the Major altogether, and say the future qualification for chemists and druggists should be the Minor or lesser, I say seeing that to be the case, and seeing the progress made in education, I think I may fairly appeal to every Major man who, like myself, has been examined and done his share of ordinary work, to say at once with me that it is desirable such men should enter into the Pharmaceutical Society as brothers, on the same footing and with the qualifications of members. And let me say we submit this to you and to our friends throughout the country, not because the present grade of associates in business happens to be the larger of the two. It is not that. It is simply because we think it is a useful and right thing. We admit that a pharmaceutical chemist to some extent is a more advanced man. He has gone further than is required by law. But it does seem to us that when the law has said a person is competent to keep open a shop, the grade of "associate" in a body like ours is an implication that he is a man who has some other qualification to get before his complete qualification is arrived at. He is entitled to ask to become a member, and it is to our interest to welcome him into our Society. I may say further, that this very proposition was actually broached, and, in fact, formed part of one of the draft Bills in the year 1867 that were to be presented to Parliament. But at that time a good many of our own members—the Major men—objected. It was proposed in fact in one of the clauses, that every person who passed the Minor examination in future should be registered as a chemist and druggist and should be eligible to become a member. At that time our young examined men were disposed to think we were giving too much away. They were too strong for us, and we had to compromise the matter by simply enabling chemists and druggists who were in business at the time of the passing of the Act to become members, and all other persons who passed the Minor were to be associates. In spite of this, I am sure it is a source of satisfaction to tell you that we have a very large number of subscribers as associates in business, and these men have, of course, all the privileges of members except that of being on the Council. They have the same privileges so far as voting goes and all that. But I do maintain, in regard to title, that when a man has a claim to keep open a shop the grade of associate is not well adapted to impress the public with the whole of his qualifications, and therefore I think it is only fair to him that he should have that qualification. At the same time, while I think that is fair, I am sure you will agree with me that the register of pharmaceutical chemists should be reserved for those who go in for the special examination. We do not want to retard education. The respect with which pharmacy is received by members of Parliament, the Government, and others, is due entirely to the work of a comparatively small number of pharmaceutical chemists, and it is to the interest of every member of the trade, whether Major or Minor, to encourage these notions by increased education, both for the Minor and the Major, and especially for the Major. You see we claim to be something more than mere tradesmen, and if we do claim this from the public we must show in the way we talk and the way we act that we are something more than tradesmen. Personally, I do not care whether you call me a tradesman or a professional man. I do not care a bit. I say that our trade, if you please to call it so, can be so carried on by conscientious and educated men as to gain the respect of the people and to promote that feeling, that professional feeling, which makes all the difference between getting good and indifferent and bad prices. It depends very largely upon the individual. It depends very much on the course of his education, whether you consider it a trade or not. It is possible to make it a trade by the way you conduct it. The public at large, the intelligent public that is, members of the Legislature, members of the bar, and the rest, regard it as a profession. They always assume it be so as a matter of course. We do not charge persons who come to us on trade terms; we charge them for brains. Anyone who says he charges for the cost of the constituents has no argument at all. To me the price of a mixture, whether it contains 10 grains of carbonate of soda, or something which costs four-fifths of the average price of the mixture, comes practically to the same. We charge not for the contents; we charge for the skill in combination and for the responsibility which attaches under Lord Campbell's Act to a person who sells, if any accident occurs though his negligence. And I submit these are things worth telling the public. I would ask you to advertise yourselves to your customers on these particular lines. I never accept a criticism as to a price without meeting it and justifying it, and in most cases with a very marked success. If we adopt that line in an independent and firm spirit, but at the same time with gentlemanly forbearance, we educate the public. If we pretend to be what we sometimes think we are—poor, broken down, weak creatures, who turn round and ask for a saviour to come and help us—then, like all such people, we shall go down, down, down. Self-help is in this case, as in all others, very important. The proposition then with regard to the constitution of the Society is broadly this:—that in future, after the passing of this Bill (at present we have not the power, and therefore it is necessary to have an Act of Parliament), every chemist and druggist who is on the register can at once become a member of the Society, and if he happens now to be an associate he can change from that grade to that of membership. On the other hand, every person who passes examination after the passing of the Act and the new bye-laws will be eligible also to become a member, but only when he goes into business, or when he is twenty-five years of age. We are going to change the name of apprentice to student, simply for the sake of convenience. It so happens that a large number of young men who have passed the Preliminary examination, and who are on the register of apprentices under the Act, imagine they are also apprentices of the Pharmaceutical Society, and there is thus a good deal of difficulty. We propose to drop the word apprentice as a matter of convenience. When an apprentice applies in future to the Society he will be put on the register of students; that is a clerical matter. The clauses by which we propose to do this are mentioned in the Bill. There is a mention that certain sections of the Pharmacy Act of 1868 shall be repealed, which would be necessary to meet these later views. We propose to repeal the clauses preventing Minor men becoming members, and we propose to insert other clauses which will enable Minor men to become members. It may be asked why exclude the young men until they are twenty-five years of age, and why wait until they go into business? There is a reason why when a man passes the Minor examination he should not be eligible to become a member. We have found by experience, and that is worth a good deal, the experience of our own young men, that they prefer a period during which a smaller subscription is paid, and, on the whole, the class of young men who take most interest in this, tell us most distinctly that it would be better to give them, as it were, a little breathing time in the future. There will be two classes—those who intend to go into business sooner or later (some very soon), and they would be at once eligible to become members; and others who would be managers or sub-managers, and who might never wish or desire to go into business. There are a great many of these, and they would become eligible for membership at twenty-five years of age. This is submitted to you and the members of the trade at large as being the best solution of that little difficulty, and it will have the advantage that it gives the Minor man what may be called a little more suitability before he is admitted as a member, and condemns, therefore, the argument that the Major man is actually being swamped. The Major man is eligible at once, and I hope will feel he is consoled by the fact that the Minor man must have a few years more experience before he is eligible, that is if he does not go into business. If he does go into business he takes upon himself that weighty responsibility which in itself tends to make a man a little more qualified than he was before. One of the other important clauses in the Bill with regard to the trade in the direct sense is the clause in which we ask for the privilege of compounding medical prescriptions. You know our friends the Irish pharmaceutical chemists have had this all along, and we think—in fact, we have reason to know—that such a clause as this would not be unacceptable to those who take an interest in our behalf in the House of Commons and to the Government. We have, therefore, I think, proposed that which we think we can take conscientiously. We desire to get the House to sanction a better system of education. It is the greatest mistake in the world to suppose that the cheapest way to get on to the register is to take the shortest cut. You cannot pass the examinations without spending money in getting knowledge; the examiners will not let you. I advise people not to be too chary of spending small sums in fees during apprenticeship. Let them avail themselves, especially if they live in Manchester, of the magnificent opportunities there are of obtaining knowledge during the period of apprenticeship. If we succeed in getting the Legislature to accept the principle that no person other than a registered chemist and druggist shall compound medical prescriptions, we might fairly, later on—we might even, possibly in committee of the present Parliament, if we get so far—propose that all dealings in certain compounded medicines—the compounded medicines of the British Pharmacopœia—might be included in it. I say, might. Why? Because my experience tells me we must not go to Parliament with a Bill bristling with the possibilities of opposition. The wisest course in Parliament is to present a mild measure, even if you find your support strong in the House and out of it. If you gentlemen will consider in this neighbourhood and elsewhere the policy of the Council and the Bill, we may make it a very much better Bill for our purpose before it gets out of Parliament. On the other hand, if you do not support us, if you are lukewarm, if you let the representatives of bogus companies, if you allow grocers, if you allow unqualified assistants without number—many of whom have votes, and all the grocers have votes as well as ourselves—if you allow all these men to have their own way, then your unfortunate President, when he goes to the lobby of the House of Commons, has a bad time in store for him. Not only is there no chance of any such Bill as this passing if you do not support it, and show by your action you support the policy of the measure, and by your arguments to the public that it is just and right that it should be so, we shall not only probably not get this Bill through, but if we do get it to the stage of second reading, we might be so unfortunate as to have it so mauled and so altered by our enemies as to be worse off at the end of the session with the Bill than we were on entering it. To you who have had no experience in Parliamentary work, it may appear to be a light work to draft a Bill. So it is. I am a capital hand at drafting Bills. I could draft you a Bill which would please everybody in this room, and that appears to me what a large number of the trade are appealing to the Society for and abusing the President for not doing. I am quite certain I could do it, and I should not want a penny for doing it. But I do not want to draft it. What is the good of throwing dust in your eyes? Here in Lancashire you understand that sort of thing, whatever they may do in the South, and you would say to me at once with the Irishman, "Blarney, Mr. President, you do not mane that." And you know perfectly well we have to consider the various interests opposed to us. I can draft a Bill which in my judgment will meet what is popularly called the just aspirations of the trade. Mark the words, gentlemen. My wife thinks her husband has never met with justice in this world, and I daresay many of you have wives who think the same; but, however that may be, I may remind you that the just aspirations of the trade have to be considered and balanced, not by ourselves, but by cold-blooded Government officials and members of the House of Commons and the House of Lords, everyone of whom is full of the phrases, "We cannot sanction anything here which is not for the good of the public. We have nothing to do with the question as to how it affects your interests. If you say that what you propose is good for the public and incidentally good for yourselves we have no objection; but the principal thing with us is the good of the public. Our constituents throughout the country will not allow us to pass class legislation of any kind in opposition to the doctrine of free trade." Unless the Government of the day supports every clause of a Bill and a fair number of members of Parliament are ready to give it support, it is useless to present it to Parliament. I have said this to my colleagues, but I do not suppose many of you read what I say. I am sorry to say I make a great many speeches; I have to talk in fact for the whole of my colleagues, and I even get the credit of being a very intelligent man because I give the wisdom of all my colleagues in one speech. But as I said before, I do not believe you all take the trouble to read what I say in regard to legislation. I find a very large number of those who clamour most at the inaction of the Council of the Pharmaceutical Society are those who do not read what we are doing, and I am sorry to say they do not appreciate the efforts I make to enlighten them at the Council table, which the various journals translate in very large type for your reading. As I dare say many of you have not seen these observations, I may just refer to them. I will not detain you long on the point; some of you will probably have something to say in the way of criticism. I shall therefore hear your observations before I go wholly into it. What I want to say is, that the omissions from this Bill are omissions deliberately made. There are many things we know you want, many things we all want. I have my bread and butter to get, like you. My pocket suffers like yours from unfair competition, but I am sorry to say we cannot get much redress from those who come to buy of us or from the Government or from the Legislature with regard to that. I will say nothing more about that at present. Probably, some of you will refer to it, and with the permission of the Chairman I can then reply later on. I only want to impress upon you that the non-insertion of certain propositions in this Bill are deliberate and intentional. They are not due to laziness, luke-warmness, or anything of that kind; they are deliberate. We know the forces opposed to us, and we have come to the conclusion that this is the largest measure in opposition to free trade that at the present moment we can ask the Legislature to grant us. Whether there will be a revolution of feeling in another seven years in regard to this great subject of free trade I do not know. That is to some extent possible in regard to educated men, but at present I may venture to say for myself and colleagues that we should be guilty of the grossest deception if we put into this Bill various clauses which many have clamoured for, and so raise hopes that there was the least possibility of such clauses becoming law. The Chairman has been good enough to say that I have the courage of my opinions My opinions are the same as those of every one who complains in this respect. I am a chemist and druggist like yourselves, and I know what I would like. You send me to the Council chamber to construct, to get something, and I say I am doing your work best when my colleagues and I construct something that is reasonable, that is capable of being argued out subsequently with the members of the House of Commons and the House of Lords and the Government; we are doing your work better than if we drafted pretty Bills to lie on the Council table of the Pharmaceutical Society, never to enter the doors of any Government department or the doors of the House of Commons. There is one clause which has nothing to do with pharmacy in the strict sense of the term. That is the clause by which every registered chemist and druggist shall be exempt from jury service. Some of you may know that I have from time to time expressed my great regret that this privilege—I will not say privilege, this necessity—was not actually conferred upon the whole class of chemists and druggists. Many of you are old enough to know, but probably it will bear repeating, that we managed to get the words pharmaceutical chemists inserted as an amendment in the Juries Bill going through Parliament in the House of Lords many years ago. We managed to do this by what I may venture to call a lucky fluke. But it does not form any part of the previous Pharmacy Bills. Therefore it is difficult to introduce a clause of this kind in a Bill which is stated to have for its object the amendment of a Pharmacy Act. Technically, juries have nothing to do with a Pharmacy Bill, but I think we have the strongest grounds for asking Parliament now, after recent decisions in law, to give us this measure of exemption. There was some excuse formerly, but after the recent very strong decision, which renders it practically penal for any person, except qualified assistants, to sell or dispense poisons in the absence of the principal, it seems to me the argument we have now is practically unanswerable, and therefore I hope you will support us in trying to get this. The reason we pharmaceutical chemists were exempted was because we were registered, and at that time chemists and druggists were not. They were asked in 1853 to join us and be registered, but they shrugged their shoulders and practically told us to go to Limbo. After a few years, when a Juries Bill was before Parliament, we were only able to secure exemptions for those persons whose names were upon the only then existing legal register. I only allude to that because some of our chemist and druggist friends have a notion there is an exclusive privilege conserved by some Pharmacy Act for pharmaceutical chemists. That is, practically, the whole story in regard to this Bill. I would remind you I am here to explain, and not to take part in your proceedings. To me it is a matter of no personal consequence what anyone thinks of our efforts. It is no doubt pleasing to all of us who feel we are sacrificing time, leisure, and money for the purposes of the trade, to know that we are backed up. But do not misunderstand me. When I ask you for your support in Parliament, I ask it for your own interests, not for any benefit I or the Council I represent would get out of it. If you are incapable of giving up sufficient of your time to help us to push the ship through Parliament, do not ask us any more to construct Bills for the benefit of the trade. If you are able to help us, and those I am to address during the next month or two are willing to combine together and join in support of this measure, then there is a chance that we may be successful with this measure; there is a chance that we may actually improve it in our own interests as it goes through Parliament; and lastly, there is a chance that we may get something more later on. But if you wait until the Pharmaceutical Society itself has obtained a monopoly for the drug trade you will have to wait until doomsday. I submit to you that the policy which the Council has proposed is in your interest and for the benefit of the trade at large.

Mr. J. Phillips (Wigan) moved—

> "That this meeting approves of the principle of the Pharmacy Act Amendment Bill, and is of opinion that the Council of the Pharmaceutical Society deserves the support of the entire trade in its efforts to promote further legislation in the interests of Pharmacy."

He said: For the past few weeks we have all been very much interested in this Pharmacy Bill, and those who have read the discussions in the Council of the Pharmaceutical Society anent the Bill need very little telling now of the advantages we should receive from it. We must strive to avoid what would be obstructive in the way of its getting through Parliament, and at the same time demand what will be of practical usefulness for the protection of the trade at large. My friend, Mr. Harrison of Sunderland, whose acumen in business matters all recognize, was very much of opinion that something should be done in the way of suppressing the stores. But the arguments which were used by the President and by other members of the Council convinced me—other things of which I have had experience helping the conclusion—that it is no use applying to Parliament for anything that is simply for the benefit of chemists. We must show that our demand is for the benefit of the public generally before we can get a hearing at all. The President has shown that the clauses of the Bill are very wise, and certainly they should conciliate those who are outside the Pharmaceutical Society. I will not go through items, but I will ask you to give them very hearty support, and to pledge yourselves to the resolution. As local secretary I have been frequently called upon by the Pharmaceutical Society to approach members of Parliament, and it has always been a great pleasure to do so. Gentlemen would find that members of Parliament like a little fuss made of them by requests to look after such and such a measure. They look upon it as a treat; seem to think they are doing a favour, and perhaps hope to win your suffrages on another occasion. I recommend local secretaries to call their colleagues together in towns and districts, and ask for very hearty support for this Bill, so that when it is actually before Parliament it may be influentially supported.

Mr. James Hart (Manchester) said: It would be very easy indeed to find a score of people far more able to second this motion, but none would do it with greater pleasure. I have very great pleasure in supporting Mr. Carteighe. My first experience of him was in 1869, when—it must have been through good temper—he allowed me to become a fully fledged chemist. I have followed his career since that time, and I think when the history of the Pharmaceutical Society comes to be written, whether by Macaulay's New Zealander or anyone else, few names will stand more prominently than that of Mr. Michael Carteighe. He has laid before us clearly and lucidly the provisions of this Bill. The Pharmaceutical Society, as a Society, has very little to gain from this Bill. It may have something to gain in the future, but the trade has the most to gain. I speak now of course of the trade and Society as two different persons. In the first place, Mr. Carteighe told us of the large number of men who were examined but not educated. In my opinion it is those men who are the curse of the trade; men to whom a physician cannot with any degree of confidence recommend his client to go; men who are utterly incapable of forming their own opinion as to the quality of the drugs they are getting, and who buy—with all due respect to a recent correspondence—everything ready-made, or if not ready-made the drugs simply want a quantity of water putting to them. The great aim of the young men of to-day is to get through with as little trouble as possible. They are like veneer on the face of furniture and the first scratch reveals the truth. Many of them would like to have a clause inserted in their indentures specifying that their employers should pass their examinations for them. The educational clauses of the Bill seem to me scarcely to go far enough. I should like to see the time when the Major, and the Major alone, or its equivalent, should be the qualifying examination. It would not follow, therefore, that the Major should be the highest examination, because it would be very easy to get another higher one for those who would go in for something higher. We have nothing to be afraid of with regard to the terrible bye laws that the Council proposes to make. It is explained that it cannot pass anything without the permission of the Society, and if you are not members of the Society it is your own fault. I should like to allude to the fact that an opportunity is now given to the trade, which it may never have presented to it again, certainly not for many years, of complete consolidation of the whole trade. The great success of trades unions has arisen not so much from individual effort as from combined effort, and where a trade has been divided it has come to very little good. I hold further that every man who is in the business should become a member of the Pharmaceutical Society. We want every chemist to join; to show an intelligent interest in our work, and not to be grumbling and growling because things do not go exactly as he likes. The most important clause, as the President has pointed out, is that relative to the compounding of physicians' prescriptions. As he has pointed out, the step from the physician's prescription to the Pharmacopœia is not a very long one. It is easy to suppose we might get it, if not in this Bill, certainly at no very distant time. What we have to complain of to-day is the continued apathy of the body as regards anything connected with the trade. If you will allow me I should like to read two or three lines from a gentleman who holds a high position in the trade—a gentleman almost as competent as the President to form an opinion as to what is going on in the trade. Writing two years ago, he says, "Apathy, crushing apathy, is at the bottom of the whole thing, and what to do to galvanise the body I do not know." This Bill gives us a very splendid opportunity, if not of galvanising the trade, at least of doing something in that direction. My friend goes on, "I wish you could get some Nestor who would get rid of this incubus. I do not think there would be anyone to complain of it at headquarters." I feel sure that is the case. We have got a Nestor now in the person of our President, who is trying to remove this apathy. With this Bill passed I think there would be a better future for the trade.

Mr. Cooper: Considering the great educational facilities of this city and the large and growing towns round about it, would it not be well for the Pharmaceutical Council to have qualifying examinations in this city?

Mr. J. T. Clarke (Bowdon): It was my pleasure, like a recent speaker, to make Mr. Carteighe's acquaintance twenty years ago. I have always had a very happy feeling that he was a genial good fellow, and I looked forward with pleasure to meeting him to-day. Just to show you the advantages of co-operation amongst us, which have been so ably discussed in this room, I want to mention a little incident that happened a short time ago. I happen to be the local secretary of Altrincham, where "we are seven." Yesterday I sent round an urgent message asking how many of my neighbours were coming to the meeting, and they all with one consent began to send excuses. I want to tell you a story to illustrate to you the advantages of association and unity. There was a Bill presented to the House of Commons, a short time ago, to regulate the sale of methylated spirit. It was assumed that a number of people in some of the suburbs of London were in the habit of buying small quantities not for illuminating, but rather for contrary purposes. It was proposed that no quantity less than a quart, or may be half-a-gallon, should be allowed to be sold at one time. The Secretary of the Pharmaceutical Society sent a letter to me and all the local secretaries, I presume, asking them to get the opinion of all the members of the trade in their town. The clause came on for discussion the same night, so when I had got the opinion of members of the trade, who, of course, thought the restriction a most disagreeable one, I sent a telegram to Sir W. C. Brooks, our member, saying that all the chemists of Altrincham were wishful that he should do his utmost to prevent the passing of this particular measure. I need scarcely tell you no more was heard about the measure, but whether that had any effect or not I cannot tell. We only hope so. I came here with the intention of proposing a resolution, but since the remarks of the President I have changed my mind. The President tells us it would be useless to burden the Bill with more than it contains, and I am quite content to leave the matter in his hands.

Mr. Harry Kemp (Manchester) said: I am sure we must all give the worthy President and the Pharma-

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[illegible] Mr. Van[illegible] and Mr. Car- [illegible] Bill which would have [illegible] such a Bill [illegible] I think [illegible] The [illegible] Cambridge and Oxford [illegible] Bill [illegible] the right [illegible] have had a little [illegible] the trade must have [illegible] and [illegible] into the trade [illegible] The President [illegible] the Pharmaceutical Council, [illegible] that the Council most ef- [illegible] pharmaceutical chemists, but [illegible] Pharmaceutical Society re- [illegible] her question altogether. [illegible] Mr. C[illegible] admitted that there is an e[illegible] side our ranks, with power [illegible] paralyse any endea- your [illegible] legislation in the right d[illegible] honesty the outsiders have no [illegible] th us than we have a right [illegible] of any club with which we [illegible] the trade is so apa- [illegible] of subscribing a few shillings a year in order to have a vote, then I think they are out of court altogether. It will be within the memory of most of us that a society established for the simple purpose of furthering trade interests and nothing else perished for lack of a few paltry 5s. per annum. Can you trust with a community like this? If the people will not come in of their own accord it will be well to attract them, and therefore as we want legislation and cannot get it, I would do what I could in that direction. I am not in a position to say that the Council can do more than it is doing. I am not prepared to denounce the Council in the common style, for I am certain that very little more can be done in the way of trades unionism or legislation for the protection of trade interests than has been already done. As Mr. Carteighe says, if we go to Parliament with Bills for the simple furtherance of our trade interests we shall never be listened to. Nevertheless there are little minor details in which the Society has powers which it does not use, including the whole question of patent medicines being sold containing scheduled poisons. It seems a gross anomaly, which never could have been anticipated by any person, that it is illegal for an unregistered person to sell twopennyworth of laudanum and legal for a neighbouring grocer to sell a 2s. 9d. bottle of chlorodyne. I think there would be less apathy and more sympathy if the Council were to assert such powers as it already possesses. The President has alluded to the keeping of unqualified assistants, and that point I would push to the bitter end. Very largely we have the power to improve our position in our own hands, and I do not believe any good will come of constantly harassing the Society and finding fault with the action of a set of men who I thoroughly believe are doing their best to gauge and measure the requirements of the business.

Mr. Taylor (Bolton) said: I feel somewhat diffident in addressing an assembly of men like this, and yet, though only a young member of the trade, I feel such a strong interest in it that I can hardly bear to sit still. From the moment when the curriculum was first projected I have given it my hearty adherence, feeling that that man is best qualified to fight the battle of life who is well educated. This is an age of education, and as a body of tradesmen we cannot do better than insist that all those who act with us shall be educated to the level of the age. Education will act as a double [illegible] It will tell upon ourselves and upon outsiders. The man who by the smallest actions of his everyday life shows the people that he is thoroughly master of the details of his business is bound to help that business [illegible] in the public estimation, and so from the beginning I had a strong wish that some time or other this [illegible] should come into force. I was very glad [illegible] that the President touched upon one very important point. In future students will have to [illegible] spend more time in entering the business, and [illegible] greatest kindness to show them at the outset of their career all the difficulties [illegible] slippery places. I have had something to do with promoting Bills in Parliament, and I know the [illegible] a comparatively small body of men working [illegible] and with a strong will [illegible] ment. From experience I know [illegible] load the Bill or ask for more than [illegible] chance of getting. You must [illegible] take a half loaf rather than [illegible] the same time there is [illegible] not about for the whole loaf [illegible] show that we have rights [illegible] that seven men shall not be allowed [illegible] and that which is illegal for them [illegible] I believe this too, that [illegible] by the button-hole and [illegible] will admit the [illegible] later it will grant that claim. Of course, the President is not asleep and knows the ropes. He comes into personal contact with the members, and we allow that his opinion should have more weight than ours, but I think the Council would do no harm, and possibly might do a great amount of good, if it would insert a clause to remedy that which is an admitted error. I think that this meeting will want the President when he gets back to his colleagues to ask them to see if there is no possible chance of inserting this clause. It might be taken out of the Bill at a critical moment if it were found to imperil the chance of the whole Bill passing. It does not seem to me that there is any more *à priori* likelihood of the Bill being wrecked because of that clause than there is of its being wrecked on the compounding clause. Whichever of these two things we can have, we shall take the wind out of the sails of those who are illegal competitors. We have no right to ask Parliament to help us against competition so long as that competition is open and above board. We have, as all men have, upon whom great responsibility has been thrown, the right to adequate protection in the exercise of that responsibility. I think we shall be listened to if we keep pegging away. I would rather see the curriculum put off a year or two, and the compounding clauses postponed a year or two, if by that means we could get removed from the Act of 1868 the error in reference to companies. The Bill as it at present stands will not really cut at the roots of what we feel to be a bitter injustice. There is one other thing which we can do, whether members of the Society or not. I am not a member of the Society. The times are hard. A guinea is 21*s*. I did not see that I was getting that amount of good for it. I kept the guinea. I know there are many more of the same opinion, but you have not the courage that I have. But whether we are in the Society or out of it, if this Bill is brought forward, and there is a fair chance of passing it, we can all squeeze our members, and, as has been said, they like to be squeezed. We cyclists, 25,000 of us, were strong enough by writing to members to get a clause in the Local Government Bill for England. Acting as the Bolton representative I received from the borough and county members promises that the request we made should be considered fairly on its merits, and that they would if they thought the request should be granted, do their utmost to get it complied with. If we lay our scheme before them in the same way, with the same united voice, we shall get it granted.

Mr. Carteighe, replying upon the discussion, said: I am very glad some of you have spoken out. I came here of course not to butter you nor to be buttered. I came to confer with you as men of sound common sense. I only claim for the views I express that they are better possibly than those of some of you, inasmuch as they are within the range of practical politics. That is the only difference between us. There are some points which are important to be considered. I do not know whether I may be permitted to explain carefully the matter, but if it is your pleasure I shall be happy to do so. With regard to the observations of Mr. Phillips and Mr. Hart I do not think it is necessary for me to say anything. I am a little disappointed at the observations of Mr. Taylor from one point of view. That is the point of view of consolidation; I shall come to that presently. He pointed out the advantage of consolidation. I want to remind you that we cannot all be cyclists, unless we all join our club or union, or pay our subscriptions. You ask me to get something for you without joining my body, without becoming my soldiers, and that is a fundamental error. Give me the united support of the trade, and I will pass anything. But the trade [illegible] "No; go and get what we want and then we [illegible] you." That is exactly the position of the case. I am sure that is right. I do not want to take any undue advantage; I congratulate Mr. Taylor on his excellent speech, but I want to point out his want of logic. I do not mean to say anything unfriendly—

Mr. Taylor (interposing): I take it in the spirit in which you address me. Whatever is done, the trade, whether members of the Society or not, must help.

Mr. Carteighe: But you see they do not. We find, unfortunately, that those who are not with us are against us. They do not do us the honour you do me to-day, in speaking frankly with sterling good sense of what the Society has done. At the same time they say for reasons of their own that they do not choose to join us. Nevertheless, they have my hearty good will and I am doing what I can for them. This is the first time I ever heard anybody not in the Society say what you have said to-day. I ask to-day for your support whether you are in the Society or not. I ask you for your own good to join the Society and increase our general strength. There are other things besides the Bill which affect our trade interests, and above all I ask everyone engaged in the trade, if, for reasons of his own, he does not care to join the Pharmaceutical Society, that at least he will help us in what is for his good as well as for ours. I will go further. The greatest compliment I can pay Mr. Taylor is really still further to criticize him. I say his logic is wrong. I want the power as President to call on Mr. Taylor as a member, or as the local secretary, to work at twenty-four hours' notice. I cannot call upon him to do that if he is only a member of the trade. I have no claim. By trade unions wages have been increased 50 per cent., through the mere voluntary combination. That is the power I want for your good, for the good of the trade, and you say you will not come in. Do not you know what can be done in a town where every chemist belongs to a local association in regard to trade matters? You do not want Parliament to come and affect your prices, if you are unanimous on the point, and there are such things as competition that may be quite unfair and unjust that does not come from companies. There are at this moment, in my judgment, heaps of things of more consequence to your future life than that. The interests of your trade will be better served if at one sweep you could be all gathered into one body and agree to be bound by the verdict of the majority in regard to elections, to general principles, and certain other procedure. There would be more good got for the individual chemist and druggist by the power that combination would give us as a whole than by a new Act of Parliament. I am here to ask you what you think of this Bill, to hear your observations and objections. I have heard what has been said as to certain omissions. I wish particularly to remind you that the strength of the whole chain is as its weakest link. A man of Mr. Taylor's calibre not in the Pharmaceutical Society at Bolton is a loss to the trade, and I would rather that his subscription were paid by somebody else than that he should be outside. Remember that the working man puts by his fourpence per week for his trade union, and I think our subscription is about the same. My arithmetic is weak just now; I do not think it is much more. I have occasion to pay the club money of our work-people under certain circumstances, when they are ill or hard up. We do weak things sometimes. I believe it comes to 2*s*. 8*d*. per month in one particular union, and 1*s*. 8*d*. in another, and so on. But at all events I may say briefly that the weekly subscription to the Pharmaceutical Society at its present rate is not greater than that which a number of working men in this country voluntarily surrender for their interests. And I submit that if the Pharmaceutical Society has not done enough for you in the past, not done as much as might have been done; if it is not doing as much as it ought to do now; the responsi-tical Council as a body every credit for doing their very best, and having more wisdom and knowledge than ourselves, got by longer experience in pharmaceutical affairs. At the same time I have not seen anything in print or heard anything that has convinced me that something could not be done successfully to prevent these bogus companies being formed: and formed as they are for the direct purpose of evading the law. I believe there cannot be found a legislator in either the Commons or the Lords who is so deficient in common sense and judgment as to justify in any way the evasion of any law. It is the law of this country that no man shall, unless he is qualified, sell or dispense prescriptions containing poisons. We may say, therefore, that no seven men can do it unless they form themselves into a limited company; and if it is illegal for seven individuals to carry on business individually as chemists and druggists, and to call themselves chemists and druggists, there is nothing in either law or equity which can say that these seven are right in combining to set aside that law. It was stated by the law lords, in that memorable case of the Pharmaceutical Society against the co-operative store, that it was an oversight on the part of the framers of the 1868 Act that the word person was not made to include the plural, persons. If that be admitted, and it can only be supposed that it was an unintentional omission on the part of the framers, we ought not to be afraid of inserting so much into the new Bill as shall enable us to include the plural with the singular. In all other respects I am at one with the Pharmaceutical Society, and could wish to see this new Bill become law before we are another twelve months older. Save for that one thing I should be glad to support the Bill exactly as it stands, but I should very much prefer that this meeting, whilst approving very much the drafted Bill as presented this month, would still urge upon the Pharmaceutical Society to add such a clause to it as would remedy that extraordinary error by which seven individuals can make legal what is at present illegal for one of them to do.

Mr. J. Rymer Young (Warrington) said: Mr. Carteighe has anticipated the criticism that there are many things omitted from the Bill which would have given infinite satisfaction, but which are impracticable. I must confess I feel disappointed that the Bill as expounded is nothing more than a curriculum Bill, and though I shall on all occasions support such a Bill you may anticipate that the trade will receive it with a considerable amount of apathy and distrust. I think it might be shown that other institutions thrive and have splendid qualifications without a curriculum. The London University, for example, whose degrees in science are better appreciated and more valued than those of the old universities of Cambridge and Oxford. Notwithstanding this, the Bill is a step in the right direction. Those who, like myself, have had a little to do with apprentices and with the trade must have been struck with the appalling ignorance and stupendous foolishness of people rushing into the trade almost destitute of any early education. The President thoroughly represents the Pharmaceutical Council, there can be no doubt that the Council most efficiently represents the pharmaceutical chemists, but whether or not the Pharmaceutical Society represents the trade is another question altogether. Mr. Carteighe has already admitted that there is an enormous opposition outside our ranks, with power at any time to utterly paralyse any endeavour the Society may make for legislation in the right direction. As a matter of honesty the outsiders have no more right to interfere with us than we have a right to criticize the bye-laws of any club with which we are not connected. If the trade is so apathetic that it will not go to the extent of subscribing a few shillings a year in order to have a vote, then I think they are out of court altogether. It will be within the memory of most of us that a society established for the simple purpose of furthering trade interests and nothing else perished for lack of a few paltry 5*s.* per annum. Can you treat with a community like this? If the people will not come in of their own accord it will be well to attract them, and therefore as we want legislation and cannot get it, I would do what I could in that direction. I am not in a position to say that the Council can do more than it is doing. I am not prepared to denounce the Council in the common style, for I am certain that very little more can be done in the way of trades unionism or legislation for the protection of trade interests than has been already done. As Mr. Carteighe says, if we go to Parliament with Bills for the simple furtherance of our trade interests we shall never be listened to. Nevertheless there are little minor details in which the Society has powers which it does not use, including the whole question of patent medicines being sold containing scheduled poisons. It seems a gross anomaly, which never could have been anticipated by any person, that it is illegal for an unregistered person to sell twopennyworth of laudanum and legal for a neighbouring grocer to sell a 2*s.* 9*d.* bottle of chlorodyne. I think there would be less apathy and more sympathy if the Council were to assert such powers as it already possesses. The President has alluded to the keeping of unqualified assistants, and that point I would push to the bitter end. Very largely we have the power to improve our position in our own hands, and I do not believe any good will come of constantly harassing the Society and finding fault with the action of a set of men who I thoroughly believe are doing their best to guage and measure the requirements of the business.

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I say that if every registered person were in the Pharmaceutical Society, all properly organized, our powers, without going to Parliament, for doing good to each other and to the whole trade, would be immeasurably increased. With reference to Mr. Cooper's observations, our notion was to get power to divide the examinations, to have part of the qualifying examination taken at places like Manchester, reserving the final to be taken in London or Edinburgh. Of course, any further modifications would be determined by circumstances and convenience. Our object would be to give apprentices, after they pass their Preliminary examination, a stimulus to work, and to let them pass examinations without going very far from their homes or away from their business. In that way we should keep up the interest of the apprentice during the whole of the time, and he would be a better man then than if allowed to do what he very frequently does, and what sometimes his master does not trouble his head very much about. Sometimes the apprentice cares nothing about the question as to how he shall pass the examination until after his apprenticeship is over. Then he comes to Manchester or London, and imagines that the three Manchester courses of cramming will be enough to deceive the Boards of Examiners, until he finds out his mistake. With reference to Mr. Kemp's observations and Mr. Taylor's observations, as to companies, if you please, I will take them together. There is a great deal more in the whole of this question than many of you know. We have often been accused of not telling you all the difficulties that beset legislation on this very thorny subject. If we have not told you always the knowledge we have had at our command—which all of you have not had at yours—it is because we have not hitherto been disposed to advertise facilities for competitors in our own trade. There are times when it is not advisable to publish to the world the facilities with which other people can fight the battle against you. We had an opinion years ago, not differing very much from what we have now, in regard to these companies. I am going to put a proposition to you. Is it equitable, is it just, for seven executors or trustees of the widow of a deceased chemist or druggist to keep open a shop? [Mr. Kemp: No, sir.] That unfortunately is in the Act of 1868. My friend, Mr. Kemp, is logical. I personally go with him. I am bound to tell him I opposed that clause in 1868, although I was then a young man, as striking at the root of the main principle of the Bill. I held that the moment the deceased qualified man dies his business ought to be carried on by a qualified successor. When once you introduce the doctrine that a widow can carry on the business and call it hers and her trustees', whether they be two, or four, or seven, and that they can carry on the business by means of a qualified assistant, you alter the character of the whole Bill. At the present moment, as for a number of years past, the popularity amongst the trade at large of this power of leaving their businesses to their widows is so great that it is hopeless to argue with them on the subject. You cannot touch the companies unless you get rid of the widows' section. You have no case. On going to Parliament, we are asked why a number of say seven men should not carry on the business by means of a qualified man, when seven trustees of a deceased chemist and druggist can. What is the difference to the security of the public in these two propositions? [A Voice: None.] Very well, then. That is my answer to the drug trade. When they tell us they will forego this particular privilege we shall be very happy to attempt legislation. The thing has been before us over and over again. We have proposed to shorten the time. We have proposed in previous Bills that three years shall be the utmost limit of time in which the business of a deceased registered person shall be carried on in the way allowed by the Act. But the moment you talk to the chemist and druggist about the widow he loses all logic and all reason. It is perfectly true, and I remember as well as if it were only yesterday, the storm of surprise and indignation with which my old colleagues on the Council of 1868—some of whom were old enough to be my grandfather, and most of them old enough to be my father—ridiculed the notion of the "impetuous young man," who wanted to get rid of the power to leave a business to a widow for the benefit of the family. I know nothing more painful than the words said to me by most intimate friends. I was looked upon as a cruel and irresponsible person, and as being even naughty. It was in vain I argued that a medical man could not practise by a widow, that a solicitor could not practise by a widow, that, in fact, no qualified person could practise by a widow, and that it was essential to the principle of the Bill, if it was to be carried out, that within the shortest practicable time the business should be sold and disposed of to a registered person, and carried on in the registered person's name and for his interest. That is what I argued. I did not want to put myself forward as a great prophet. I was horribly beaten then, even mangled. I was called an "impetuous young man;" I was told that I was not married, and that the time would come when I should take a different view. I am sorry to say that my colleagues were right in guaging the views of the members of the trade whom we represent, because this widows' section is the most popular in the Act. You will see this is so if you go through the ranks of those who complain about the companies. Those who complain most are the first to take advantage of this power of leaving their business to their widows. I remember in one case a member of the Council saying that he would stir up the whole of Edinburgh in opposition to any proposal to curtail the rights of chemists' widows. I consider this illogical, but I have to deal with it. I am sent to the Council in your behalf to do constructive work, not to quibble. It is no use my crying over spilt milk. If you go to the Council of the Pharmaceutical Society in the spirit in which Mr. Kemp has made his observations, and in the spirit in which Mr. Taylor has spoken, I say it is no good. It is not a bit of good. If you go to Parliament on that platform you will only be laughed at, as long as you say that any person shall be able to leave his business to an unqualified widow, under the guise of trustees, or otherwise. My friend here, who has evidently refreshed his memory with the legal case, will remember that case was lost to the Pharmaceutical Society because of that very clause. The judges said "You, the promoters of the Act, the trade at large, the Pharmaceutical Society, have admitted that it is safe for the public, in the case of a widow, if the business of the shop be carried on by a qualified man, and we fail to see that the public will be damaged if seven persons take the profit, provided the manager of the business be a qualified man, like the widow's man." I feel you would think me a coward if I did not state this. That is what has brought the whole difficulty on our hands. Mr. Kemp and I would say "Turn back, alter and amend." There is not the slightest chance; the sentiment of most of the members of the drug trade is so tremendous on this issue. It is so inherent that we have not dared of late years to raise it. When judgments were given in the courts, Mr. Kemp will remember, the press and the judges went out of their way to do two things. They said if you intended to say in your Act that you included corporations you did not say so. They did not say anything about an oversight. We have concocted that to make their sayings fit in with our desires. What Lord Selborne said was that a qualifying person handed over the poison. He was a registered chemist and druggist, and judgment would be given against the Pharmaceutical Society. Lord Selborne also said—I am giving the correct substance, though not the exact words—"I should have had difficulty in coming to this conclusion if I thought the public were in the slightest danger from the result of our judgment. In this case it seems to me they are not. The person who hands over the poison is in the case of a corporation the seller." Practically the judgment made two classes of sellers—a man who keeps open a shop on his own account and sells drugs, and a widow and executors who sell by means of a qualified man. The mischief caused by that clause is now deep-rooted. The public have taken hold of it. We have drafted a Bill to deal with corporations, and I have seen the officials of the Government about it. They say, "No; we have taken the opinion of our advisers. We do not accept that." They introduced a Government Bill in opposition to ours, in which they proposed to deal with stores on the principle already admitted. They said, "The only grievance you have against stores or companies is that the name of the person who sells is not put up over the part used for the sale of poisons." That is as far as they will go. If you look at the temper of the times, at the interest members of Parliament have in such stores [A Voice: "Now you are coming to it."], if you look at every conceivable portion of the community, if you see where your defect lies—you yourselves have a weak widow clause—I think you will admit there is some difficulty in dealing with it. We have consulted counsel from time to time in regard to this; we have had papers writing about it, we have had opinions given by judges, and they speak from the common sense point of view in regard to this clause. They maintain that no injustice is done to the public as long as the person who hands over the poison is the seller. There is no danger to the public, and to guard against that was the object of the Act. There was a time when we had some doubt whether we could hit the man who sold for the corporation if he was not qualified. We have succeeded in doing that, and we have to some extent been instrumental in smashing up a number of bogus companies in certain towns by going against the unqualified seller, who is often one of the principal shareholders, and recovering several penalties. Many of these cases are not reported. People have paid the fees into court and we cannot say anything about it. We have the power in our hands, but it is somewhat difficult to find out the servant. We have the power to insist that in every bogus company nobody but a qualified man shall sell poisons, and that does, to some extent, give us a little better position than if they were absolutely free from every provision of the Act. The spirit of the age is combination. The Companies' Act was never intended to be used as it is. We have made efforts to remedy the Companies' Act, because that is where we feel it. It seems absurd that any seven persons can go to a Government officer, pay a small sum of money, and create themselves into a corporation. That is an absurdity. Remember the dentists are in the same boat, and the veterinary surgeons. Dentists' associations, limited, are advertised and all the rest. We have been working quietly in the dark. We do not choose to let the enemy know what we are doing. We have had interviews with the Lord Chancellor, the President of the Board of Trade, and presidents of various bodies, pointing out this. They have admitted the anomaly, and they say: "We cannot devise any way by which we can get what you want without affecting thousands of other people, and it cannot be done. If you want it, it must be done by the Legislature." By way of parenthesis let me tell you that the present Lord Chancellor, although he sympathized with us, and would himself vote for any such thing, said: "My dear Mr. President, in the present state of the House of Commons and public opinion, as represented in the House of Commons, I am afraid you have no chance of being listened to." That from a man who took our side is worth listening to. My answer to you about trying is: "I cannot try unless you are powerful enough to back me." Remember it will not do to shut our eyes to the fact that all these actions by companies are not evasions of the law; they are the law. It is very annoying and galling, but it is the law. It is law by judgment, and we have to upset the law, and point out that the judges were wrong in their conclusions in the interests of the public, before we can get the House of Commons to consider our case I am sorry for it, but it is better that you should know it plainly. I am not deficient in pluck, but I cannot face what you ask me to do. We feel the case is hopeless unless the whole trade of this country were at our back. Then there might be a chance, and then it would have to be worked in the same way as an ordinary political Bill is worked. You would have to be devoted throughout the country, and to talk to your members of Parliament upon it. How many members of the drug trade have approached members of Parliament during the last few years on the subject of companies? How many of you in this room have ever taken the trouble to influence a member of Parliament in this direction? Not many I am afraid. You do not all answer at once. [A Voice, "One."] I say we should want you to be organized in every borough, and in every county division, and at the general election we should want you to be powerful enough to keep the grocers and the people interested in the companies at bay before there would be the least chance of success. If you were prepared to do that throughout the length and breadth of the country there might be some hope, but if you are content to sit in your shops, and say you have not time to do it and will not help the Pharmaceutical Society and the Council, I assure you it is utterly hopeless. Mr. Phillips has referred to Mr. Harrison, but Mr. Harrison, with all his desire to move in the matter, has not had the courage—I will not say courage—he has not thought it practicable to propose anything more than a question of title. Mr. Harrison proposed that for the present the existing companies should be legalised, but that no further companies should be formed except under certain conditions. He failed to get that listened to. I may point out to you that such a measure would have allowed an indefinite multiplication of companies in the shape of branch stores. A company could open branches all over the place and it would have a privilege that would be worth a large sum of money. It would be very quick in using its powers, and personally I should prefer to fight the companies as they are now than fight companies made specially active by being limited in number, with power as they would have to open drug stores wherever they thought fit. The fact is you would increase the capital of those men. We succeed now because they sometimes are deficient in this capital, but you would increase their capital, and our distress in many out of the way districts would be infinitely greater than it is now. That was the proposition of Mr. Harrison. Afterwards he proposed that it might be desirable to prevent companies from using the title of chemist and druggist. We have been told in very unmeasured terms that we do not care for the title, because I happened to make the observation that for practical purposes it is not worth while trying to deal with the title with our present powers if you cannot deal with the sale. We cannot get a conviction of any person for the use of the title of chemist and druggist unless at the same time he sells poison. The title of chemist is used in so many ways, apart from pharmacy. The word chemist, as the word goes, is not a person using any name or distinction implying that he is registered under this Act. The way that a magistrate or county court judge looks at the matter is this. If this person is using the title for the purpose of selling poisons, prove that he is and we are satisfied, and obviously if we cannot prevent a corporation having a profit on the sale of poisons we could not convict them under this clause for using the title. That is, if they could not be convicted of selling. The two things hang together. A corporation is held by the law to be incapable of being examined, and the judges have chosen to regard companies as being persons who, if they carried on their business by means of qualified chemists and druggists, could do the various things under that Act from which ordinary individuals are restricted. That is the whole thing. We cannot recover penalties simply for the use of the title in any case. We have often had to consider it and try it, and we think it simply useless to move in that direction. The root of the evil is in the Companies' Acts, and in the mode in which the powers under those Acts are used. I am sorry to say that the old and respectable morality of tradesmen, apart from professional men, seems to be departed. We used to think it was a grand thing for a man not only to run the risk of losing what little he had in his occupation, every stick, if he made a mistake, but now we find every form of business being carried on by companies. It is a perfect rage and mania. Are we to choose this time, when all these things are rolling on the top of the tide, to go to a Parliament, elected at such a time, without any support, without any agitation by any of you in different parts of the country where men are being elected, without any chance of being listened to? When I have been in the lobby of the House of Commons I have been working in this direction. The Curriculum Bill was a peg to give me an introduction and to talk to various members. When I get hold of them they say that seems very unjust. Then a cold blood on the other side says, "You speak about unqualified persons not keeping qualified assistants. My neighbour round the corner, though qualified, is never in the place. He has got a good many unqualified assistants. I do not say whether they are all unqualified or not. Which of these two businesses do you think, Mr. Member of Parliament, is most dangerous to the life of the public?" and the member is puzzled. I have been to the Government. You will say the Government changes, but for the purposes of such acts as ours the Government never changes. The subordinates, the under secretaries, are persons who keep on continually, and these are the persons who advise the Government of the day that such a thing is not required, is not desirable, and not necessary. Whatever Government is in office takes the advice of those subordinates who are supposed to know all about it. You have to beat the Government as well as persuade the House of Commons, and that can only be done by every one of you becoming a power and capable of exercising power upon members of Parliament. I have not seen any desire on your part to exercise it. If you can promise me that by next Christmas every registered chemist and druggist would so organize himself there might be some chance. Without that I assure you, though my heart is completely with you, with all the activity I am supposed to possess, I know it is hopeless. Then we must not be met by the charge that the Pharmaceutical Society represents only two-thirds of the trade or whatever it is. Give the President—whether Mr. Carteighe or someone else—there are plenty of excellent men who would probably make better Presidents than I—such a power that their suggestions would be practical. Without power they are hopeless. In conclusion, let me remind you that even if you were successful, it would take some time to accomplish. Are you quite sure that an Act of Parliament would give you better prices than you get now? Are you quite sure the members of our own trade do not do us quite as much harm as these bogus companies? Did we never hear of this sort of thing before the bogus companies came? By bogus companies I mean outside separate companies. I used the term for convenience, and not offensively. In London we have had these things to meet ever since just after the Act passed, and I am bound to tell you some of us think the harm done to us is greater from those persons who are registered than from these bogus companies. No Act of Parliament will protect us there. I say consolidate yourselves and act with professional spirit, realize your position, and then there is some chance of your doing some good. And now I should like to refer to two errors. I should not like them to go uncontradicted. Mr. Young is mistaken in supposing that the London University does not require a curriculum. When the degrees are granted by law a curriculum is always required. A degree in science is not a legal one. May I also remind you that the authorities in London, assisted to some extent by your excellent authorities at Victoria University, are advocating a teaching university for London, for all the degrees. They have found out that mere examinations do not do what was expected of them. As to the powers the Society has in reference to patent medicines I hope Mr. Young will be good enough to leave it for a little while. If we have that power and we use it, it must be used under such conditions as to ensure absolute success. If we lose we shall do ourselves tremendous harm. I am quite prepared to fight, but when I do I want all the conditions on my side. You think we are doing nothing, but we are waiting for a suitable opportunity. If we failed the very objectionable result would come to pass that the grocer would be allowed to sell poisonous patent medicines, notwithstanding the fact that they are labelled poison. It is the law—I am not a lawyer but it is my opinion—that every patent medicine containing a poison must have the word poison put outside. In the Matthias case that view was upheld, and it was stated that the Treasury would prosecute in all cases that came within its cognizance. Any person may bring a prosecution before an ordinary police magistrate; the Pharmaceutical Society is not the sole prosecuting body. In the early days the intention was that the police should do it. We have not hitherto considered that it is our business to attack people on the question of the label. For one reason we do not want to harass our own people who sometimes forget the label themselves. If the point were taken to the Court of Appeal, and it was held there that every preparation containing poison should be labelled poison, and we were asked to take proceedings to ascertain whether an unqualified person could sell it, we should be bound to try it. I hope we should win it, but if we did not then the grocers would have in their windows bottles labelled poison, and they would by that convey to the public an intimation that the grocers as well as the chemists could sell poisons. I do not think that would be an advantage to the trade. And now I have only to ask you whether you will support us or not. If you say you will not we know where we are. But how is it possible for an officer, however able he may be, to lead you to victory, if he has no soldiers behind him?

The motion was carried unanimously.

Mr. G. S. Woolley said: I will not detain you one moment, but it is very important we should pass one resolution. I propose, "That the best thanks of this meeting be accorded to Mr. Carteighe for his presence and for his valuable address." I would just like to say this—there is no man living who has shown such self-devotion in the interests of pharmacy and pharmacists as Mr. Carteighe. In my opinion there is only one man who has gone over to the majority who equalled him and that is the late Mr. Jacob Bell. Nobody can form any conception of the amount of time that a man, who does his duty on behalf of the Pharmaceutical Society in the manner that Mr. Carteighe does it, is taken away from his business. It makes a tremendous call upon his time, such as very few of us have any conception of. The least we can do is to pass the resolution I have read. I have held for a long time that the great thing for us to accomplish down here was to get a good representative meeting of the trade face to face with Mr. Carteighe. I was quite confident he would do us good. I am sure he must have carried conviction into your minds. The way in which the resolution was carried shows he has done that in the case of every man in the room. We are deeply indebted to him for the trouble he has taken and the time he has spared in coming down here to address this meeting. I beg to move the resolution.

Mr. T. Kay: I rise with very great pleasure to second the motion, because Mr. Carteighe is of all the Presidents of the Pharmaceutical Society I remember, since the time of Jacob Bell, a governor, a master, and a captain of the ship of pharmacy. I wish he could represent some borough in Parliament. We ought to have a representative in Parliament. I should be very glad to help to put him in, because there he would be a power, an able and an argumentative power. Without that in the House we have very little influence indeed. I am perfectly persuaded from my own knowledge of the members of our district we can secure their adhesion. If you will all work together I have no doubt you can get the Bill passed. I think you might extend the Bill and make this pharmacy educational establishment of ours in London into a university of pharmacy. I think you might carry the higher examinations to such a pitch that you might institute degrees of bachelors and masters of pharmacy. These would be very desirable degrees. I beg to ask you to give your very hearty thanks to Mr. Carteighe for the able address and for meeting us in this grand spirit.

The motion was carried with acclamation.

Mr. Carteighe: I am very much obliged to you. I have already detained you so long that I will not enlarge further, except to say that if I have not been in Manchester before at a representative meeting of the trade it is not my fault. I have never been asked.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The opening meeting of the session of the Midland Counties Chemists' Association took place on Tuesday evening at the Midland Hotel, Birmingham, when Mr. A. Southall (the President) delivered his inaugural address. There was a large attendance of pharmacists of Birmingham and the district.

The President's Address.

The President in his address said: It is usually expected that the President shall give you some review of the past, and I propose saying something about the events of the last twelve months. In pharmaceutical politics several, perhaps in themselves small circumstances, seem to indicate a prospect of greater activity. Although we must not expect any legislative measures to be in any sense a panacea for all the ills to which pharmacy is heir, still we may confidently look forward to a considerable enlargement of our privileges if the Pharmacy Bill just now adopted by the Council should become law, and on that account it behoves all pharmacists to work with a will for the furtherance of that Bill. With your permission I will briefly scan some of the provisions of this proposed Act, which will, I think, enable us to obtain some idea of its value; but I should be sorry if this brief sketch should serve to prevent any of my hearers from carefully studying the provisions of the Bill for themselves. First there are two clauses empowering the Pharmaceutical Society to apply an educational curriculum, and to divide the examinations as may be deemed most suitable. For instance, at present there is no power to enforce a longer period than three months between the Preliminary and the Minor; consequently many apprentices do not attempt the first during their apprenticeship, or at the best often leave it until the last year, when they undergo a species of cram to enable them to gather together their old school knowledge, which has been scattered to the winds through neglect. Following on this they gorge themselves with doses, formulæ and "tips" relating to materia medica, pharmacy, etc., and present themselves after, say only three months, for the Minor. This is well known to us all, and we all admit that some change would be beneficial, not only to the public, by the pharmacists being better trained, but also to the future pharmacist himself. Knowledge, like food, should be taken in gradually. Food taken in too hastily is not properly assimilated, and consequently does not nourish the body; the gastric juices have not a chance to do their work, and indigestion follows. We suffer doubly. We receive harm negatively by not being nourished, and positively by actual disease. In like manner there is a corresponding mental dyspepsia, and it is precisely this unhealthy condition which we wish to avoid.

Now if these clauses become law, the Council will probably impose a bye-law to the effect that the embryo pharmacist must have passed his Preliminary, or its equivalent, before he commences his apprenticeship. This will have the effect of preventing the less studious youths from entering the trade at all, and apprentices would consist of a class of young men, who would, generally speaking, find the necessary studies for the qualifying examination more or less to their taste. This will be further ensured by the division of the qualifying examination, the apprentice being required to present himself for the former part during his apprenticeship. To aid him in his studies it will be advisable for the master to allow time for his attendance at courses of lectures, whereby his studies will be turned into suitable channels, and so relieve the master of some of the responsibility of the theoretical education of his apprentice. The cry of *cui bono*? will again be raised from many lips. Why should pharmacy be burdened with a curriculum, when it presents so few advantages over ordinary trades? We know that if a pharmacist is to be looked up to as a man capable of advising his customers on subjects connected with science, hygiene, etc., etc., he must be far better educated than is the case with the great majority of the present day. This superior education will be best attained by a thoroughly efficient curriculum of the subjects connected with his own profession, combined with a special reading, which most of the graduates in pharmacy will then spontaneously follow up, as a love of science, especially applied science, will be the usual outcome of such studies. This education, besides giving its owner a far keener enjoyment of life on its own account, will at the same time supply him with the tangible advantages arising out of the possession of the confidence of his neighbours. Moreover, the pharmacist will then be upon a footing somewhat approaching that of his brethren in Germany, Belgium, Denmark, etc. He will be the adviser of the medical man upon chemical and pharmaceutical matters, and he will be in a position to have all the privileges of membership, wanted to be made pharmaceutical chemists, and the Council of the Pharmaceutical Society at the time could not meet their wishes. The examined men of that time declared that they held a certain position, that it was unjust, and all the rest of it, and practically the Council was unable to accede to the request. Well, the effect of that was that an agitation sprang up, an opposition society was founded, and the result was a sort of internecine war, in which I took a very large share and in which I had much to do in bringing very many excellent members of the trade who did not belong to the Society into close accord with the Society. I say that the result was not a good Pharmacy Bill, but a very indifferent Poisons Bill. Therefore if you tell me now that after twenty-five years titles mean nothing, that the question as to whether a man is to be a member or associate of the Pharmaceutial Society has no effect upon those members of the trade who wish to join it, I will accept it if you say so, but at the same time remind you that on this question of titles the best pharmacy measure ever brought forward was actually rejected by the trade. It was a Bill to limit the compounding of prescriptions and the sale of simple compounded drugs, and that Bill was drafted at the request of the Medical Council, who put pressure on the Government to say that there ought to be legislation in regard to pharmacy, and that there should be none of those curious anomalies which allowed only chemists to sell the poisons in the schedule, but anybody to sell a very potent thing very nearly a poison outside the schedule. If the question of title was enough to cause the trade to oppose the Pharmaceutical Society, and to prevent that unanimity without which no Bill can pass in Parliament, I submit we are justified in considering the terms under which the various grades of our body shall be admitted in future into the Society. And we propose that inasmuch as the qualification for keeping open a shop is now the Minor examination—that is 'the chemist and druggist's examination—whereas in the early days of the Society, and after the Act of 1852, the Major examination was the only qualifying examination (because some of you who are old enough will remember the Minor examination was called the assistants' examination); seeing that it was the pleasure of Parliament to knock away the Major altogether, and say the future qualification for chemists and druggists should be the Minor or lesser, I say seeing that to be the case, and seeing the progress made in education, I think I may fairly appeal to every Major man who, like myself, has been examined and done his share of ordinary work, to say at once with me that it is desirable such men should enter into the Pharmaceutical Society as brothers, on the same footing and with the qualifications of members. And let me say we submit this to you and to our friends throughout the country, not because the present grade of associates in business happens to be the larger of the two. It is not that. It is simply because we think it is a useful and right thing. We admit that a pharmaceutical chemist to some extent is a more advanced man. He has gone further than is required by law. But it does seem to us that when the law has said a person is competent to keep open a shop, the grade of "associate" in a body like ours is an implication that he is a man who has some other qualification to get before his complete qualification is arrived at. He is entitled to ask to become a member, and it is to our interest to welcome him into our Society. I may say further, that this very proposition was actually broached, and, in fact, formed part of one of the draft Bills in the year 1867 that were to be presented to Parliament. But at that time a good many of our own members—the Major men—objected. It was proposed in fact in one of the clauses, that every person who passed the Minor examination in future should be registered as a chemist and druggist and should be eligible to become a member. At that time our young examined men were disposed to think we were giving too much away. They were too strong for us, and we had to compromise the matter by simply enabling chemists and druggists who were in business at the time of the passing of the Act to become members, and all other persons who passed the Minor were to be associates. In spite of this, I am sure it is a source of satisfaction to tell you that we have a very large number of subscribers as associates in business, and these men have, of course, all the privileges of members except that of being on the Council. They have the same privileges so far as voting goes and all that. But I do maintain, in regard to title, that when a man has a claim to keep open a shop the grade of associate is not well adapted to impress the public with the whole of his qualifications, and therefore I think it is only fair to him that he should have that qualification. At the same time, while I think that is fair, I am sure you will agree with me that the register of pharmaceutical chemists should be reserved for those who go in for the special examination. We do not want to retard education. The respect with which pharmacy is received by members of Parliament, the Government, and others, is due entirely to the work of a comparatively small number of pharmaceutical chemists, and it is to the interest of every member of the trade, whether Major or Minor, to encourage these notions by increased education, both for the Minor and the Major, and especially for the Major. You see we claim to be something more than mere tradesmen, and if we do claim this from the public we must show in the way we talk and the way we act that we are something more than tradesmen. Personally, I do not care whether you call me a tradesman or a professional man. I do not care a bit. I say that our trade, if you please to call it so, can be so carried on by conscientious and educated men as to gain the respect of the people and to promote that feeling, that professional feeling, which makes all the difference between getting good and indifferent and bad prices. It depends very largely upon the individual. It depends very much on the course of his education, whether you consider it a trade or not. It is possible to make it a trade by the way you conduct it. The public at large, the intelligent public that is, members of the Legislature, members of the bar, and the rest, regard it as a profession. They always assume it be so as a matter of course. We do not charge persons who come to us on trade terms; we charge them for brains. Anyone who says he charges for the cost of the constituents has no argument at all. To me the price of a mixture, whether it contains 10 grains of carbonate of soda, or something which costs four-fifths of the average price of the mixture, comes practically to the same. We charge not for the contents; we charge for the skill in combination and for the responsibility which attaches under Lord Campbell's Act to a person who sells, if any accident occurs though his negligence. And I submit these are things worth telling the public. I would ask you to advertise yourselves to your customers on these particular lines. I never accept a criticism as to a price without meeting it and justifying it, and in most cases with a very marked success. If we adopt that line in an independent and firm spirit, but at the same time with gentlemanly forbearance, we educate the public. If we pretend to be what we sometimes think we are—poor, broken down, weak creatures, who turn round and ask for a saviour to come and help us—then, like all such people, we shall go down, down, down. Self-help is in this case, as in all others, very important. The proposition then with regard to the constitution of the Society is broadly this:—that in future, after the passing of this Bill (at present we have not the power, and therefore it is necessary to have an Act of Parliament), every chemist and druggist who is on the register can at once become a member of the Society, and if he happens now to be an associate he can change from that grade to that of membership. On the other hand, every person who passes examination after the passing of the Act and the new bye-laws will be eligible also to become a member, but only when he goes into business, or when he is twenty-five years of age. We are going to change the name of apprentice to student, simply for the sake of convenience. It so happens that a large number of young men who have passed the Preliminary examination, and who are on the register of apprentices under the Act, imagine they are also apprentices of the Pharmaceutical Society, and there is thus a good deal of difficulty. We propose to drop the word apprentice as a matter of convenience. When an apprentice applies in future to the Society he will be put on the register of students; that is a clerical matter. The clauses by which we propose to do this are mentioned in the Bill. There is a mention that certain sections of the Pharmacy Act of 1868 shall be repealed, which would be necessary to meet these later views. We propose to repeal the clauses preventing Minor men becoming members, and we propose to insert other clauses which will enable Minor men to become members. It may be asked why exclude the young men until they are twenty-five years of age, and why wait until they go into business? There is a reason why when a man passes the Minor examination he should not be eligible to become a member. We have found by experience, and that is worth a good deal, the experience of our own young men, that they prefer a period during which a smaller subscription is paid, and, on the whole, the class of young men who take most interest in this, tell us most distinctly that it would be better to give them, as it were, a little breathing time in the future. There will be two classes —those who intend to go into business sooner or later (some very soon), and they would be at once eligible to become members; and others who would be managers or sub-managers, and who might never wish or desire to go into business. There are a great many of these, and they would become eligible for membership at twenty-five years of age. This is submitted to you and the members of the trade at large as being the best solution of that little difficulty, and it will have the advantage that it gives the Minor man what may be called a little more suitability before he is admitted as a member, and condemns, therefore, the argument that the Major man is actually being swamped. The Major man is eligible at once, and I hope will feel he is consoled by the fact that the Minor man must have a few years more experience before he is eligible, that is if he does not go into business. If he does go into business he takes upon himself that weighty responsibility which in itself tends to make a man a little more qualified than he was before. One of the other important clauses in the Bill with regard to the trade in the direct sense is the clause in which we ask for the privilege of compounding medical prescriptions. You know our friends the Irish pharmaceutical chemists have had this all along, and we think—in fact, we have reason to know—that such a clause as this would not be unacceptable to those who take an interest in our behalf in the House of Commons and to the Government. We have, therefore, I think, proposed that which we think we can take conscientiously. We desire to get the House to sanction a better system of education. It is the greatest mistake in the world to suppose that the cheapest way to get on to the register is to take the shortest cut. You cannot pass the examinations without spending money in getting knowledge; the examiners will not let you. I advise people not to be too chary of spending small sums in fees during apprenticeship. Let them avail themselves, especially if they live in Manchester, of the magnificent opportunities there are of obtaining knowledge during the period of apprenticeship. If we succeed in getting the Legislature to accept the principle that no person other than a registered chemist and druggist shall compound medical prescriptions, we might fairly, later on—we might even, possibly in committee of the present Parliament, if we get so far—propose that all dealings in certain compounded medicines—the compounded medicines of the British Pharmacopœia—might be included in it. I say, might. Why? Because my experience tells me we must not go to Parliament with a Bill bristling with the possibilities of opposition. The wisest course in Parliament is to present a mild measure, even if you find your support strong in the House and out of it. If you gentlemen will consider in this neighbourhood and elsewhere the policy of the Council and the Bill, we may make it a very much better Bill for our purpose before it gets out of Parliament. On the other hand, if you do not support us, if you are lukewarm, if you let the representatives of bogus companies, if you allow grocers, if you allow unqualified assistants without number—many of whom have votes, and all the grocers have votes as well as ourselves—if you allow all these men to have their own way, then your unfortunate President, when he goes to the lobby of the House of Commons, has a bad time in store for him. Not only is there no chance of any such Bill as this passing if you do not support it, and show by your action you support the policy of the measure, and by your arguments to the public that it is just and right that it should be so, we shall not only probably not get this Bill through, but if we do get it to the stage of second reading, we might be so unfortunate as to have it so mauled and so altered by our enemies as to be worse off at the end of the session with the Bill than we were on entering it. To you who have had no experience in Parliamentary work, it may appear to be a light work to draft a Bill. So it is. I am a capital hand at drafting Bills. I could draft you a Bill which would please everybody in this room, and that appears to me what a large number of the trade are appealing to the Society for and abusing the President for not doing. I am quite certain I could do it, and I should not want a penny for doing it. But I do not want to draft it. What is the good of throwing dust in your eyes? Here in Lancashire you understand that sort of thing, whatever they may do in the South, and you would say to me at once with the Irishman, "Blarney, Mr. President, you do not mane that." And you know perfectly well we have to consider the various interests opposed to us. I can draft a Bill which in my judgment will meet what is popularly called the just aspirations of the trade. Mark the words, gentlemen. My wife thinks her husband has never met with justice in this world, and I daresay many of you have wives who think the same; but, however that may be, I may remind you that the just aspirations of the trade have to be considered and balanced, not by ourselves, but by cold-blooded Government officials and members of the House of Commons and the House of Lords, everyone of whom is full of the phrases, "We cannot sanction anything here which is not for the good of the public. We have nothing to do with the question as to how it affects your interests. If you say that what you propose is good for the public and incidentally good for yourselves we have no objection; but the principal thing with us is the good of the public. Our constituents throughout the country will not allow us to pass class legislation of any kind in opposition to the doctrine of free trade." Unless the Government of the day supports every clause of a Bill and a fair number of members of Parliament are ready to give it support, it is useless to present it to Parliament. I have said this to my colleagues, but I do not suppose many of you read what I say. I am sorry to say I make a great many speeches; I have to talk in fact for the whole of my colleagues, and I even get the credit of being a very intelligent man because I give the wisdom of all my colleagues in one speech. But as I said before, I do not believe you all take the trouble to read what I say in regard to legislation. I find a very large number of those who clamour most at the inaction of the Council of the Pharmaceutical Society are those who do not read what we are doing, and I am sorry to say they do not appreciate the efforts I make to enlighten them at the Council table, which the various journals translate in very large type for your reading. As I dare say many of you have not seen these observations, I may just refer to them. I will not detain you long on the point; some of you will probably have something to say in the way of criticism. I shall therefore hear your observations before I go wholly into it. What I want to say is, that the omissions from this Bill are omissions deliberately made. There are many things we know you want, many things we all want. I have my bread and butter to get, like you. My pocket suffers like yours from unfair competition, but I am sorry to say we cannot get much redress from those who come to buy of us or from the Government or from the Legislature with regard to that. I will say nothing more about that at present. Probably, some of you will refer to it, and with the permission of the Chairman I can then reply later on. I only want to impress upon you that the non-insertion of certain propositions in this Bill are deliberate and intentional. They are not due to laziness, luke-warmness, or anything of that kind; they are deliberate. We know the forces opposed to us, and we have come to the conclusion that this is the largest measure in opposition to free trade that at the present moment we can ask the Legislature to grant us. Whether there will be a revolution of feeling in another seven years in regard to this great subject of free trade I do not know. That is to some extent possible in regard to educated men, but at present I may venture to say for myself and colleagues that we should be guilty of the grossest deception if we put into this Bill various clauses which many have clamoured for, and so raise hopes that there was the least possibility of such clauses becoming law. The Chairman has been good enough to say that I have the courage of my opinions My opinions are the same as those of every one who complains in this respect. I am a chemist and druggist like yourselves, and I know what I would like. You send me to the Council chamber to construct, to get something, and I say I am doing your work best when my colleagues and I construct something that is reasonable, that is capable of being argued out subsequently with the members of the House of Commons and the House of Lords and the Government; we are doing your work better than if we drafted pretty Bills to lie on the Council table of the Pharmaceutical Society, never to enter the doors of any Government department or the doors of the House of Commons. There is one clause which has nothing to do with pharmacy in the strict sense of the term. That is the clause by which every registered chemist and druggist shall be exempt from jury service. Some of you may know that I have from time to time expressed my great regret that this privilege—I will not say privilege, this necessity—was not actually conferred upon the whole class of chemists and druggists. Many of you are old enough to know, but probably it will bear repeating, that we managed to get the words pharmaceutical chemists inserted as an amendment in the Juries Bill going through Parliament in the House of Lords many years ago. We managed to do this by what I may venture to call a lucky fluke. But it does not form any part of the previous Pharmacy Bills. Therefore it is difficult to introduce a clause of this kind in a Bill which is stated to have for its object the amendment of a Pharmacy Act. Technically, juries have nothing to do with a Pharmacy Bill, but I think we have the strongest grounds for asking Parliament now, after recent decisions in law, to give us this measure of exemption. There was some excuse formerly, but after the recent very strong decision, which renders it practically penal for any person, except qualified assistants, to sell or dispense poisons in the absence of the principal, it seems to me the argument we have now is practically unanswerable, and therefore I hope you will support us in trying to get this. The reason we pharmaceutical chemists were exempted was because we were registered, and at that time chemists and druggists were not. They were asked in 1853 to join us and be registered, but they shrugged their shoulders and practically told us to go to Limbo. After a few years, when a Juries Bill was before Parliament, we were only able to secure exemptions for those persons whose names were upon the only then existing legal register. I only allude to that because some of our chemist and druggist friends have a notion there is an exclusive privilege conserved by some Pharmacy Act for pharmaceutical chemists. That is, practically, the whole story in regard to this Bill. I would remind you I am here to explain, and not to take part in your proceedings. To me it is a matter of no personal consequence what anyone thinks of our efforts. It is no doubt pleasing to all of us who feel we are sacrificing time, leisure, and money for the purposes of the trade, to know that we are backed up. But do not misunderstand me. When I ask you for your support in Parliament, I ask it for your own interests, not for any benefit I or the Council I represent would get out of it. If you are incapable of giving up sufficient of your time to help us to push the ship through Parliament, do not ask us any more to construct Bills for the benefit of the trade. If you are able to help us, and those I am to address during the next month or two are willing to combine together and join in support of this measure, then there is a chance that we may be successful with this measure; there is a chance that we may actually improve it in our own interests as it goes through Parliament; and lastly, there is a chance that we may get something more later on. But if you wait until the Pharmaceutical Society itself has obtained a monopoly for the drug trade you will have to wait until doomsday. I submit to you that the policy which the Council has proposed is in your interest and for the benefit of the trade at large.

Mr. J. Phillips (Wigan) moved—

> "That this meeting approves of the principle of the Pharmacy Act Amendment Bill, and is of opinion that the Council of the Pharmaceutical Society deserves the support of the entire trade in its efforts to promote further legislation in the interests of Pharmacy."

He said: For the past few weeks we have all been very much interested in this Pharmacy Bill, and those who have read the discussions in the Council of the Pharmaceutical Society anent the Bill need very little telling now of the advantages we should receive from it. We must strive to avoid what would be obstructive in the way of its getting through Parliament, and at the same time demand what will be of practical usefulness for the protection of the trade at large. My friend, Mr. Harrison of Sunderland, whose acumen in business matters all recognize, was very much of opinion that something should be done in the way of suppressing the stores. But the arguments which were used by the President and by other members of the Council convinced me—other things of which I have had experience helping the conclusion—that it is no use applying to Parliament for anything that is simply for the benefit of chemists. We must show that our demand is for the benefit of the public generally before we can get a hearing at all. The President has shown that the clauses of the Bill are very wise, and certainly they should conciliate those who are outside the Pharmaceutical Society. I will not go through items, but I will ask you to give them very hearty support, and to pledge yourselves to the resolution. As local secretary I have been frequently called upon by the Pharmaceutical Society to approach members of Parliament, and it has always been a great pleasure to do so. Gentlemen would find that members of Parliament like a little fuss made of them by requests to look after such and such a measure. They look upon it as a treat; seem to think they are doing a favour, and perhaps hope to win your suffrages on another occasion. I recommend local secretaries to call their colleagues together in towns and districts, and ask for very hearty support for this Bill, so that when it is actually before Parliament it may be influentially supported.

Mr. James Hart (Manchester) said: It would be very easy indeed to find a score of people far more able to second this motion, but none would do it with greater pleasure. I have very great pleasure in supporting Mr. Carteighe. My first experience of him was in 1869, when—it must have been through good temper—he allowed me to become a fully fledged chemist. I have followed his career since that time, and I think when the history of the Pharmaceutical Society comes to be written, whether by Macaulay's New Zealander or anyone else, few names will stand more prominently than that of Mr. Michael Carteighe. He has laid before us clearly and lucidly the provisions of this Bill. The Pharmaceutical Society, as a Society, has very little to gain from this Bill. It may have something to gain in the future, but the trade has the most to gain. I speak now of course of the trade and Society as two different persons. In the first place, Mr. Carteighe told us of the large number of men who were examined but not educated. In my opinion it is those men who are the curse of the trade; men to whom a physician cannot with any degree of confidence recommend his client to go; men who are utterly incapable of forming their own opinion as to the quality of the drugs they are getting, and who buy —with all due respect to a recent correspondence— everything ready-made, or if not ready-made the drugs simply want a quantity of water putting to them. The great aim of the young men of to-day is to get through with as little trouble as possible. They are like veneer on the face of furniture and the first scratch reveals the truth. Many of them would like to have a clause inserted in their indentures specifying that their employers should pass their examinations for them. The educational clauses of the Bill seem to me scarcely to go far enough. I should like to see the time when the Major, and the Major alone, or its equivalent, should be the qualifying examination. It would not follow, therefore, that the Major should be the highest examination, because it would be very easy to get another higher one for those who would go in for something higher. We have nothing to be afraid of with regard to the terrible bye laws that the Council proposes to make. It is explained that it cannot pass anything without the permission of the Society, and if you are not members of the Society it is your own fault. I should like to allude to the fact that an opportunity is now given to the trade, which it may never have presented to it again, certainly not for many years, of complete consolidation of the whole trade. The great success of trades unions has arisen not so much from individual effort as from combined effort, and where a trade has been divided it has come to very little good. I hold further that every man who is in the business should become a member of the Pharmaceutical Society. We want every chemist to join; to show an intelligent interest in our work, and not to be grumbling and growling because things do not go exactly as he likes. The most important clause, as the President has pointed out, is that relative to the compounding of physicians' prescriptions. As he has pointed out, the step from the physician's prescription to the Pharmacopœia is not a very long one. It is easy to suppose we might get it, if not in this Bill, certainly at no very distant time. What we have to complain of to-day is the continued apathy of the body as regards anything connected with the trade. If you will allow me I should like to read two or three lines from a gentleman who holds a high position in the trade—a gentleman almost as competent as the President to form an opinion as to what is going on in the trade. Writing two years ago, he says, "Apathy, crushing apathy, is at the bottom of the whole thing, and what to do to galvanize the body I do not know." This Bill gives us a very splendid opportunity, if not of galvanizing the trade, at least of doing something in that direction. My friend goes on, "I wish you could get some Nestor who would get rid of this incubus. I do not think there would be anyone to complain of it at headquarters." I feel sure that is the case. We have got a Nestor now in the person of our President, who is trying to remove this apathy. With this Bill passed I think there would be a better future for the trade.

Mr. Cooper: Considering the great educational facilities of this city and the large and growing towns round about it, would it not be well for the Pharmaceutical Council to have qualifying examinations in this city?

Mr. J. T. Clarke (Bowdon): It was my pleasure, like a recent speaker, to make Mr. Carteighe's acquaintance twenty years ago. I have always had a very happy feeling that he was a genial good fellow, and I looked forward with pleasure to meeting him to-day. Just to show you the advantages of co-operation amongst us, which have been so ably discussed in this room, I want to mention a little incident that happened a short time ago. I happen to be the local secretary of Altrincham, where "we are seven." Yesterday I sent round an urgent message asking how many of my neighbours were coming to the meeting, and they all with one consent began to send excuses. I want to tell you a story to illustrate to you the advantages of association and unity. There was a Bill presented to the House of Commons, a short time ago, to regulate the sale of methylated spirit. It was assumed that a number of people in some of the suburbs of London were in the habit of buying small quantities not for illuminating, but rather for contrary purposes. It was proposed that no quantity less than a quart, or may be half-a-gallon, should be allowed to be sold at one time. The Secretary of the Pharmaceutical Society sent a letter to me and all the local secretaries, I presume, asking them to get the opinion of all the members of the trade in their town. The clause came on for discussion the same night, so when I had got the opinion of members of the trade, who, of course, thought the restriction a most disagreeable one, I sent a telegram to Sir W. C. Brooks, our member, saying that all the chemists of Altrincham were wishful that he should do his utmost to prevent the passing of this particular measure. I need scarcely tell you no more was heard about the measure, but whether that had any effect or not I cannot tell. We only hope so. I came here with the intention of proposing a resolution, but since the remarks of the President I have changed my mind. The President tells us it would be useless to burden the Bill with more than it contains, and I am quite content to leave the matter in his hands.

Mr. Harry Kemp (Manchester) said: I am sure we must all give the worthy President and the Pharmaceutical Council as a body every credit for doing their very best, and having more wisdom and knowledge than ourselves, got by longer experience in pharmaceutical affairs. At the same time I have not seen anything in print or heard anything that has convinced me that something could not be done successfully to prevent these bogus companies being formed: and formed as they are for the direct purpose of evading the law. I believe there cannot be found a legislator in either the Commons or the Lords who is so deficient in common sense and judgment as to justify in any way the evasion of any law. It is the law of this country that no man shall, unless he is qualified, sell or dispense prescriptions containing poisons. We may say, therefore, that no seven men can do it unless they form themselves into a limited company; and if it is illegal for seven individuals to carry on business individually as chemists and druggists, and to call themselves chemists and druggists, there is nothing in either law or equity which can say that these seven are right in combining to set aside that law. It was stated by the law lords, in that memorable case of the Pharmaceutical Society against the co-operative store, that it was an oversight on the part of the framers of the 1868 Act that the word person was not made to include the plural, persons. If that be admitted, and it can only be supposed that it was an unintentional omission on the part of the framers, we ought not to be afraid of inserting so much into the new Bill as shall enable us to include the plural with the singular. In all other respects I am at one with the Pharmaceutical Society, and could wish to see this new Bill become law before we are another twelve months older. Save for that one thing I should be glad to support the Bill exactly as it stands, but I should very much prefer that this meeting, whilst approving very much the drafted Bill as presented this month, would still urge upon the Pharmaceutical Society to add such a clause to it as would remedy that extraordinary error by which seven individuals can make legal what is at present illegal for one of them to do.

Mr. J. Rymer Young (Warrington) said: Mr. Carteighe has anticipated the criticism that there are many things omitted from the Bill which would have given infinite satisfaction, but which are impracticable. I must confess I feel disappointed that the Bill as expounded is nothing more than a curriculum Bill, and though I shall on all occasions support such a Bill you may anticipate that the trade will receive it with a considerable amount of apathy and distrust. I think it might be shown that other institutions thrive and have splendid qualifications without a curriculum. The London University, for example, whose degrees in science are better appreciated and more valued than those of the old universities of Cambridge and Oxford. Notwithstanding this, the Bill is a step in the right direction. Those who, like myself, have had a little to do with apprentices and with the trade must have been struck with the appalling ignorance and stupendous foolishness of people rushing into the trade almost destitute of any early education. The President thoroughly represents the Pharmaceutical Council, there can be no doubt that the Council most efficiently represents the pharmaceutical chemists, but whether or not the Pharmaceutical Society represents the trade is another question altogether. Mr. Carteighe has already admitted that there is an enormous opposition outside our ranks, with power at any time to utterly paralyse any endeavour the Society may make for legislation in the right direction. As a matter of honesty the outsiders have no more right to interfere with us than we have a right to criticise the bye-laws of any club with which we are not connected. If the trade is so apathetic that it will not go to the extent of subscribing a few shillings a year in order to have a vote, then I think they are out of court altogether. It will be within the memory of most of us that a society established for the simple purpose of furthering trade interests and nothing else perished for lack of a few paltry 5*s*. per annum. Can you treat with a community like this? If the people will not come in of their own accord it will be well to attract them, and therefore as we want legislation and cannot get it, I would do what I could in that direction. I am not in a position to say that the Council can do more than it is doing. I am not prepared to denounce the Council in the common style, for I am certain that very little more can be done in the way of trades unionism or legislation for the protection of trade interests than has been already done. As Mr. Carteighe says, if we go to Parliament with Bills for the simple furtherance of our trade interests we shall never be listened to. Nevertheless there are little minor details in which the Society has powers which it does not use, including the whole question of patent medicines being sold containing scheduled poisons. It seems a gross anomaly, which never could have been anticipated by any person, that it is illegal for an unregistered person to sell twopennyworth of laudanum and legal for a neighbouring grocer to sell a 2*s*. 9*d*. bottle of chlorodyne. I think there would be less apathy and more sympathy if the Council were to assert such powers as it already possesses. The President has alluded to the keeping of unqualified assistants, and that point I would push to the bitter end. Very largely we have the power to improve our position in our own hands, and I do not believe any good will come of constantly harassing the Society and finding fault with the action of a set of men who I thoroughly believe are doing their best to guage and measure the requirements of the business.

Mr. Taylor (Bolton) said: I feel somewhat diffident in addressing an assembly of men like this, and yet, though only a young member of the trade, I feel such a strong interest in it that I can hardly bear to sit still. From the moment when the curriculum was first projected I have given it my hearty adherence, feeling that that man is best qualified to fight the battle of life who is well educated. This is an age of education, and as a body of tradesmen we cannot do better than insist that all those who act with us shall be educated to the level of the age. Education will act as a double thrust, it will tell upon ourselves and upon outsiders. The man who by the smallest actions of his everyday life shows the people that he is thoroughly master of the details of his business is bound to help that business and rise in the public estimation, and so from the beginning I had a strong wish that some time or other this curriculum should come into force. I was very glad to notice that the President touched upon one very important point. In future students will have to pay more and spend more time in entering the business, and it is the greatest kindness to show them at the outset of their career all the difficulties, all the rocks, and all the slippery places. I have had something to do with promoting Bills in Parliament, and I know the effect that a comparatively small body of men working unitedly and with a strong will has upon members of Parliament. From experience I know you must not overload the Bill or ask for more than there is a reasonable chance of getting. You must be prepared in fact to take a half loaf rather than go without bread. At the same time there is no reason why you should not shout for the whole loaf. I believe that we can show that we have right on our side when we contend that seven men shall not be allowed to do collectively that which is illegal for them to do individually; and I believe this too, that if you will only take the public by the button-hole and compel it to listen to you, it will admit the justice of your claim, and sooner or later it will grant that claim. Of course, the President is not asleep and knows the ropes. He comes into personal contact with the members, and we allow that his opinion should have more weight than ours, but I think the Council would do no harm, and possibly might do a great amount of good, if it would insert a clause to remedy that which is an admitted error. I think that this meeting will want the President when he gets back to his colleagues to ask them to see if there is no possible chance of inserting this clause. It might be taken out of the Bill at a critical moment if it were found to imperil the chance of the whole Bill passing. It does not seem to me that there is any more *à priori* likelihood of the Bill being wrecked because of that clause than there is of its being wrecked on the compounding clause. Whichever of these two things we can have, we shall take the wind out of the sails of those who are illegal competitors. We have no right to ask Parliament to help us against competition so long as that competition is open and above board. We have, as all men have, upon whom great responsibility has been thrown, the right to adequate protection in the exercise of that responsibility. I think we shall be listened to if we keep pegging away. I would rather see the curriculum put off a year or two, and the compounding clauses postponed a year or two, if by that means we could get removed from the Act of 1868 the error in reference to companies. The Bill as it at present stands will not really cut at the roots of what we feel to be a bitter injustice. There is one other thing which we can do, whether members of the Society or not. I am not a member of the Society. The times are hard. A guinea is 21*s*. I did not see that I was getting that amount of good for it. I kept the guinea. I know there are many more of the same opinion, but you have not the courage that I have. But whether we are in the Society or out of it, if this Bill is brought forward, and there is a fair chance of passing it, we can all squeeze our members, and, as has been said, they like to be squeezed. We cyclists, 25,000 of us, were strong enough by writing to members to get a clause in the Local Government Bill for England. Acting as the Bolton representative I received from the borough and county members promises that the request we made should be considered fairly on its merits, and that they would if they thought the request should be granted, do their utmost to get it complied with. If we lay our scheme before them in the same way, with the same united voice, we shall get it granted.

Mr. Carteighe, replying upon the discussion, said: I am very glad some of you have spoken out. I came here of course not to butter you nor to be buttered. I came to confer with you as men of sound common sense. I only claim for the views I express that they are better possibly than those of some of you, inasmuch as they are within the range of practical politics. That is the only difference between us. There are some points which are important to be considered. I do not know whether I may be permitted to explain carefully the matter, but if it is your pleasure I shall be happy to do so. With regard to the observations of Mr. Phillips and Mr. Hart I do not think it is necessary for me to say anything. I am a little disappointed at the observations of Mr. Taylor from one point of view. That is the point of view of consolidation; I shall come to that presently. He pointed out the advantage of consolidation. I want to remind you that we cannot all be cyclists, unless we all join our club or union, or pay our subscriptions. You ask me to get something for you without joining my body, without becoming my soldiers, and that is a fundamental error. Give me the united support of the trade, and I will pass anything. But the trade says "No; go and get what we want and then we will help you." That is exactly the position of the case. I am sure that is right. I do not want to take any undue advantage; I congratulate Mr. Taylor on his excellent speech, but I want to point out his want of logic. I do not mean to say anything unfriendly—

Mr. Taylor (interposing): I take it in the spirit in which you address me. Whatever is done, the trade, whether members of the Society or not, must help.

Mr. Carteighe: But you see they do not. We find, unfortunately, that those who are not with us are against us. They do not do us the honour you do me to-day, in speaking frankly with sterling good sense of what the Society has done. At the same time they say for reasons of their own that they do not choose to join us. Nevertheless, they have my hearty good will and I am doing what I can for them. This is the first time I ever heard anybody not in the Society say what you have said to-day. I ask to-day for your support whether you are in the Society or not. I ask you for your own good to join the Society and increase our general strength. There are other things besides the Bill which affect our trade interests, and above all I ask everyone engaged in the trade, if, for reasons of his own, he does not care to join the Pharmaceutical Society, that at least he will help us in what is for his good as well as for ours. I will go further. The greatest compliment I can pay Mr. Taylor is really still further to criticize him. I say his logic is wrong. I want the power as President to call on Mr. Taylor as a member, or as the local secretary, to work at twenty-four hours' notice. I cannot call upon him to do that if he is only a member of the trade. I have no claim. By trade unions wages have been increased 50 per cent., through the mere voluntary combination. That is the power I want for your good, for the good of the trade, and you say you will not come in. Do not you know what can be done in a town where every chemist belongs to a local association in regard to trade matters? You do not want Parliament to come and affect your prices, if you are unanimous on the point, and there are such things as competition that may be quite unfair and unjust that does not come from companies. There are at this moment, in my judgment, heaps of things of more consequence to your future life than that. The interests of your trade will be better served if at one sweep you could be all gathered into one body and agree to be bound by the verdict of the majority in regard to elections, to general principles, and certain other procedure. There would be more good got for the individual chemist and druggist by the power that combination would give us as a whole than by a new Act of Parliament. I am here to ask you what you think of this Bill, to hear your observations and objections. I have heard what has been said as to certain omissions. I wish particularly to remind you that the strength of the whole chain is as its weakest link. A man of Mr. Taylor's calibre not in the Pharmaceutical Society at Bolton is a loss to the trade, and I would rather that his subscription were paid by somebody else than that he should be outside. Remember that the working man puts by his fourpence per week for his trade union, and I think our subscription is about the same. My arithmetic is weak just now; I do not think it is much more. I have occasion to pay the club money of our work-people under certain circumstances, when they are ill or hard up. We do weak things sometimes. I believe it comes to 2*s*. 8*d*. per month in one particular union, and 1*s*. 8*d*. in another, and so on. But at all events I may say briefly that the weekly subscription to the Pharmaceutical Society at its present rate is not greater than that which a number of working men in this country voluntarily surrender for their interests. And I submit that if the Pharmaceutical Society has not done enough for you in the past, not done as much as might have been done; if it is not doing as much as it ought to do now; the responsibility lies upon yourselves. You must, if you will have power, combine together, and it is with that object I have been advising you. I say that if every registered person were in the Pharmaceutical Society, all properly organized, our powers, without going to Parliament, for doing good to each other and to the whole trade, would be immeasurably increased. With reference to Mr. Cooper's observations, our notion was to get power to divide the examinations, to have part of the qualifying examination taken at places like Manchester, reserving the final to be taken in London or Edinburgh. Of course, any further modifications would be determined by circumstances and convenience. Our object would be to give apprentices, after they pass their Preliminary examination, a stimulus to work, and to let them pass examinations without going very far from their homes or away from their business. In that way we should keep up the interest of the apprentice during the whole of the time, and he would be a better man then than if allowed to do what he very frequently does, and what sometimes his master does not trouble his head very much about. Sometimes the apprentice cares nothing about the question as to how he shall pass the examination until after his apprenticeship is over. Then he comes to Manchester or London, and imagines that the three Manchester courses of cramming will be enough to deceive the Boards of Examiners, until he finds out his mistake. With reference to Mr. Kemp's observations and Mr. Taylor's observations, as to companies, if you please, I will take them together. There is a great deal more in the whole of this question than many of you know. We have often been accused of not telling you all the difficulties that beset legislation on this very thorny subject. If we have not told you always the knowledge we have had at our command—which all of you have not had at yours—it is because we have not hitherto been disposed to advertise facilities for competitors in our own trade. There are times when it is not advisable to publish to the world the facilities with which other people can fight the battle against you. We had an opinion years ago, not differing very much from what we have now, in regard to these companies. I am going to put a proposition to you. Is it equitable, is it just, for seven executors or trustees of the widow of a deceased chemist or druggist to keep open a shop? [Mr. Kemp: No, sir.] That unfortunately is in the Act of 1868. My friend, Mr. Kemp, is logical. I personally go with him. I am bound to tell him I opposed that clause in 1868, although I was then a young man, as striking at the root of the main principle of the Bill. I held that the moment the deceased qualified man dies his business ought to be carried on by a qualified successor. When once you introduce the doctrine that a widow can carry on the business and call it hers and her trustees', whether they be two, or four, or seven, and that they can carry on the business by means of a qualified assistant, you alter the character of the whole Bill. At the present moment, as for a number of years past, the popularity amongst the trade at large of this power of leaving their businesses to their widows is so great that it is hopeless to argue with them on the subject. You cannot touch the companies unless you get rid of the widows' section. You have no case. On going to Parliament, we are asked why a number of say seven men should not carry on the business by means of a qualified man, when seven trustees of a deceased chemist and druggist can. What is the difference to the security of the public in these two propositions? [A Voice: None.] Very well, then. That is my answer to the drug trade. When they tell us they will forego this particular privilege we shall be very happy to attempt legislation. The thing has been before us over and over again. We have proposed to shorten the time. We have proposed in previous Bills that three years shall be the utmost limit of time in which the business of a deceased registered person shall be carried on in the way allowed by the Act. But the moment you talk to the chemist and druggist about the widow he loses all logic and all reason. It is perfectly true, and I remember as well as if it were only yesterday, the storm of surprise and indignation with which my old colleagues on the Council of 1868—some of whom were old enough to be my grandfather, and most of them old enough to be my father—ridiculed the notion of the "impetuous young man," who wanted to get rid of the power to leave a business to a widow for the benefit of the family. I know nothing more painful than the words said to me by most intimate friends. I was looked upon as a cruel and irresponsible person, and as being even naughty. It was in vain I argued that a medical man could not practise by a widow, that a solicitor could not practise by a widow, that, in fact, no qualified person could practise by a widow, and that it was essential to the principle of the Bill, if it was to be carried out, that within the shortest practicable time the business should be sold and disposed of to a registered person, and carried on in the registered person's name and for his interest. That is what I argued. I did not want to put myself forward as a great prophet. I was horribly beaten then, even mangled. I was called an "impetuous young man;" I was told that I was not married, and that the time would come when I should take a different view. I am sorry to say that my colleagues were right in guaging the views of the members of the trade whom we represent, because this widows' section is the most popular in the Act. You will see this is so if you go through the ranks of those who complain about the companies. Those who complain most are the first to take advantage of this power of leaving their business to their widows. I remember in one case a member of the Council saying that he would stir up the whole of Edinburgh in opposition to any proposal to curtail the rights of chemists' widows. I consider this illogical, but I have to deal with it. I am sent to the Council in your behalf to do constructive work, not to quibble. It is no use my crying over spilt milk. If you go to the Council of the Pharmaceutical Society in the spirit in which Mr. Kemp has made his observations, and in the spirit in which Mr. Taylor has spoken, I say it is no good. It is not a bit of good. If you go to Parliament on that platform you will only be laughed at, as long as you say that any person shall be able to leave his business to an unqualified widow, under the guise of trustees, or otherwise. My friend here, who has evidently refreshed his memory with the legal case, will remember that case was lost to the Pharmaceutical Society because of that very clause. The judges said "You, the promoters of the Act, the trade at large, the Pharmaceutical Society, have admitted that it is safe for the public, in the case of a widow, if the business of the shop be carried on by a qualified man, and we fail to see that the public will be damaged if seven persons take the profit, provided the manager of the business be a qualified man, like the widow's man." I feel you would think me a coward if I did not state this. That is what has brought the whole difficulty on our hands. Mr. Kemp and I would say "Turn back, alter and amend." There is not the slightest chance; the sentiment of most of the members of the drug trade is so tremendous on this issue. It is so inherent that we have not dared of late years to raise it. When judgments were given in the courts, Mr. Kemp will remember, the press and the judges went out of their way to do two things. They said if you intended to say in your Act that you included corporations you did not say so. They did not say anything about an oversight. We have concocted that to make their sayings fit in with our desires. What Lord Selborne said was that a qualifying person handed over the poison. He was a registered chemist and druggist, and judgment would be given against the Pharmaceutical Society. Lord Selborne also said—I am giving the correct substance, though not the exact words—"I should have had difficulty in coming to this conclusion if I thought the public were in the slightest danger from the result of our judgment. In this case it seems to me they are not. The person who hands over the poison is in the case of a corporation the seller." Practically the judgment made two classes of sellers—a man who keeps open a shop on his own account and sells drugs, and a widow and executors who sell by means of a qualified man. The mischief caused by that clause is now deep-rooted. The public have taken hold of it. We have drafted a Bill to deal with corporations, and I have seen the officials of the Government about it. They say, "No; we have taken the opinion of our advisers. We do not accept that." They introduced a Government Bill in opposition to ours, in which they proposed to deal with stores on the principle already admitted. They said, "The only grievance you have against stores or companies is that the name of the person who sells is not put up over the part used for the sale of poisons." That is as far as they will go. If you look at the temper of the times, at the interest members of Parliament have in such stores [A Voice: "Now you are coming to it."], if you look at every conceivable portion of the community, if you see where your defect lies—you yourselves have a weak widow clause—I think you will admit there is some difficulty in dealing with it. We have consulted counsel from time to time in regard to this; we have had papers writing about it, we have had opinions given by judges, and they speak from the common sense point of view in regard to this clause. They maintain that no injustice is done to the public as long as the person who hands over the poison is the seller. There is no danger to the public, and to guard against that was the object of the Act. There was a time when we had some doubt whether we could hit the man who sold for the corporation if he was not qualified. We have succeeded in doing that, and we have to some extent been instrumental in smashing up a number of bogus companies in certain towns by going against the unqualified seller, who is often one of the principal shareholders, and recovering several penalties. Many of these cases are not reported. People have paid the fees into court and we cannot say anything about it. We have the power in our hands, but it is somewhat difficult to find out the servant. We have the power to insist that in every bogus company nobody but a qualified man shall sell poisons, and that does, to some extent, give us a little better position than if they were absolutely free from every provision of the Act. The spirit of the age is combination. The Companies' Act was never intended to be used as it is. We have made efforts to remedy the Companies' Act, because that is where we feel it. It seems absurd that any seven persons can go to a Government officer, pay a small sum of money, and create themselves into a corporation. That is an absurdity. Remember the dentists are in the same boat, and the veterinary surgeons. Dentists' associations, limited, are advertised and all the rest. We have been working quietly in the dark. We do not choose to let the enemy know what we are doing. We have had interviews with the Lord Chancellor, the President of the Board of Trade, and presidents of various bodies, pointing out this. They have admitted the anomaly, and they say: "We cannot devise any way by which we can get what you want without affecting thousands of other people, and it cannot be done. If you want it, it must be done by the Legislature." By way of parenthesis let me tell you that the present Lord Chancellor, although he sympathized with us, and would himself vote for any such thing, said: "My dear Mr. President, in the present state of the House of Commons and public opinion, as represented in the House of Commons, I am afraid you have no chance of being listened to." That from a man who took our side is worth listening to. My answer to you about trying is: "I cannot try unless you are powerful enough to back me." Remember it will not do to shut our eyes to the fact that all these actions by companies are not evasions of the law; they are the law. It is very annoying and galling, but it is the law. It is law by judgment, and we have to upset the law, and point out that the judges were wrong in their conclusions in the interests of the public, before we can get the House of Commons to consider our case I am sorry for it, but it is better that you should know it plainly. I am not deficient in pluck, but I cannot face what you ask me to do. We feel the case is hopeless unless the whole trade of this country were at our back. Then there might be a chance, and then it would have to be worked in the same way as an ordinary political Bill is worked. You would have to be devoted throughout the country, and to talk to your members of Parliament upon it. How many members of the drug trade have approached members of Parliament during the last few years on the subject of companies? How many of you in this room have ever taken the trouble to influence a member of Parliament in this direction? Not many I am afraid. You do not all answer at once. [A Voice, "One."] I say we should want you to be organized in every borough, and in every county division, and at the general election we should want you to be powerful enough to keep the grocers and the people interested in the companies at bay before there would be the least chance of success. If you were prepared to do that throughout the length and breadth of the country there might be some hope, but if you are content to sit in your shops, and say you have not time to do it and will not help the Pharmaceutical Society and the Council, I assure you it is utterly hopeless. Mr. Phillips has referred to Mr. Harrison, but Mr. Harrison, with all his desire to move in the matter, has not had the courage—I will not say courage—he has not thought it practicable to propose anything more than a question of title. Mr. Harrison proposed that for the present the existing companies should be legalized, but that no further companies should be formed except under certain conditions. He failed to get that listened to. I may point out to you that such a measure would have allowed an indefinite multiplication of companies in the shape of branch stores. A company could open branches all over the place and it would have a privilege that would be worth a large sum of money. It would be very quick in using its powers, and personally I should prefer to fight the companies as they are now than fight companies made specially active by being limited in number, with power as they would have to open drug stores wherever they thought fit. The fact is you would increase the capital of those men. We succeed now because they sometimes are deficient in this capital, but you would increase their capital, and our distress in many out of the way districts would be infinitely greater than it is now. That was the proposition of Mr. Harrison. Afterwards he proposed that it might be desirable to prevent companies from using the title of chemist and druggist. We have been told in very unmeasured terms that we do not care for the title, because I happened to make the observation that for practical purposes it is not worth while trying to deal with the title with our present powers if you cannot deal with the sale. We cannot get a conviction of any person for the use of the title of chemist and druggist unless at the same time he sells poison. The title of chemist is used in so many ways, apart from pharmacy. The word chemist, as the word goes, is not a person using any name or distinction implying that he is registered under this Act. The way that a magistrate or county court judge looks at the matter is this. If this person is using the title for the purpose of selling poisons, prove that he is and we are satisfied, and obviously if we cannot prevent a corporation having a profit on the sale of poisons we could not convict them under this clause for using the title. That is, if they could not be convicted of selling. The two things hang together. A corporation is held by the law to be incapable of being examined, and the judges have chosen to regard companies as being persons who, if they carried on their business by means of qualified chemists and druggists, could do the various things under that Act from which ordinary individuals are restricted. That is the whole thing. We cannot recover penalties simply for the use of the title in any case. We have often had to consider it and try it, and we think it simply useless to move in that direction. The root of the evil is in the Companies' Acts, and in the mode in which the powers under those Acts are used. I am sorry to say that the old and respectable morality of tradesmen, apart from professional men, seems to be departed. We used to think it was a grand thing for a man not only to run the risk of losing what little he had in his occupation, every stick, if he made a mistake, but now we find every form of business being carried on by companies. It is a perfect rage and mania. Are we to choose this time, when all these things are rolling on the top of the tide, to go to a Parliament, elected at such a time, without any support, without any agitation by any of you in different parts of the country where men are being elected, without any chance of being listened to? When I have been in the lobby of the House of Commons I have been working in this direction. The Curriculum Bill was a peg to give me an introduction and to talk to various members. When I get hold of them they say that seems very unjust. Then a cold blood on the other side says, "You speak about unqualified persons not keeping qualified assistants. My neighbour round the corner, though qualified, is never in the place. He has got a good many unqualified assistants. I do not say whether they are all unqualified or not. Which of these two businesses do you think, Mr. Member of Parliament, is most dangerous to the life of the public?" and the member is puzzled. I have been to the Government. You will say the Government changes, but for the purposes of such acts as ours the Government never changes. The subordinates, the under secretaries, are persons who keep on continually, and these are the persons who advise the Government of the day that such a thing is not required, is not desirable, and not necessary. Whatever Government is in office takes the advice of those subordinates who are supposed to know all about it. You have to beat the Government as well as persuade the House of Commons, and that can only be done by every one of you becoming a power and capable of exercising power upon members of Parliament. I have not seen any desire on your part to exercise it. If you can promise me that by next Christmas every registered chemist and druggist would so organize himself there might be some chance. Without that I assure you, though my heart is completely with you, with all the activity I am supposed to possess, I know it is hopeless. Then we must not be met by the charge that the Pharmaceutical Society represents only two-thirds of the trade or whatever it is. Give the President—whether Mr. Carteighe or someone else—there are plenty of excellent men who would probably make better Presidents than I—such a power that their suggestions would be practical. Without power they are hopeless. In conclusion, let me remind you that even if you were successful, it would take some time to accomplish. Are you quite sure that an Act of Parliament would give you better prices than you get now? Are you quite sure the members of our own trade do not do us quite as much harm as these bogus companies? Did we never hear of this sort of thing before the bogus companies came? By bogus companies I mean outside separate companies. I used the term for convenience, and not offensively. In London we have had these things to meet ever since just after the Act passed, and I am bound to tell you some of us think the harm done to us is greater from those persons who are registered than from these bogus companies. No Act of Parliament will protect us there. I say consolidate yourselves and act with professional spirit, realize your position, and then there is some chance of your doing some good. And now I should like to refer to two errors. I should not like them to go uncontradicted. Mr. Young is mistaken in supposing that the London University does not require a curriculum. When the degrees are granted by law a curriculum is always required. A degree in science is not a legal one. May I also remind you that the authorities in London, assisted to some extent by your excellent authorities at Victoria University, are advocating a teaching university for London, for all the degrees. They have found out that mere examinations do not do what was expected of them. As to the powers the Society has in reference to patent medicines I hope Mr. Young will be good enough to leave it for a little while. If we have that power and we use it, it must be used under such conditions as to ensure absolute success. If we lose we shall do ourselves tremendous harm. I am quite prepared to fight, but when I do I want all the conditions on my side. You think we are doing nothing, but we are waiting for a suitable opportunity. If we failed the very objectionable result would come to pass that the grocer would be allowed to sell poisonous patent medicines, notwithstanding the fact that they are labelled poison. It is the law—I am not a lawyer but it is my opinion—that every patent medicine containing a poison must have the word poison put outside. In the Matthias case that view was upheld, and it was stated that the Treasury would prosecute in all cases that came within its cognizance. Any person may bring a prosecution before an ordinary police magistrate; the Pharmaceutical Society is not the sole prosecuting body. In the early days the intention was that the police should do it. We have not hitherto considered that it is our business to attack people on the question of the label. For one reason we do not want to harass our own people who sometimes forget the label themselves. If the point were taken to the Court of Appeal, and it was held there that every preparation containing poison should be labelled poison, and we were asked to take proceedings to ascertain whether an unqualified person could sell it, we should be bound to try it. I hope we should win it, but if we did not then the grocers would have in their windows bottles labelled poison, and they would by that convey to the public an intimation that the grocers as well as the chemists could sell poisons. I do not think that would be an advantage to the trade. And now I have only to ask you whether you will support us or not. If you say you will not we know where we are. But how is it possible for an officer, however able he may be, to lead you to victory, if he has no soldiers behind him?

The motion was carried unanimously.

Mr. G. S. Woolley said: I will not detain you one moment, but it is very important we should pass one resolution. I propose, "That the best thanks of this meeting be accorded to Mr. Carteighe for his presence and for his valuable address." I would just like to say this—there is no man living who has shown such self-devotion in the interests of pharmacy and pharmacists as Mr. Carteighe. In my opinion there is only one man who has gone over to the majority who equalled him and that is the late Mr. Jacob Bell. Nobody can form any conception of the amount of time that a man, who does his duty on behalf of the Pharmaceutical Society in the manner that Mr. Carteighe does it, is taken away from his business. It makes a tremendous call upon his time, such as very few of us have any conception of. The least we can do is to pass the resolution I have read. I have held for a long time that the great thing for us to accomplish down here was to get a good representative meeting of the trade face to face with Mr. Carteighe. I was quite confident he would do us good. I am sure he must have carried conviction into your minds. The way in which the resolution was carried shows he has done that in the case of every man in the room. We are deeply indebted to him for the trouble he has taken and the time he has spared in coming down here to address this meeting. I beg to move the resolution.

Mr. T. Kay: I rise with very great pleasure to second the motion, because Mr. Carteighe is of all the Presidents of the Pharmaceutical Society I remember, since the time of Jacob Bell, a governor, a master, and a captain of the ship of pharmacy. I wish he could represent some borough in Parliament. We ought to have a representative in Parliament. I should be very glad to help to put him in, because there he would be a power, an able and an argumentative power. Without that in the House we have very little influence indeed. I am perfectly persuaded from my own knowledge of the members of our district we can secure their adhesion. If you will all work together I have no doubt you can get the Bill passed. I think you might extend the Bill and make this pharmacy educational establishment of ours in London into a university of pharmacy. I think you might carry the higher examinations to such a pitch that you might institute degrees of bachelors and masters of pharmacy. These would be very desirable degrees. I beg to ask you to give your very hearty thanks to Mr. Carteighe for the able address and for meeting us in this grand spirit.

The motion was carried with acclamation.

Mr. Carteighe: I am very much obliged to you. I have already detained you so long that I will not enlarge further, except to say that if I have not been in Manchester before at a representative meeting of the trade it is not my fault. I have never been asked.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The opening meeting of the session of the Midland Counties Chemists' Association took place on Tuesday evening at the Midland Hotel, Birmingham, when Mr. A. Southall (the President) delivered his inaugural address. There was a large attendance of pharmacists of Birmingham and the district.

THE PRESIDENT'S ADDRESS.

The President in his address said: It is usually expected that the President shall give you some review of the past, and I propose saying something about the events of the last twelve months. In pharmaceutical politics several, perhaps in themselves small circumstances, seem to indicate a prospect of greater activity. Although we must not expect any legislative measures to be in any sense a panacea for all the ills to which pharmacy is heir, still we may confidently look forward to a considerable enlargement of our privileges if the Pharmacy Bill just now adopted by the Council should become law, and on that account it behoves all pharmacists to work with a will for the furtherance of that Bill. With your permission I will briefly scan some of the provisions of this proposed Act, which will, I think, enable us to obtain some idea of its value; but I should be sorry if this brief sketch should serve to prevent any of my hearers from carefully studying the provisions of the Bill for themselves. First there are two clauses empowering the Pharmaceutical Society to apply an educational curriculum, and to divide the examinations as may be deemed most suitable. For instance, at present there is no power to enforce a longer period than three months between the Preliminary and the Minor; consequently many apprentices do not attempt the first during their apprenticeship, or at the best often leave it until the last year, when they undergo a species of cram to enable them to gather together their old school knowledge, which has been scattered to the winds through neglect. Following on this they gorge themselves with doses, formulæ and "tips" relating to materia medica, pharmacy, etc., and present themselves after, say only three months, for the Minor. This is well known to us all, and we all admit that some change would be beneficial, not only to the public, by the pharmacists being better trained, but also to the future pharmacist himself. Knowledge, like food, should be taken in gradually. Food taken in too hastily is not properly assimilated, and consequently does not nourish the body; the gastric juices have not a chance to do their work, and indigestion follows. We suffer doubly. We receive harm negatively by not being nourished, and positively by actual disease. In like manner there is a corresponding mental dyspepsia, and it is precisely this unhealthy condition which we wish to avoid.

Now if these clauses become law, the Council will probably impose a bye-law to the effect that the embryo pharmacist must have passed his Preliminary, or its equivalent, before he commences his apprenticeship. This will have the effect of preventing the less studious youths from entering the trade at all, and apprentices would consist of a class of young men, who would, generally speaking, find the necessary studies for the qualifying examination more or less to their taste. This will be further ensured by the division of the qualifying examination, the apprentice being required to present himself for the former part during his apprenticeship. To aid him in his studies it will be advisable for the master to allow time for his attendance at courses of lectures, whereby his studies will be turned into suitable channels, and so relieve the master of some of the responsibility of the theoretical education of his apprentice. The cry of *cui bono*? will again be raised from many lips. Why should pharmacy be burdened with a curriculum, when it presents so few advantages over ordinary trades? We know that if a pharmacist is to be looked up to as a man capable of advising his customers on subjects connected with science, hygiene, etc., etc., he must be far better educated than is the case with the great majority of the present day. This superior education will be best attained by a thoroughly efficient curriculum of the subjects connected with his own profession, combined with a special reading, which most of the graduates in pharmacy will then spontaneously follow up, as a love of science, especially applied science, will be the usual outcome of such studies. This education, besides giving its owner a far keener enjoyment of life on its own account, will at the same time supply him with the tangible advantages arising out of the possession of the confidence of his neighbours. Moreover, the pharmacist will then be upon a footing somewhat approaching that of his brethren in Germany, Belgium, Denmark, etc. He will be the adviser of the medical man upon chemical and pharmaceutical matters, and he will be in a position to train himself still further to fulfil such duties as those of the public analyst. I trust that I have said enough to convince you, should anyone have been sceptical beforehand, that a curriculum would prove a real benefit to our craft, especially if, as some of us hope, the progress of the student will be tested not once only at the completion, but two or three times during his apprenticeship. The knowledge thus gained will be retained, and will fit our young men for the more severe studies required for the Major or honours examination.

Clause 6 gives the present associates in business the power of becoming full members of the Society, and a similar right to the Minor man when commencing business, or at the age of twenty-five years, and so satisfies those who do not think it worth while to pass the Major examination.

Clause 7. This provides that the dispensing of prescriptions shall be reserved for chemists and medical men only. It needs very little comment to enforce the value of this clause; it practically brings to pharmacists what should be the most important part of their business, and it will tend to raise them more than anything else to their proper position in society. This I believe we can obtain if we act unitedly. And here let me urge that we should all sink our petty grievances and support with a will this Bill, in order to gain what we can in the way of legislative protection for the general body of pharmacists.

Clause 9—the Juries' Clause—exempts the Minor man from serving on all juries and inquests, and gives him in this respect the position now held by the pharmaceutical chemist. And lastly, Clause 10, the councillors are to be elected for three years; this will give a feeling of greater responsibility, and as Mr. Harrison remarked, it will also give a degree of continuity to the policy of the Society.

But now I want to call your attention to the proposition of Mr. Harrison. In very eloquent language he urged the Council to have a clause added to the Bill to prevent the starting of fresh stores or limited liability companies, but at the same time to legalize those now existing. For my part I can hardly believe the Legislature would thus put a stamp of legality on what is acknowledged by all to be a way of evading the law and depriving the public of that security which they have a right to expect from a proprietor of a business. I cannot believe such a clause would pass. But if it did it would certainly do us much harm. And while urging you to give your hearty support to the Bill as brought in by the Council, I would ask you to oppose heartily this suggested addition. Our Irish brethren have succeeded in obtaining their Bill—not exactly what they wanted, but what our rulers thought was good for them. Why should not we be equally successful?

This year, for the first time in our history, we have been requested by the Medical Council to assist in preparing the Pharmacopœia addendum. This is certainly a step in the right direction. Hitherto we have been completely ignored; now, thanks to our better education, we are requested to consider the best modes of preparing and exhibiting medicines for the prescriber's use. It may be we have some of us long considered we were fit for this work, but now it is acknowledged by others that we are. No doubt the establishment of our research laboratories, and the general advance of pharmaceutical energy, which has been going on steadily during the last few years, have materially contributed to this recognition. The work of the medical profession is so closely interwoven with that of pharmacy that it is of the utmost importance that the two should go on harmoniously and on parallel lines without any friction. Such matters as the Pharmacopœia Addendum tend in no small degree to this mutual harmony, which is both advantageous to the professions and the public good. If we can but row well together, I feel sure there are few things which we shall be unable to obtain either in politics, or elsewhere, and gradually, but none the less surely, the mutual jealousies now existing on account of the prescribing of chemists and the dispensing of surgeons will cease to exist, because the causes will be removed by tacit agreement.

I now pass to the consideration of some trade subjects of interest to pharmacists. A large quantity of methylated spirit is sold by chemists. In some parts of the country, we are told, the poorer classes use it as a cheap drink to a great extent. With a view of putting a stop to this bad and dangerous practice the Inland Revenue proposed to prohibit all small sales, and to compel chemists and others to keep it put up in quart bottles, allowing it to be sold only in this form. The Pharmaceutical Society here did good service. We instructed our President to see the authorities and show them how useless such an arrangement was. The sale of reputed quart bottles at 10d. each would not prevent drinking, and on the other hand such a quantity would often be unnecessarily large for domestic purposes, and would but hamper a legitimate and useful trade. You will remember that our capable and eloquent President was eminently successful. The authorities were convinced of the uselessness of their proposed action, and we have still the sale of methylated spirit, instead of it having become a bottle trade, and so passed into the hands of the stores, limited companies and publicans. But we now come to a subject which is of some trade importance, and in which we are at the present time liable to be much hampered. Since the early part of last year, when a Bradford chemist was fined for the sale of beef wine, numerous communications appeared in the trade journals respecting the position of chemists with regard to the wine licence. As the law at present stands there is no doubt that the medicated wines sold by pharmacists must be so far medicated as to be too unpleasant or too dangerous to be used as beverages, or simple stimulants, otherwise the seller would be obliged to take out a wine licence. He therefore has two courses left open to him, either to render his wine sufficiently unpleasant or to take out a licence. The wines of the British Pharmacopœia, except orange and sherry, may safely be considered outside the scope of a wine licence, while pepsin and coca wines have been specially exempted from the law, under certain restrictions as to strength laid down by the Inland Revenue department. Pepsin wine must contain not less than 2 fl. drs. of strong hydrochloric acid and 320 grains of pepsin per pint, and coca wine is to be prepared from the leaves, and contain not less than half a grain cocaine per fluid ounce.

There can be no question that the proper position for the pharmacist to assume is that of selling true medicinal wines only. Unquestionably a great many of the so-called coca, beef and other advertised wines are nothing more than wine with a suspicion of medicinal value, and are bought chiefly for surreptitious tippling. Assisting such practices as this (I speak now altogether apart from my known connection with the temperance cause) is surely dishonouring to a class of professional or business men, who profess to be seeking the good of the public by supplying them with medicines to heal their sicknesses, under which category it is hard to place the tipple of those who are too weak to resist the covering of so-called medicine. To take action on these lines of course means inability to sell many of the popular advertised wines, but surely the chemists of to-day ought to have burnt their fingers enough over the proprietary medicine trade, to prevent them from doing the same over proprietary wines, which are of doubtful medicinal value.

During the past year a few new drugs have either come into use or greatly extended their popularity; amongst these there are six which seem likely to take a permanent place on our shelves. I refer to aristol, chloralamide, exalgin, phenacetin, pyoktanin and sulphonal. These have been introduced by German, not English chemists; in fact, we have to look to Germany or France for almost every advance in the direction of new remedies. This is undoubtedly due to the admirable laboratories and excellent scientific education, so far in advance of our own. Surely it is time we shook off this disgrace and once more took our position in the van of chemical research.

The constitution of these bodies was ably discussed by Mr. Hodgkin at the recent meeting of the British Pharmaceutical Conference. I need, therefore, not enlarge on that point. The speaker having indicated briefly the properties and uses of these new remedies, continued,—

When next any of you visit London I would recommend you to pay our London home a visit. I think you will acknowledge that 17, Bloomsbury Square, is a place of great interest to the pharmacist, and altogether a very creditable establishment. Those of you who knew the place in former days will be interested in the improvements of the last few years, those improvements on which we have been spending some of our savings. The two houses next to No. 17 have been rebuilt this year. The one is to be let as a private house; in the other we have placed our offices on the ground floor; previously they were upstairs and very inconveniently situated. Then on the first floor we have a new Council Chamber, larger and better ventilated than the old one. Doubtless the increased air and space will bear fruit in the wiser and more efficient work of your councillors. The other rooms are used for committees. These improvements have given space in the old premises which has been adapted for other purposes. Our old Council Chamber now forms part of the Library, which had long ago grown too large for its location. Then, too, the recent improvements in the premises in Galen Place have provided us with a magnificent Examination Hall, Research Laboratories, and a less elaborate laboratory for practical pharmacy. At the present time our Library and Museum are such as to kindle a flame of honest pride in the minds of those who may justly consider themselves as part of the Pharmaceutical Society. I think we may say that a good deal has been done during the past year, but much more might have been done had the chemists in the country been united. The cry always is that the Pharmaceutical Society is no good, not worth supporting; it never takes up trade matters. And so the larger proportion of chemists keep themselves aloof from the Society. The late Trade Association was supported no better and allowed to die; many chemists wish it was alive again. But it is no good crying over the past. What can we do for the future? Anything we like if we are only united. If we can show our M.P.'s that we really want help to enable us to carry out the law of the land, we shall obtain it. Now we are told that the Council do not represent the trade, and the result is that our Bill is opposed by a number of chemists. If the proposed Bill were supported by the trade generally it would pass, and would give us much power which we do not at present possess, power that would be of the greatest advantage to us. Birmingham, although its motto is "Forward," is no more united in aiding pharmaceutical politics than the rest of the country. As a local Association we often have good meetings, but our young men do not take the interest and active part in them they might. They do not read papers, nor do they assist us to form classes. Our proposed Bill will not do everything for us. We must be willing ourselves to work, and that energetically and unitedly.

Mr. W. H. Pullen, in moving a vote of thanks to the President for his address, characterized it as a very able and interesting one. The remarks made with reference to the necessity for combination were well timed, for if chemists applied combination to their own interests they would obtain a far better position, a far greater voice in the management of their own affairs, and a better opportunity of going to the Government and telling it that their education entitled them to fuller recognition. They had many disabilities but few advantages. The Acts of Parliament which had already been passed had been to their advantage, but combination would still further improve their position. He agreed with the provision of the proposed Bill relating to the curriculum. Education was the basis of an improved social position. The curriculum would give them that, and in time their position would be improved.

Mr. G. E. Perry seconded the proposition, which was agreed to, and in replying the President said Mr. Carteighe had promised to visit Birmingham on the 18th of November.

A musical evening followed.

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE PHARMACY ACT.

On Monday, October 27, 1890, the case of Richard Bremridge, Secretary and Registrar of the Pharmaceutical Society, against Thomas Shields, residing at No. 36, Dundas Street, Glasgow, for four infringements of the 1st and 15th sections of the Pharmacy Act of 1868, in selling scheduled poisons, he being unregistered, was heard before Sheriff Balfour in the Glasgow Sheriff Court.

Mr. T. Shaw, advocate, and Mr. P. Morison, S. S. C., Edinburgh, prosecuted. The defence was conducted by Mr. A. Orr Deas, advocate, Edinburgh, and Mr. William Robertson, solicitor, Glasgow.

The libel charged the accused with four distinct sales of scheduled poisons in contravention of the statute.

The accused pleaded not guilty.

Mr. Deas stated he had no objections to the relevancy of the libel.

Mr. Shaw: Well, then, I shall lead my proof. My first witness is Mr. Hill.

John Rutherford Hill, sworn, examined by Mr. Shaw: I reside at 36, York Place, Edinburgh. I am Assistant-Secretary to the Pharmaceutical Society. Mr. Bremridge is Secretary to the Society, and Registrar under the Pharmacy Acts of 1852 and 1868. The Society has a Council under Act of Parliament, located in London. Mr. Bremridge, the complainer, acts under its authority I am also a registered pharmaceutical chemist. About the beginning of August this year I received instructions from the Registrar to investigate the manner in which the business at No. 37, Dundas Street, Glasgow, was being carried on. The correspondence between Mr. Bremridge, acting for the Society, and Dr. Faulds, whose name was connected with these premises in Dundas Street, was sent to me. Among other documents forwarded to me were two letters from Faulds, one dated 26th June, 1890, and the other of 7th July, 1890, which I now produce. These were sent with copies of the letters of 23rd June and 1st July from Mr. Bremridge to Dr. Faulds. Notwithstanding the letters from Mr. Bremridge to Dr. Faulds, and the protest contained therein, the business was continued without any change. In consequence of that I was instructed to make further investigations. I was also instructed to make purchases from the premises in question, and to ascertain the standing of Shields, the accused, and the manner in which the business was conducted. The accused is not duly registered or qualified under the Act. I establish that by producing a copy of the Register for 1890, in which accused's name does not appear. On the 14th of August last I went to Glasgow and called at the shop. The accused was alone in the shop. I made a purchase from him of a small bottle of steel drops. The shop is not a large one. There is a small portion at the back partitioned off, with a door leading from the front to the back. I made five visits to the premises. There was never anything going on in the back shop, so far as I could see, and the door leading to the back shop was always open. My second visit was on the 9th September, about half-past four in the afternoon. I was accompanied by James Allan, who is a witness here to-day. Allan acts as my assistant in the premises of the Pharmaceutical Society. Before starting I had taken the precaution to write out a prescription. When I entered the shop I handed it to the accused. There was no one in the shop beside him on that occasion, nor in the back shop. The contents of that prescription were *inter alia* 1 grain of hydrochlorate of morphia, and 1 dram of chloral hydrate. After furnishing him with that prescription he made it up. He entered it in his prescription book kept on the premises. The number on the prescription, "B. 73045," is in accused's handwriting. I saw him write it. The witness Allan was present during the whole of the proceedings. I now produce the prescription which he made up. The label bears date 10th September, 1890 [shown bottle]. That contains the poisons I got on the 9th September, On the label attached to the bottle the following docquet was put by me, "Purchased at the shop, 37, Dundas Street, Glasgow, on Tuesday, 9th September. Sold by Thomas Shields. Analysed and found to contain hydrochlorate of morphia and chloral hydrate." The statements in that are correct. I tested to see whether the prescription had been accurately made up and contained the poisons specified. I found that it contained the poisons mentioned in the first count of the libel. I made the analysis the morning after I purchased the medicine. That is part of my business as a chemist. Both of the poisons in the prescription are struck at by the 1868 Act. There is a fatal dose in that bottle. During the time that Allan and I were waiting, while accused was dispensing the prescription, there was a constant stream of customers coming to the shop. There seemed to be a fair business done. I paid 2*s*. 2*d*. for the bottle. I again visited the shop along with Allan on the 12th of September. Previous to my visit I had written out a prescription which I now produce. I again found accused alone in the shop. I handed him the prescription and obtained a bottle of medicine, which I now produce. The label attached to it contains a correct statement of the facts. I analysed the contents and found they consisted *inter alia* of the quantities of chloroform and liniment of belladonna prescribed. That bottle contains several fatal doses. There was nobody assisting accused either in the front or back shop on that occasion. I returned to Edinburgh and analysed the contents of the bottle. Allan and I again visited the premises on the 15th of September, about 9.30 in the morning. There was only a servant girl in the shop, and I handed her the prescription which I had previously written out. She told me that accused was not in, and accordingly we called back about 8 o'clock in the evening. I found accused in then. There was nobody in the shop with him nor in the back shop. The prescription which I now produce was the one furnished to him. Attached to the bottle is a docket written by me in Edinburgh, which contains a true statement of the facts. The bottle contained 1 fluid drachm of dilute prussic acid. There is a mistake in the dispensing of this prescription, inasmuch as it measures 7½ fluid ounces instead of 8 fluid ounces. The bottle contains one of the most powerful poisons known, and the poison is not sufficiently diluted. There is a great deal more than a fatal dose in that bottle. Allan accompanied me on that occasion and saw my movements, and also witnessed my analysis on every occasion. On 23rd of September we again visited the same shop about 4 o'clock in the afternoon, and presented the prescription I now produce. Accused was in the shop. There were two gentlemen standing speaking to him in front of the counter. I heard that the conversation had reference to a supply of poison. They evidently wished to have poison for some purpose or other. One of the gentlemen asked for 1 ounce of cyanide of potassium.

Mr. Deas: I object. We have nothing to do with that here.

Mr. Shaw: I will leave that point.

Mr. Hill (continuing)—I waited to hear the conversation out, and then presented my own prescription. I got it and took it to Edinbugh, and analysed it in presence of Allan with the result docqueted on it. It contained a quantity of arsenic and strychnine. That bottle contains more than a fatal dose. I paid for the prescriptions on each occasion. I paid 2*s*. 2*d*. for the first, 1*s*. 8*d*. for the second, 1*s*. 6*d*. for third, and 2*s*. 4*d*. for the last. On all those occasions there were customers coming and going out and into the shop. On some occasions it would be twenty minutes before I would be served. I never saw any medical man consulting in the shop. The wrappings of the bottles and the corks were sealed with the name W. G. Andus, chemist, 37, Dundas Street, Glasgow. He was a registered chemist, but he is now dead. I think he died about two years ago. His name is not in the register now, and was not at the time of this complaint.

Cross-examined by Mr. Deas.

When I presented the first prescription accused said "What is the name?" I said "Mrs. Smith." There was a fatal dose in the first bottle. It would not be fatal if taken by an adult according to the directions on the label. I observe upon the bottle there is the name of the "North British Apothecaries' Hall, Dundas Street." The name Audus is not upon the label. The second bottle would not be fatal if used as directed. That is for external use. The dose stated on the label of the first bottle would not be fatal to an adult. It would be very dangerous to a child. The contents of the second bottle would not be dangerous if applied externally. If one table-spoonful of the prussic acid mixture was taken three times a day by a "Mrs. Smith" it would not be poisonous. If a "Mrs. Smith" were taking 10 drops thrice daily in water, after meals, of the arsenic and strychnine mixture it would not be poisonous. When I handed the first prescription to accused he said he thought he knew the handwriting and wanted to know who the doctor was. I said I did not think he would know the handwriting, as it was written by an Edinburgh man. I did not say the prescriptions were written by a young doctor in Edinburgh. It did not suit my purpose to tell accused that I had written them myself. If I had told him they were written by myself he might have had more questions to ask. The prescriptions are initialed "W. McL." There was a glass case at the back of the shop. I could not say whether there was a door or not. I was standing in the shop most of the time, but when seated I had my back to the opening into the back place. There was no one in the back shop when I was in the premises. I did not go into the back shop to see. It is possible but not probable that there might have been some person in the back shop. The register of chemists and druggists is kept regularly. I do not know how it is William George Audus appears as a registered chemist and druggist. I thought the name was "Andus," and looked for that name, but I see now that it is "Audus." Audus is on the register. I am not sure of the date of his death. I could not say that all the prescriptions were accurately made up. In the third case it was wrongly dispensed. I did not test the accuracy of the dispensing in any of the other cases. We frequently send prescriptions containing harmless ingredients to be made up in order to obtain evidence for a prosecution. This is the first prosecution I have had in Glasgow. The letters which I have produced were handed to me by Mr. Bremridge. I know section 1 of the Act of 1869. I received from Mr. Bremridge the letters which Dr. Faulds had sent to him, stating that this shop was in the possession of a medical man, before I made inquiries. I went on with the prosecution because I was instructed to do so. I got my instructions from the Registrar in London.

By Mr. Shaw: No medical man gave any assistance to accused in regard to these prescriptions in any manner or form. Accused never communicated with any one during the course of making up the prescriptions or subsequent to the making up of these prescriptions. He did not talk with any one nor receive instructions from any one. It was entirely his own doing from beginning to end. As regards Audus I know as a matter of fact that he is dead. I never saw any medical man in connection with these prescriptions, and I do not think it matters. I had a prosecution recently in Hamilton and have had others elsewhere in Scotland. The Hamilton case was in the same position as this. The Hamilton case was reported widely in public prints at the time.

By the Sheriff: The initials "W. McL." are frequently used in similar cases by me. They are really the initials of a deceased medical practitioner whose prescriptions I have frequently copied.

Thomas Allan (14), examined by Mr. Shaw. I am assistant to Mr. Hill, the last witness. On 8th September I was told I was to go to Glasgow the following day with Mr. Hill. I paid various visits along with him to the shop 37, Dundas Street, Glasgow. On 9th September we went about four o'clock in the afternoon. I knew Mr. Hill had a prescription with him. I saw him produce it and obtain medicine from the accused. He took the medicine home to Edinburgh and analysed it, and then I signed the docket upon the bottle, which is correct. On 12th September the same thing occurred. I remember going on the 15th. It was on that occasion the accused was not in. We went back in the evening and obtained the medicine and brought it to Edinburgh, analysed it, and docketed it. On the 23rd of September I went to Glasgow along with Mr. Hill and saw him present a prescription to the accused. He got the medicine, brought it home and analysed it. On these occasions accused was not assisted by anyone in dispensing these drugs. He did not communicate with anyone at the back of the shop. He never got any instructions from anyone with regard to them. It was all his own doing from beginning to end.

Cross-examined by Mr. Deas: The bottles that accused took down were at his back. He dispensed the medicine in the front shop at the back of the counter. It is a small shop. He had water in a bottle. I am not sure whether there is a glass partition at the back of the shop, with an apartment behind. Two of the bottles were at the back of the shop. There were two or three at his side. Nearly the whole of them were at the back of him.

By Mr. Shaw: He was standing facing us. The bottles out of which he got the medicines were at his back. He did not go away through to the back shop to get anything at all.

Mr. Shaw stated this was his case for the prosecution.

Proof for the Defence.

Dr. Archibald Galbraith Faulds, examined by Mr. Deas: I am a graduate of the Glasgow University and have got the degree of M.B., C.M. I am proprietor of the business carried on under the name of the North British Apothecaries' Hall, at 37, Dundas Street. I became proprietor on the 28th of May. The accused was my assistant. I attend at the North British Apothecaries' Hall sometimes in the morning at nine, and sometimes at ten. I stay till eleven. I go in the afternoons from two till four, as a rule, and in the evening from about eight till ten generally. During the time the accused was my assistant I knew that he was not a registered chemist under the Pharmacy Act. I told him that he was not on any account to dispense poisons. I am not conversant with the 1868 Act. I understood that I was entitled to keep a druggist's shop without a qualified assistant. I found accused to be a thoroughly qualified man. I have been present on several occasions when accused dispensed poisons. I superintend the sales personally. I was present when the poisons in question were dispensed. I remember the prescriptions I am now shown. The shop is a small one. There is a small compartment behind. I am in the habit of standing in that apartment when I go to the shop. My reason for doing so is that I do not care to be seen behind the counter, being a medical man in practice. I remember looking at these prescriptions. The poisons that are mentioned in these prescriptions were got in the back shop with the exception of one—strychnine, I think. It is kept within reach of my arm from where I stand. The first prescription, if taken in the quantities specified on the label, will not do any harm to an adult. It is used for sleeplessness. With regard to the second quantity, if it is applied externally it is not poisonous. With regard to the third, it is not poisonous if taken in the quantities specified on the label. I have dispensed larger doses than that. The arsenic and strychnine, if taken in the quantities stated on the label, 10 drops thrice daily, will not be poisonous. The arsenic is used simply as a tonic. The prussic acid is also a tonic and sedative. The accused in putting these prescriptions before me said that they were for a Mrs. Smith. I looked to see if the prescriptions were all right.

Cross-examined by Mr. Shaw: I am about twenty-eight years of age. I have been a graduate of the Glasgow University since 1888. I reside in Stirling-road, about four minutes walk from 37, Dundas-street. I generally go to the shop at the times I have already stated, but am not what you call strictly punctual. If a prescription which is in a hurry comes into the shop when I am not there, I am sent for and I come down. As far as I remember the first prescription was given out between two and four. It might have been two o'clock. The last one, as far as I remember, was in the afternoon, between two and four, but I am not sure whether it would be about two or near four. The third prescription would either be in the morning at the time I have already stated, or in the afternoon when I was there. It might have been in the evening for all I know. I won't take upon myself to swear that it was in the evening. I remember I was there when the third prescription was dispensed. I remember perfectly well seeing accused dispensing this prescription. It may have been dispensed in the morning, noon or night for all I know. There was a boy along with Mr. Hill when the prescriptions were being dispensed. I have seen him here to-day. There were two came into the shop but I could not say whether it was the boy I have seen to-day or not. There might be other customers in the shop when the prescriptions were being dispensed. I do not remember anybody else being in the shop on the first, second, third or fourth occasion. I distinctly told the accused that he was not to dispense prescriptions containing poisons in my absence, on the ground that he was not competent. I got a letter from Mr. Bremridge on the 23rd of June, and I wrote him on the 26th of June in reply. It might have been an omission on my part in not telling Mr. Bremridge that I had prevented accused from ever dispensing poisons. I got a letter from Mr. Bremridge on the 1st of July, 1890. It also may have been an omission on my part to tell him that I had prevented Shields from dispensing poisons. Accused was not selling poisons as far as I know. The ingredients of these bottles were got out of the back shop. Anyone in the shop would have seen if accused had to go to the back shop for them. When accused received the first prescription he looked at it and asked the party who brought it in to take a seat. He took a seat, and the boy, the witness here, who was with him, also sat down. Accused then brought the prescription to me in the back shop, laid it down for a minute, and whispered to me that this was for the Pharmaceutical Society. I looked it over to see if the doses were right and gave it to accused. He then went to the front shop and dispensed it. He could not possibly have given a double dose, because the back shop is not far away from the front shop, and I would have seen him. He dispensed the poison in the front shop while I was in the back shop. There is no difference between the back and front shop; there is a small partition. I was not in the front shop, but I could see perfectly well what he was doing. The people in the front shop could not see me. I was concealed. There was no whispering unless on the first occasion. Accused will send up to my premises for me to dispense medicine probably once in the course of a day. By good luck I was present on every occasion when Mr. Hill called. I had a good idea that this case was going to happen. I attended attentively to business at that time. I did not think it was necessary to tell Mr. Bremridge that I had told the accused not to dispense poisons. I mean to continue this business upon its present footing. I now show you my prescription book. The prescription of 9th September is in accused's handwriting. When accused sent up to my house I went down to the shop. If I was out on my practice the bottle was left, and I went down immediately I came back. The prescription book is laid on a desk in the front shop. The two entries immediately before the one shown me were dispensed on the 8th, and they contained poisons. I have been in the shop when there was a girl in attendance and accused not there. I do not remember Mr. Hill coming when there was a girl there, but I remember that he had been there. I was not in the shop when he called in the morning. I was asked by the agent for the prosecution to allow myself to be precognosced, but I refused on certain grounds. I am entered in the return for the valuation roll as occupier and Thomas C. Dunlop as tenant of the premises 37, Dundas-street, Glasgow. Dunlop is abroad, I understand. I do not know when he went abroad. He was a medical man. I pay the rent to the factor. I understand Dunlop went abroad about May. I think he went to America, but I am not sure. There is such a thing as having a patent medicine licence in order to sell patent medicines. It is in my name. I swear that I am the patent medicine licensee of this business. The accused may be the patent medicine licensee, but I have to pay for it all the same. I applied to put it in my own name, and I think I succeeded in that. I think I called and got it changed. I cannot give you the dates. It was this year, a few weeks ago. It was not before the 9th of September. I suppose accused held the licence for selling patent medicines before that, and after this complaint and these investigations I went and changed the name of the licence to my own name.

The Sheriff: Why did you not say that at first?

By Mr. Deas: Previous to that I had some correspondence, which has already been referred to, with the Pharmaceutical Society. I received the letter on 23rd June. I was not conversant with the Act of 1868, but I knew of it. It was in consequence of these letters from Mr. Bremridge that I told accused not to dispense poisons unless I was present. As far as I know he was selling poisons before that. There are a number of prescriptions made up at this shop. I cannot remember the exact time of day when the prescriptions in this action were made up, but it was always in the afternoon. With regard to the valuation roll, Dr. Dunlop was the former occupant of the shop. His name is still entered as tenant, because the valuation roll is made up in September. As far as I know it was made up when Dr. Dunlop left. I am now shown a receipt from the Glasgow Apothecaries' Company, which is addressed to the North British Apothecary Hall. I pay the accounts. I am responsible for them. There are a number of accounts of the same nature. I am proprietor of the business at 37, Dundas Street.

Mr. Deas stated he had not any more evidence to lead.

The Sheriff: Am I to advise this case without speeches? If so, I shall do so to-day.

Mr. Shaw: I am willing your lordship should do so.

Mr. Deas: I request to be heard, my lord; but shall be brief.

Mr. Shaw: I, of course, must then address your lordship also.

Mr. Shaw (continuing)—My lord, the defence of to-day is a very different defence from what it was before. It is a defence upon the facts, which were it substantiated would have prevented any prosecution. The position taken up by Dr. Faulds before today was totally different. We complained, and his answer to the complainant was, "Oh, but I am entitled to carry on the business in the manner you object to." In his letter of the 26th of June this is practically the position be takes up: "I am entitled to go on in the way you complain of." Till to-day he never suggested that he had taken a different view, but simply said "Notwithstanding your complaint, I will do it all the same." This is my first remark about his letters. It is a very uncandid beginning. The next remark is this, that during the whole course of the prosecutor's case there was not the slightest indication that this defence was to be taken; not one word was put in cross-examination to the effect, "Did you hear any whispering going on in the back? Did you see Shields go to the back and get any instructions? Did you see anything take place in the back at all?" But the evidence was closed, and we were met with this series of surprises in the evidence of this gentleman. Now, my lord, there is only one witness on behalf of this defence, as against two witnesses, perfectly unimpeachable, for the prosecution. The one witness, as your lordship will remember, did not remember a single hour when these medicines were dispensed. The first medicine was dispensed at half-past four o'clock in the afternoon, an hour when this man Faulds is not usually on the premises. He goes away at four and he comes back at eight, and yet he says that he saw this medicine dispensed. There was not a shadow of suspicion thrown upon this evidence in the cross-examination, and it was not hinted for a moment that we were going to be met with any kind of plea of this kind. The third sale took place at eight o'clock at night. The two witnesses for the prosecution speak to that occasion being eight o'clock at night. Theirs is not a vague recollection. Your lordship will remember that is the occasion on which they called in the morning and saw the girl. They waited the day and went back at eight in the evening. What does Dr. Faulds say to that? He says that it was the afternoon, but on feeling himself in a box says, "Well, it might be morning, noon, or night." I am bound to say, my lord, that the general tenor of that man's evidence was, it was all in the afternoon, when there were a good many people there. Now there is an occasion in the afternoon which our two witnesses remember, and I submit to your lordship that it would be quite out of the question in a trial of this kind to accept Faulds' evidence. Dr. Faulds says he was there and saw it; he was a party to the whispering and concealment. How can that be taken to be refutation of the evidence of two witnesses as to the transaction which took place at eight o'clock at night. I do not like the way he gave his evidence. I put all my questions as plainly as they could be put about the patent medicine licence, and your lordship was a witness to the fact of how he varied in his answers. Faulds said he did not know whose name the patent medicine licence was in. It turned out that that gentleman's mind was in this condition, that he knew so absolutely and clearly well that he himself had been a party a few weeks ago to changing the name from Shield's (the accused's) to his own, and yet upon his oath he said he did not know in whose name the patent medicine licence was. It seemed below Dr. Faulds' dignity to appear behind the counter, and with regard to the dispensing of the medicine he took no more interest in that matter than you or I. The accused might have given a double dose or a treble dose, and he was not there to check him. He looked at the prescription, and forsooth that is the discharge of his duty. The statute says that no person unqualified shall sell or compound. Who was the seller and compounder of the medicines? It was Shields and nobody else but him. I could understand a case where a skilled man says "The actual hand that did it was not mine, but the eye that controlled the operation was mine, and I know that that statute was complied with." But in this case we have Shields and him alone at the act. I submit that that falls within the statute, and that the concealment of a so-called proprietor behind a wooden partition in a back shop, who indulges in whispers and who cannot and does not do anything else to protect this transaction and to insure the safety of the public, is of no avail here. Permit me to refer your lordship to the preamble of the Act. It says that "Whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, etc., of poisons, and persons known as chemists and druggists should possess a competent practical knowledge of their business." This, my lord, was the purpose for which this statute was passed. It was passed in the interests of the public, and in the interests of the public the registrar of the Pharmaceutical Society was appointed the prosecutor, so that it might not remain a dead letter in consequence of no one being charged with the duty of seeing it carried into execution. As the representative of the person appointed for the protection of the public, I ask your lordship for the penalties in each instance, as it is the duty of the Society to put down this practice. I may state that I was a party in the Hamilton case. In that case when the question arose I stated to Sheriff Birnie that the case was brought as a test case, and I asked for no penalties, but my position is very different in this case. The Hamilton case was fully reported, and ample notice given of the decision, so there is no excuse for a continuation of this evil practice.

Mr. Deas: The Hamilton case is different from this. Dr. Lennox said he was not in the habit of coming to the shop, and superintending the dispensing of the drugs by the chemist. I have two arguments in support of my asking your lordship to dismiss this action. The first is, the first 15 sections of the Pharmacy Act under which this prosecution is brought, do not apply to the case of doctors or medical practitioners. Your lordship will find the section I found on in section 1 of 32 and 33 Victoria, Cap. 117.

The Sheriff: I think there is no doubt that these fifteen sections would not apply to Faulds.

Mr. Deas: No, they do not apply to Faulds. There is no doubt that a doctor was entitled prior to the passing of the 1868 Act to dispense poisons. The first 15 sections of the 1868 Act should be held as not applying to doctors. Therefore they would not apply to Dr. Faulds, who is the occupier of this shop. We are thrown back to the common law as it existed prior to the Pharmacy Act of 1868, when the sale of poison was free, and when a doctor might sell either at his own shop or anybody else's. In the Hamilton case Dr. Lennox said he felt himself entitled to sell at his own house. Assuming that the first fifteen sections of 1868 may not apply to Dr. Faulds, the fact that he was there dispensing the drugs and superintending the process should be sufficient to enable your lordship to dismiss the accused. I refer your lordship to a case in the Queen's Bench Division, the Pharmaceutical Society *v.* Wheeldon. The case I have referred to is where a man sold some Battle's vermin-killer. I submit that Shields under these words would be entitled to get away, because he was acting under the personal superintendence of a qualified employer, viz., Dr. Faulds. Your lordship will observe that Mr. Hill in giving his evidence has admitted, as Dr. Faulds also admitted, that not one of the medicines if taken in the doses mentioned on the label would do any harm to an adult. You also remember that Mr. Shield's asked particularly who the prescription was for, when the answer he received was "Mrs. Smith." These prescriptions are put before Dr. Faulds and he looks at them and says there is nothing wrong with them. Assuming that the accused was not a qualified chemist he could not dispense poisons wrongly to such an extent that death would have been the result. I do not think the prosecution has been perfectly honest in the matter. A totally different method was adopted in Hamilton. They sent to the shop and got pure poison. The prosecution do not do that here; they write out prescriptions and go to the shop and get those prescriptions made up. I do not deny that the medicines contain poisons in the schedule annexed to the 1868 Act. This case is very similar to the Wheeldon case which I have referred your lordship to. In that case the man was charged with selling vermin-killer and the Society evidently thought that the Act was not sufficient to include compounds of poisons.

The Sheriff: It is awkward going into this just now, as you waived your objections to the relevancy of the charge.

Mr. Deas: It is a matter for your lordship, and I would ask your lordship to keep the case of Wheeldon in mind. I ask your lordship to dismiss the accused.

The Sheriff: This appears to me to be a most important prosecution. It is brought under the Pharmacy Act of 1868 and particularly under sections 1 and 15 of that Act. The first section provides that it is unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons unless he be a pharmaceutical chemist or a chemist and druggist within the meaning of this Act and be registered under the Act. The 15th section provides that from and after a certain date any person who shall sell or keep open shop for retailing or dispensing or compounding poisons, not being a duly registered pharmaceutical chemist or a chemist and druggist, shall for every such offence be liable to pay a penalty of £5. In this particular case the complaint alleges that this man, Thos. Shields, who has a shop or is in a shop in Dundas Street of this city, has on four different occasions sold to Mr. John Rutherford Hill poisons in violation of the Act. The shop in which he carries on business is a small shop and is said to have a front and back apartment. It is occupied by a man called Archibald Galbraith Faulds, but the apparent tenant is a man Dunlop, who has not been here to-day. The sales were made by this man Shields, and it is admitted that he is not a registered chemist in terms of the Act, and that he had no right to dispense poisons. This man Faulds, however, who is a graduate of Glasgow University and an M.B. and C.M., according to this amending Act, would have been entitled to sell poisons. I refer to the Act of 1869, which says that nothing contained in the first fifteen sections of the 1868 Act, to which I have already alluded, shall affect any person who has been registered as a qualified medical practitioner. But that does not in any way entitle him to put a man who is not registered into a shop to sell poisons. The next objection taken is that Shields was not registered, but that Faulds was duly qualified to sell poisons and that the poisons were actually sold under his superintendence. The authority of Mr. Justice Hawkins is referred to. He gave the dictum in the case of Wheeldon, which Mr. Deas read, and the gist of it consists of this, that an unqualified person can sell poisons if he acts under the personal superintendence of a qualified employer or a qualified assistant of such an employer. By such personal superintendence, Mr Justice Hawkins means not mere presence in the shop or room where the sale takes place, but actual personal supervision, so that every individual sale shall be so guarded round by these precautions prescribed by the Act, that the safety of every member of the public may be provided for, as far as the law can accomplish that object. That opens up a question of fact in this case, and the question of fact is whether these sales of poison under the circumstances described in the evidence, can be said to have been made under the personal superintendence of Dr. Faulds. There is not much doubt about the evidence for the prosecution. It consisted of Mr. Hill and an intelligent young lad of 14 years of age, Thomas Allan, and their evidence amounts to this: that they went on four different occasions to this shop, and the prescriptions, which I understand had been previously written by Mr. Hill, were shown to Shields behind the counter, and Shields from behind the counter, and with the bottles from which he took the compound elements of the prescription behind him, dispensed these medicines there and then by himself, without any person being behind the counter at the time. I thoroughly believe that evidence. The evidence of Faulds is entirely inconsistent with this, and is to this effect: that he says that this man Shields left the counter and went into what was called the back shop and showed him the prescriptions, and that he looked at the prescriptions. He says, again, that he looked to see if the prescriptions were all right. I do not believe a word of it. Even if I did believe that Shields left the counter and went into the back shop and showed the prescriptions to Faulds, and Faulds approved of them, that is not personal superintendence in the sense of Mr. Justice Hawkins' dictum. Personal superintendence is not approving of prescriptions. Prescriptions show the thing wanted, not the thing dispensed, and if Faulds was going to personally superintend at all, what he ought to have done was to have left the back shop, gone behind the counter, looked on while the things were being put into the bottle, and if he had done that we should have heard nothing of this prosecution. Look at the kind of man Shields is. He is not qualified. He has sold poisons prior to the 9th of September; he entered prescriptions in this book at the window away from the back shop, and he held a patent medicine licence to the 9th of September till these questions were raised in this case. In fact he was the ruling spirit in the shop. He was the man that was doing the whole thing and dispensing poisons and all. Again, it is said that these prescriptions are not poisonous, and if taken according to the labels on the outside of the bottles, they will do nobody any harm. The fact remains that they are poisonous, and they are poisons within the meaning of the Act, and are struck at and included in schedule A of that Act. The object of the Act is to protect the public. It is said that these were deadly powerful poisons, that they were fatal, and it just comes to this, that if a clever poisoner went into the accused's shop for a poison for a fabulous "Mrs. Smith," saying that she was sleepless, Shields would dispense the poison. The dispensing of these poisons is to be restricted in the hands of a qualified person, and must not be in the hands of an unqualified person. The fact that if taken in a certain way they will not be fatal does not alter matters. They are poisons which an unqualified and unregistered assistant has no right to dispense, in terms of that Act of Parliament. The last objection taken by Mr. Deas has been raised at the wrong time, and I do not require to discuss it, but I cannot see that Wheeldon's case helps him. In conclusion, I have only to say that the defence has utterly failed, and for the protection of the public and to put down this wrong system, which has been going on for a long course of time, whereby utterly unqualified persons—unregistered and not passing any examination—have been selling poisons, I will inflict a penalty of £3 for each offence, or £12 in all, with £2 2*s*. of modified expenses.

Mr. Deas: I ask your lordship to state a case for appeal.

The Sheriff: Certainly.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE GLASGOW SALICYLIC ACID PROSECUTION.—HONOUR TO WHOM HONOUR IS DUE.

Sir,—May I be allowed to state, for the benefit of those of your readers who are not cognisant of the real state of affairs, that the late Mr. John Williams (of the firm of Hopkin and Williams) was the pioneer of salicylic acid in this country.

He first made the natural acid in this country, and he it was who introduced it to the medical profession. In the *Pharmaceutical Journal* for April 6, 1878, page 155, he published a most valuable paper, in which he gave full details as to how to purify the artificial acid, so as to make what is now called "physiologically pure" acid, and he supplied it commercially. He did not patent his process: like our friends at Glasgow he was "above that sort of thing," even though he had the slight advantage of being the originator and actual discoverer of the process.

In conclusion let me add that pure artificial salicylic acid, prepared according to his directions, is still obtainable by those who may desire it.

16, *Cross Street, E.C.* JOHN HODGKIN.

North British Photo.—We are not aware that such a photograph has been published.

J. Flemens.—*Euonymus europæus.*

D. A. Davies.—Apply to the Secretary for a copy of the pamphlet "Hints to Students."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Seccombe, Popham, Blount, Williams, Preston, Proctor, Walker, Hyslop, Symons, Robb, Mumbray, Hubbard, Turner, and J. W. T.

"THE MONTH."

Glutin-peptone-sublimate Hydrochloride.

Under the name "glutin-peptone-sublimate hydrochloride" another addition has been made to the list of mercurial preparations (*Apot.-Zeit.*, Oct. 8., p. 621). According to Herr Paal the first stage in its manufacture is the suitable treatment of glutin with hydrochloric acid, resulting in the formation of what he calls "hydrochloride of glutin-peptone, containing about 12 per cent. of hydrochloric acid." This compound, which is soluble in water and in alcohol in all proportions, is described as combining with mercuric chloride to form "double salts," of which the one containing 50 per cent. of $HgCl_2$ is insoluble and that containing the lower quantity is soluble in alcohol; both are, however, soluble in water. For therapeutic purposes a compound containing exactly 25 per cent. of $HgCl_2$ was prepared as a white hygroscopic powder, consisting of shining scales. An aqueous solution of this compound is said not to be precipitated by caustic or carbonated alkalies, nor by blood or albumen solution, while in the dry condition or in solution it can be kept in closed vessels, sheltered from light, for a year without alteration. Further, the caustic properties of the mercuric chloride are said to entirely disappear in the combination with the peptone. The advantage claimed for this preparation over others consists in its prompt and certain action, and the small pain and irritation caused when used as an injection.

Iodo-Carvacrol.

When carvacrol is subjected to the same treatment as its isomer thymol is in the preparation of "aristol" (*Pharm. Journ.*, [3], xx., 601), an iodine substitution product is obtained resembling in its general characters the iodine derivatives of phenols, and said to be likely to find a place in the materia medica (*Chem. Zeit.*, October 4, p. 1355). A dilute solution of 1·5 parts of carvacrol in 1·6 parts of soda is heated with 10·16 parts of iodine and 10·16 parts of potassium iodide and made alkaline, when a yellow precipitate forms that is separated and washed with water. The new compound is described as occurring in the form of a yellow-brown powder, which is insoluble in water, difficultly soluble in alcohol, and easily soluble in ether, ligroin, chloroform and olive oil. It is unaltered by light, and when heated in a capillary tube softens at 50° C. and melts at about 90° C. to a brown liquid.

Euphorin: Phenyl-urethane.

Following a practice that has now become frequent, although in the present instance with less than the usual excuse, the trivial name "euphorin" has been bestowed upon the synthetic compound introduced a short time since as "phenylurethane" (*Pharm. Journ.*, [3], xx., 501). This compound, which is represented by the formula $CO{<}^{OC_2H_5}_{NH(C_6H_5)}$, it may be recalled, is said to be produced by the action of chlorocarbonic ethyl ester upon aniline, and to occur as a white crystalline powder with a faintly aromatic odour and a scarcely perceptible taste that subsequently becomes more acrid and somewhat clove-like. It is very slightly soluble in cold water, very freely soluble in alcohol, and sufficiently soluble in mixtures of alcohol and water, such as white wine, to be given in solution in such menstrua. According to Sansoni (*Pharm. Centr.*, Oct. 9, p. 616) the urine after the administration of euphorin shows the p-amidophenol reaction either directly or after the distillation of the urine made alkaline by potassium carbonate. Neither phenol nor aniline occur in the urine, and albumen and sugar are not met with, but probably the secretion of urea is increased.

Phenacetin Adulteration.

An incident that has occurred recently in Elberfeld has had the result of calling attention to the possible adulteration of phenacetin with acetanilide (*Apot.-Zeit.*, Oct. 22, p. 651). A woman after taking the second of five powders supplied by a druggist as containing each a gram of phenacetin, was seized with pains in the head, followed by symptoms of poisoning that required energetic treatment before they disappeared. As the patient had previously taken phenacetin with good results and without unfavourable bye-effects the medical man suspected a substitution, and investigation showed that the remaining powders consisted of equal parts of phenacetin and antifebrin or acetanilide. The local pharmaceutical association and chemical manufacturers, having been communicated with, took up the inquiry and further supplies of "phenacetin" were obtained from the druggist upon various written orders. As all these supplies proved to be of the same composition the case was brought under the notice of the authorities and a prosecution instituted. A charge of inflicting bodily injury fell through on the ground that the injurious action of antifebrin was not yet quite understood, whilst evidence was given that phenacetin had been known to produce similar symptoms in susceptible persons. Moreover it was urged that hundreds of these powders had been taken without injury resulting. Subsequently the judge told the jury that the difference in the cost of the two substances for a single powder was so small as to put the question of adulteration for the sake of gain out of the question and the druggist was acquitted. The *Apotheker-Zeitung* remarks that the decision has not failed to arouse great surprise, and points out that at the time when, according to the defendant, he was supplying hundreds of the powders, the price lists quoted antifebrin at about 4*s.* 3*d.* the kilo, whilst phenacetin cost about £3 18*s.*

Separation of Antifebrin and Phenacetin.

In view of the possibility of the difference in cost leading to a sophistication of phenacetin with antifebrin a number of tests for the presence of acetanilide have been published, a digest of which has already been given in "The Month" (*Pharm. Journ.*, [3], xviii., 1085). To these may now be added a method of determining within certain limits the proportions of acetanilide and phenacetin in a mixture, based upon their differing solubilities, which was worked out by Dr. Will for the purposes of the investigation referred to in the preceding paragraph (*Apot.-Zeit.*, Oct. 22, p. 652). It was found that 1 gram of acetanilide shaken for half-an-hour with 200 c.c. of cold water dissolved completely, and did not separate after standing for a day at the ordinary temperature. On the other hand, when 0·5 gram of phenacetin was shaken for the same time with 200 c.c. of water only 0·13 gram was dissolved. Upon shaking 1 gram of a mixture of equal parts of acetanilide and phenacetin with 200 c.c. of water the whole of the acetanilide went into solution, with only 0·13 gram of phenacetin, the residual phenacetin, when separated and washed with water, being quite free from acetanilide. In two other experiments in which the proportions of the two compounds were slightly varied, it was found that the weight of the undissolved phenacetin added to 0·13 gram, as the quantity dissolved in 200 c.c. of water, corresponded to the quantity present in the mixture used.

Purity of Glycerine.

Since the publication in the new German Pharmacopœia of a more stringent test for the purity of glycerine, by which a complete absence of coloration or precipitation upon addition of three drops of silver nitrate solution to a mixture of 1 c.c. of glycerine boiled with 1 c.c. of ammonia solution is demanded, statements have appeared in various quarters to the effect that commercial samples complying with this requirement cannot be obtained. Dr. H. Will (*Apot.-Zeit.*, Oct. 4, p. 612) considers that these complaints arise from a misapplication of the test, due to the glycerine being too strongly heated over a free flame after addition of ammonia. He recommends that the mixture be only heated in boiling water or in an air bath until bubbles of ammonia gas appear, by which means overheating is avoided, and that the test-tube be removed from the bath immediately after the addition of silver nitrate, since the same sample of glycerine gives different results according to the length of time it is exposed to the action of the ammoniacal silver oxide solution at a high temperature. Another correspondent (*Apot.-Zeit.*, Oct. 8, p. 621) supports Dr. Will's views, as he has obtained like favourable results by taking the above precautions. In commenting upon the test Dr. Ritsert remarks (*Pharm. Cent.*, Oct. 9, p. 610) that it is unnecessary to test glycerine that has no reducing action upon ammoniacal silver solution for arsenic.

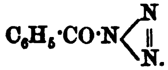
Solubility of Ether in Sulphuric Acid.

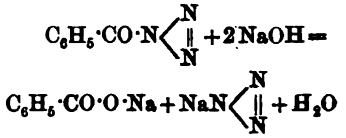
Owing to the return of an application for patent rights over a process for removal of ether from ethyl bromide by means of concentrated sulphuric acid, with the request for definite proof of the asserted solubility of ether in this reagent, and to a subsequent dispute respecting the novelty of the observation, Dr. Scholvien instituted some experiments for the purpose of reviewing the conflicting statements in chemical literature. He finds (*Apot.-Zeit.*, Oct. 1, p. 607) that although considerable heat is evolved upon the mixture of equal parts of ether and concentrated sulphuric acid, no formation of the mono- or di-ethyl ester of the acid occurs, as might be expected. The mixture possesses the same specific gravity after six months' storage, and the greater part of the ether can even then be separated from it by the cautious admixture of double its weight of ice. After removal of the ether and neutralization with soda, the residue obtained by evaporation to dryness consists solely of sodium sulphate and contains no ethylsulphuric acid salt. By long continued heating (about thirty hours) at 100° C. of a mixture of sulphuric acid and ether, however, much ethylsulphuric acid and some di-ethyl ester are formed, but at a higher temperature decomposition into sulphurous acid, ethylene and water, occurs. The reaction therefore appears especially applicable for the removal of the ether that always accompanies, to the extent of 7 to 9 per cent., crude ethyl bromide prepared from bromides and ethysulphuric acid, separation through fractional distillation, owing to the approximate boiling points of the two bodies, being impossible.

Imidazoic Acid.

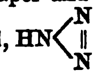
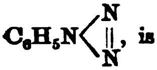
One of the most interesting communications to the Naturforscher Versammlung in Bremen last month, was a paper read before the Chemical Section by Professor T. Curtius, of Kiel, concerning a remarkable new compound of nitrogen and hydrogen, N_3H, possessing acid properties. It will be remembered that this chemist recently prepared the stem-substance of the hydrazines, $H_2N—NH_2$, from diazoacetic acid. Experimenting on its properties he has now found (*Berichte*, xxiii., 3023) that hydrazine hydrate, N_2H_4,H_2O, reacts with benzoyl-glycollic acid, $C_6H_5·CO·O·CH_2·COOH$, to form benzoylhydrazine, $C_6H_5·CO·NH·NH_2$, and hydrazoacetic acid, $NH_2·NH·CH_2·COOH$.

$$C_6H_5·CO·O·CH_2·COOH + 2NH_2·NH_2 =$$
$$C_6H_5·CO·NH·NH_2 + NH_2·NH·CH_2·COOH + H_2O.$$

If a nitroso group be introduced into the benzoylhydrazine molecule by the action of nitrous acid, the nitrosobenzoyl-hydrazine, $C_6H_5·CO·\!<\!\begin{smallmatrix}NO\\NH_2\end{smallmatrix}$ so produced, changes spontaneously, with separation of a molecule of water, into benzoylazoimide,  $C_6H_5·CO·N\!<\!\begin{array}{c}N\\\|\\N\end{array}$. The latter compound is readily converted by boiling with caustic soda solution into sodium benzoate and a sodium compound of a body possessing marked acid properties, which Professor Curtius terms "stickstoffwasserstoffsäure," or "azoimid." The former name is hardly translatable satisfactorily into English; but if it be desired to emphasize the acid properties of the new compound it might from its constitution very well be called "imidazoic acid."



$$C_6H_5·CO·N\!<\!\begin{array}{c}N\\\|\\N\end{array} + 2NaOH =$$
$$C_6H_5·CO·O·Na + NaN\!<\!\begin{array}{c}N\\\|\\N\end{array} + H_2O$$

The same final product is also stated to be more conveniently obtained by the action of hydrazine hydrate upon the ethyl ester of hippuric acid, $C_6H_5·CO·NH·CH_2·CO·O·C_2H_5$. The resulting hydrazine hippuric acid ester readily loses a molecule of alcohol and passes into the anhydride, which is converted into a nitrosamine by the action of nitrous acid, and the latter product splits up into hippuric and imidazoic acids upon boiling with alkalies. By warming the sodium salt with sulphuric acid the acid is set free as a colourless gas, possessing a very pungent odour, reddening blue litmus paper and dissolving easily in water. The free acid,  $HN\!<\!\begin{array}{c}N\\\|\\N\end{array}$ presents a surprising analogy to the halogen acids in both its physical and chemical properties. Upon boiling the saturated aqueous solution much of the acid at first passes off in concentrated condition, but finally a dilute acid of constant composition distils over. Dense fumes of the ammonium salt, N_4H_4, are formed when imidazoic acid and ammonia gases are brought together, but this salt, which is completely volatile at 100° C., does not crystallize in the cubic system like sal-ammoniac. Metals dissolve in even dilute solutions of the acid, under copious evolution of hydrogen, and, like the corresponding chlorides, the silver and mercurous salts are insoluble in water. Both these azoimides, AgN_3 and Hg_2N_6, are, however, distinguished by their extraordinary explosive properties, 0·001 gram of the silver compound indenting an iron plate on which it was exploded, and further the silver salt does not blacken by exposure to light. The soluble barium salt, BaN_6, separates from concentrated solutions in short shining anhydrous crystals. The acid also possesses feeble reducing properties, so that frequently solutions of metallic salts, for instance, of copper salts, precipitate less soluble lower oxides upon boiling. Esters of imidazoic acid have also been obtained, by the action of alkylogens upon its metallic derivatives, and of these the phenyl ester,  $C_6H_5N\left\langle\begin{matrix}N\\ \|\\ N\end{matrix}\right.$, is identical with the diazobenzolimide of Griess. Professor Curtius also expresses a hope of discovering bodies containing a larger number of nitrogen atoms combined in a ring form within the molecule.

Smokeless Powder.

The basis of all the new kinds of gunpowder is cotton subjected to the action of nitric acid and the consequent formation of mono-, bi- and tri-nitrocellulose according to the strength of acid employed. The solubility of the bi-nitrocellulose in nitroglycerine has been already utilized for the manufacture of the so-called "sprenggelatine," but recently a powder of similar constitution has been prepared in Krupp's iron factory at Essen (*Pharm. Zeit.*, Oct. 11, p. 638). The "collodium wool" is saturated with nitroglycerine in a vacuum at 6-8° C., and the excess of the latter then pressed out, so that a product containing about equal parts of nitrocellulose and nitroglycerine is obtained. This is warmed to 60-90° in order to render it gelatinous, 1 to 2 per cent. of diphenylamine added to ensure chemical stability, and the mass pressed between warm plates, whose surfaces are furrowed according to the degree of fineness required for the powder. This new powder is said to be on the average three times as powerful as the old, the decomposition upon explosion being so complete that only the gaseous products carbon monoxide, carbonic dioxide, steam and free nitrogen result. In consequence no further vapour appears than a slight puff of steam. The powder, which may be represented by the formula $10\,C_3H_5(ONO_2)_3+9\,C_6H_7O_2OH(ONO_2)_2$, also possesses the advantage of not sustaining damage by damp.

Permanent Ozone Water.

A German patent has been taken out by Dr. Graf, of Berlin, for a method of preparing a permanent ozone water (*Apot.-Zeit.*, Oct. 4, p. 616). It depends upon the addition of a small quantity of sodium or magnesium chloride to an ozone solution prepared by passing ozonized oxygen through water, or to the water before the solution of the ozone is effected.

Estimation of Sugar in Urine.

As a result of practical experience, Dr. U. Haussmann, of Bremen, in a paper read before the pharmacy section of the recent Naturforscher Versammlung, advocates the rejection of methods of sugar estimation in urine based upon the reduction of copper or bismuth salts. Further, since the precipitates with phenylhydrazine frequently contain so much brown amorphous matter that the presence of the characteristic sugar compound is concealed, whilst polarimetric determinations of dextroglucose may be vitiated by the presence of other optically active compounds in the urine, Dr. Haussmann recommends the fermentation of the liquid with yeast. For a qualitative test the urine should be first boiled, to remove dissolved gases, and after cooling introduced with pure yeast into a U-tube, of which the longer arm is sealed, and maintained at a temperature of 35-40° C. A large bubble of gas collects in this arm after two or three hours, even if only 0·05 per cent. of sugar be present. Good quantitative results, according to Dr. Haussmann, may be obtained by a comparison of the reduction and polarizing equivalents, and also of the specific weights of the solution, determined before and after fermentation of the liquid.

Estimation of Urea.

In *Comptes Rendus* (Oct. 6, p. 501) M. Miquel describes a method for the estimation of urea in solution by its conversion into ammonium carbonate through the fermenting action of very active urophagic bacilli. In the case of a pure aqueous solution it is only necessary to add an equal quantity of the diastatic fluid and determine by titration the alkalinity of the mixture immediately and after a lapse of two hours, during which interval the fluid has to be kept at a temperature of 50° F. The difference in the two estimations gives the amount of ammonium carbonate, and indirectly of urea, in solution. When the solution contains, however, unknown impurities, especially of organic nature, it is advisable to first add a slight excess of ammonium carbonate, warm, and filter, in order to avoid errors arising from the presence of acids or acid salts, or from the formation of double ammonium salts. Care must also be taken that the solution does not contain more than 10 per cent. of urea, since in a greater degree of concentration the base has a toxic effect upon the ferment, the diastatic action being very weak in a 20 and disappearing in a 30 per cent. solution. When these precautions are taken, however, M. Miquel asserts that very accurate results are obtained, though he presence of certain substances, which will be considered in a further communication, is admitted to interfere with the action of the ferment.

Pomegranate Root Bark.

Some samples of pomegranate root bark derived from *Punica Granatum* growing wild in Java have been recently examined by Herr Stoeder (*Nederl. Tydsch. Pharm.*, 1890, p. 299). The bark is said to be used as a remedy against tænia by the natives of Java, who recognize three varieties, derived respectively from plants bearing red ("merah"), white ("poetih") and "black" flowers ("hitam"). They prefer the variety "poetih" as being the most active, and this preference seems to be justified by the results of analyses. Herr Stoeder separated the alkaloids as hydrochlorides, and found the bark from the white-flowered plant to yield 3·75 per cent., that from the red-flowered plant 2·430, and that from the "black"-flowered plant 1·71 per cent. The samples are described as having been received in quills that had evidently been taken from slender roots, all surrounded by the cortical layer.

Oil of Stavesacre Seeds.

A parcel of stavesacre seeds received from an "English colony in Africa," has been submitted to distillation with steam in a partial vacuum by Herr Haensel, who reports that the seeds yielded an extremely small quantity—0·02 per cent.—of a brownish-red essential oil, having a peculiar, not exactly disagreeable odour, at first recalling that of the sulphydric compound of carvol; it had a weak acid reaction and was soluble in ether, chloroform and alcohol. The seeds after distillation yielded to pressure about 16 per cent. of a bright pale green oil, having an extremely disagreeable penetrating odour. Herr Haensel suggests that it is to this fixed oil that stavesacre seeds owe their activity as a parasiticide, and offers to provide samples of it for experimental purposes. From this remark it would appear that he is not acquainted with the observation published in 1877 by Mr. Balmanno Square (*Pharm. Journ.*, [3], vii., 1042), that the fixed oil is active, but that the seeds after having been extracted with ether are inert. The authors of 'Pharmacographia' also mention that they found the oil removed from the seeds by ether to carry with it in solution a considerable proportion of the alkaloid.

Poisoning by Sulphonal.

A case is recorded in the *British Medical Journal* (Oct. 25, p. 905) in which apparently more than an ounce of sulphonal had been taken to induce sleep. The patient died after remaining in a state of stupor, deepening into insensibility and anæsthesia, during three days. After the evening of the first day there was total suppression of urine, a state which nature apparently made an effort to counterbalance by the production of a profuse perspiration. This appears to be the first case on record of death from an overdose of the drug.

The Action of Chloroform.

Dr. J. A. MacWilliam, reporting on an experimental investigation of the action of chloroform and ether (*Brit. Med. Journ.*, Oct. 25, p. 948), points out that the inhalation of chloroform vapour, even when restricted to 4 or 4½ per cent. of the air inhaled, may result in an overdose. An amount of chloroform which can be given with safety during easy breathing may lead to fatal collapse if administered during exaggerated, *i.e.*, deep and rapid respiration.

Cholera Bacillus.

According to the experiments of Professor V. de Graxa the reproduction of the cholera bacillus in soil is only possible when the earth contains but few ordinary bacteria. When the soil is rich in common species, the cholera bacillus, even though it finds conditions favourable to its existence and reproduction, rapidly succumbs in the struggle for existence that takes place between it and other bacteria (*Journ. Roy. Micr. Soc.*, Oct., p. 652).

Thrush Fungus.

M. Laurent states (*Journ. Roy. Micr. Soc.*, Oct., p. 648) that the thrush fungus is neither an *Oidium* nor a *Saccharomyces*. Specimens obtained from the hospitals of Paris and Brussels and cultivated showed that they possessed no fermentative powers. In slightly acid saccharated liquids only the oval pseudo-yeasts were developed, which like those of *Dematium pullulans* (*Cladosporium herbarum*) possess no fermentative powers. When cultivated on gelatinized beer-wort it always develops quite dense spheroidal colonies in connection with filaments, from the ends of which they are propagated. In liquid media the connection between these colonies and the filaments is not so apparent, as the former soon become free. M. Laurent suggests the name *Dematium albicans* for the thrush fungus.

Botanic Gardens, Trinidad.

In the last annual report on the Trinidad Botanic Gardens, Mr. J. H. Hart, the superintendent, states that since it has been shown that logwood grown in the island is equal in quality to that imported from Honduras and Jamaica, considerable areas have been planted with the tree. Chinese ginger, also, which is said to have a rhizome about four times as large as the ordinary ginger grown in the West Indies, is now on trial in the Trinidad Botanic Gardens. The difference in size of the rhizome is apparently due either to it being a horticultural variety or to more careful treatment of the ordinary plant, since according to the Kew authorities it does not differ specifically from *Zingiber officinale*. Mr. Hart mentions among other plants, *Triumfetta semitriloba*, L., a malvaceous plant used on the island as a remedy in chronic dysentery. It bears the singular name of *Cousine Mahoe* in Trinidad, the name having been given by the French colonists in allusion to the tenacity with which the capsules hook themselves on to the clothes of travellers. Another Trinidad plant, known as Violette, identified as *Chione glabra*, has been sent to England and America to have its medicinal properties, which are believed to be very potent, examined. The chaulmugra tree, although it grows luxuriantly in Trinidad, has never yet produced fruit there. Cardamoms, however, fruit freely in the island, and are valued at 10*d.* to 3*s.* per lb. in the drug markets of Europe.

Digitalis in Australia.

The English foxglove is said by Mr. Fisdall to have established itself on the slopes of Stringer's Creek Valley, near Walhalla, Victoria. In some parts the banks were purple with them last season (*Nature*, Oct. 16, p. 598).

Styrax Benzoin.

In an article on resin producing receptacles (*Journ. Roy. Micr. Soc.*, Oct., p. 621) Herr A. Tschirch states that there are no resin receptacles, the balsamic resin not being a product of the plant in a healthy condition. Although it flows out copiously from wounds in the stem it must be regarded as a pathological result of injury.

Physiology of Corolla and Calyx.

M. Curtel in a note published in *Comptes Rendus* (cxi., p. 539) shows that the corolla and calyx serve not only to attract insects by their colour, but play a definite physiological *rôle*. They possess energetic respiratory and transpiratory functions, superior as a rule to those of the ordinary leaves, at least in darkness or in a feeble light. In fact M. Curtel states that a considerable oxidation is effected by the floral envelopes, resulting probably in the preparation of a part of the products of oxidation necessary to the fruit and the formation at the expense of the tannin and chlorophyll of the colouring matters utilized by the floral organs.

The Pharmaceutical Journal,

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SATURDAY, NOVEMBER 8, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE COUNCIL MEETING.

THE meeting of the Council last Wednesday was attended by eighteen members. Two persons were elected members of the Society and forty were elected associates. The report of the Finance Committee was adopted, recommending in addition to the ordinary items a payment not exceeding £300 on account of the new building. The President mentioned that a considerable amount had been received for penalties, but that the cost of recovering them had still to be paid. A considerable amount has also been received on account of the Benevolent Fund, and the donation account has been increased to £84 4*s*. On the recommendation of the Benevolent Fund Committee two grants of five pounds to widows were authorized. A list of persons nominated as local secretaries was presented by the Committee, to which the consideration of the new arrangements for this purpose had been entrusted, and the appointments were agreed to. The President referred to the interest that had been taken in this matter, and expressed the hope that the alteration which was made would have a stimulating effect on those appointed, and be the means of promoting a closer relationship between the Council of the Society and the members throughout the country. A list of the Local Secretaries appointed will be found at pages 385–387.

Closely connected with this object was the motion of which Mr. SCHACHT had given notice, to the effect that a meeting of the Society should be held every year, under the auspices of the President and Council, at some provincial centre. In speaking on this proposal Mr. SCHACHT referred to some letters he had published in the Journal many years ago, advocating a similar proceeding. The outcome of that suggestion was the formation of the Pharmaceutical Conference, which has been very successful in affording opportunity for the discussion of scientific matters relating to pharmacy. There is, however, still some want of similar facilities for the discussion of questions relating to pharmaceutical politics, and of the proceedings of the Council by those who are remote from the metropolitan centre, such as have been suggested recently by Mr. BALKWILL. It is to meet that want Mr. SCHACHT proposes that annual meetings of the Society should be held in provincial centres, and the satisfaction which has been afforded by the President's recent visits to Sheffield, Dover, Devonshire, and Manchester, constitutes a strong argument in favour of a systematic adoption of the proposed meetings. Some difficulties may be encountered in the arrangement of details, especially in regard to financial requirements, and the additional demands that would be made upon the President, Vice-President, and other members of the Council; but, whatever they may be, the importance of increasing the opportunity of personal contact between the members of the Executive body and the members of the Society, in all parts of the kingdom, is so manifest, that every effort should be made to overcome any obstacles to the carrying out of this project. Nor is it only in regard to members of the Society that it is desirable, for it would most likely be an effectual means of dispelling the ill feeling entertained by some members of the trade towards the Society and of enabling them to perceive that the executive of the Society is the only body able and willing to act for them in the promotion of their interests.

MEETINGS OF CHEMISTS TO DISCUSS THE PHARMACY BILL.

THE meeting of the Western Chemists' Association last Wednesday was well attended, and after some introductory remarks from the President, Mr. LONG, the several clauses of the Pharmacy Act Amendment Bill were read by Mr. ANDREWS, the Honorary Secretary, and discussion invited on each. The general feeling, however, was that Mr. CARTEIGHE's speech at Manchester had so completely disposed of any possible objection to the Bill that there was really nothing to be said beyond passing a resolution approving of the Bill, and recommending that it should be unanimously supported by the trade. It may be mentioned that in the short discussion which took place on the seventh clause it was suggested that the existing provision for allowing a business to be carried on for the benefit of a widow should be rescinded, if that could be made the means of obtaining power to prevent company trading, and on putting this to the vote it was carried by 16 to 7. But eventually it was agreed that there would still be great improbability of carrying through Parliament the proposal to stop company trading, and it was thought better to leave the matter as it is.

On Thursday afternoon a meeting was held in Islington, at which the chair was taken by Mr. BROAD, and after some discussion a resolution was passed approving the principles of the Bill and recommending the trade to give it their unanimous support. An effort was made to support the suggestion that some addition should be made to Clause 7, with the view of stopping company trading, but this was eventually abandoned on the ground that such an attempt would endanger the passing of the Bill.

On Thursday evening a meeting was held at Greenwich, which was also well attended by chemists from the neighbourhood. Mr. Carteighe was present and addressed the meeting in explanation of the Bill. A report of the proceedings will be found at page 393.

TWENTY-FIFTH ANNUAL CHEMISTS' BALL, 1891.

An announcement which appeared in our advertisement columns of last week reminds us of the approaching return of the season when busy pharmacists are accustomed to relax their devotion to business and take their dutiful share in the general homage paid to Terpsichore. Prominent among these field gatherings is that of the Chemists' Ball. The forthcoming one is to be held at the Portman Rooms, Baker Street, on January 14, 1891. Those of our readers who have attended the annual function need not to be told of the exceptional advantages it offers for social intercourse amid surroundings the most enchanting. The invitation to merriment and glee is not confined to London and its suburbs, but is voiced to pharmacists from the Dan to the Beersheba of the British Isles. The necessary arrangements, upon the efficiency of which the success of the evening largely depends, are committed to the conduct of an expert Committee, of which Mr. H. A. Thomas is the Honorary Secretary. We are requested to emphasize the statement, that as in previous years the balance over expenditure will be handed in to the Council of the Pharmaceutical Society to be placed to the credit of the Benevolent Fund. The Committee of Management expresses the hope that the attendance will be such as to afford it the gratification of making a substantial donation to that most deserving charity, this being not only the twenty-fifth annual ball, but also the jubilee of the Pharmaceutical Society.

An Evening Meeting of the Pharmaceutical Society in London will be held on Wednesday next, at 17, Bloomsbury Square, when a communication from the Research Laboratory will be read on "The Constituents of the Artificial Salicylic Acid of Commerce," by Professor Dunstan and Mr. O. F. Block; to be followed by a communication on "The Physiological Action of the Artificial Salicylic Acid of Commerce," by Dr. M. Charteris, Professor of Materia Medica in the University of Glasgow. The chair will be taken at 8 o'clock, but as usual the Theatre will be open an hour earlier, to afford an opportunity for the inspection of exhibits. We understand that on this occasion several exceedingly interesting donations to the Museum will be laid on the table, among which may be mentioned the Curaçoa aloe plant, strophanthus seeds from Professor Frazer, oubaio wood and leaves, the rhizome of *Podophyllum Emodi*, the fruits from which "dragons' blood" is prepared in Borneo and the apparatus used, as well as herbarium specimens of the benzoin tree, sandalwood tree and true and false cubebs plants.

* * *

In Edinburgh also an Evening Meeting of the Pharmaceutical Society will be held on Wednesday evening, at the Society's House, 36, York Place, the chair to be taken at half past 8 o'clock. The papers to be read are some "Laboratory Notes," by Mr. D. B. Dott, on "Arsenic in Sulphuric Acid," "Solubility of Lead Sulphide in Hydrochloric Acid," and "Blue Glass;" and some Notes on "The Assay of Scammony," and the "Pharmacy of Exalgine," by Mr. Peter Boa. Mr. J. R. Hill will also call attention to some recent donations to the Museum.

* * *

We are informed by Mr. John Bain, the Honorary Secretary of the Liverpool Chemists' Association, that a special general meeting will be held at the Royal Institution, Colquitt Street, on Thursday, November 13, at 3 o'clock p.m. The Council of the Association has invited the President of the Pharmaceutical Society to attend and address the meeting, and he has arranged to do so. The meeting will assume the form of a Conference, in which all the chemists of the Liverpool district are invited to take part, and in view of the important subjects relating to pharmaceutical and general trade interests which will be discussed, it is hoped that there will be a large attendance. A dinner will take place in the evening at the Royal Restaurant, 17, Old Hall Street, which Mr. Carteighe has also promised to attend.

* * *

In reference to the case decided at Glasgow last week, in which the Sheriff, at the instance of the Pharmaceutical Society, imposed four penalties upon an unqualified assistant to a medical man for dispensing and "selling" medicines containing scheduled poisons, it will be noticed with satisfaction that the Secretary was able to report to the Council that the defendent had withdrawn his application for leave to appeal, and paid the penalties and costs imposed. Our contemporary, the *Medical Press and Circular*, in commenting upon the case from a medical point of view, expresses its pleasure that the position of the unqualified assistant is daily becoming more untenable, being of opinion that if the decision is upheld, the employment of such assistants has come nearly to be an impossibility. It points out that if such a functionary is unable to recover payment for his work, cannot give a certificate, and must not compound a bottle of medicine, his occupation has gone.

* * *

We learn from the *Liverpool Journal of Commerce* that Mr. John J. Evans, chemist and druggist, of the firm of Messrs. Evans, Sons and Co., of Liverpool, is to be placed upon the Commission of the Peace for the County of Cheshire.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 5, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Evans, Gostling, Greenish, Hampson, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Schacht and Southall.

The minutes of the previous meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Bennet, Andrew Russell.
Hazlitt, Harry Haworth.
Hocking, Francis Almond.
Pears, Harry William Kilby.
Riding, William John.
Shepheard, William Frederick John.
Shrubsole, Alfred.
Williams, William John.

ELECTIONS.

MEMBERS.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Hazlitt, Harry Haworth	Bury.
Pears, Harry William Kilby	Brighton.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Ames, John Charles	Bath.
Anthony, Thomas	St. Austell.
Argles, Woodfield Henry	Aylesbury.
Barrett, Allan Lifton	Hay.
Brown, Arthur Miller	West Malvern.
Care, Harry Bristow	London.
Cherrett, Ernest Robert	West Hartlepool.
Cocker, Harris	Earls Heaton.
Cooke, Lewis Ernest	Barnsley.
Crail, John	Dunkeld.
Dalton, Robert	Wilmslow.
Day, William	Hull.
Dean, Thomas Henry	Hemel Hempstead.
Dey, Alexander John	Edinburgh.
Drury, George John	Scarborough.
Frowde, John James	Douglas.
Grammer, Frank	Newark.
Griffin, James Frederick	Birmingham.
Hopkinson, Joe	Rishworth.
Innes, John	Dufftown.
Lee, George West	Melton Mowbray.
Lewis, Samuel Judd	London.
Lucas, Albert	Derby.
Mair, William	Dundee.
Maudson, Charles Frederick	Leeds.
Moir, William Sinclair	Aberdeen.
Petrie, James	Dundee.
Polley, Thomas Edgar	London.
Riding, John	Preston.
Robbins, Percy John	London.
Rollett, Harry	Lincoln.
Seymour, William Herbert	London.
Sharland, William Cragg	Auckland.
Spivey, Fred	Huddersfield.
Stockdale, Richard	Skipton-in-Craven.
Temple, Arthur William	Thrapston.
Truscott, William Hearle	Southampton.
Watson, Edward	London.
Watson, Edwin Joseph	Birmingham.
Watson, James Edward Henry	Norwich.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Thomas Kerry, 30, Grosvenor Terrace, Leeds.
George Balfour Murray, Cullen, Banffshire.
Richard Tice, 106, Fenchurch Street, London, E.C.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee included the usual items and recommended the payment of a sum not exceeding £300 in addition to the amount authorized last month, on account of the new buildings on the certificate of the architect.

The PRESIDENT, as Chairman of the Committee, moved the adoption of the report and recommendations. He said that amongst the receipts there was a considerable amount received for penalties, the cost of recovering which would have to be paid hereafter, so that it was not by any means a clear profit. The examination fees were large, there having been two sets of examinations during the month. On the Benevolent Fund there had been £213 received in subscriptions, which was satisfactory, and was largely owing to the impending election of annuitants. There had been a discussion last month as to allowing candidates to spend money in canvassing, but it was again shown, as on previous occasions, that these contests did increase the interest in the Fund and add to its resources. On the donation account seven guineas had been received, and it now stood at £84 4*s.*; he hoped that the amount would be made up to £100 before the next meeting, so that it might be invested before Christmas. He then gave various details as to the expenditure on the fittings, including electric light apparatus ready for use when the current is available, and some additional water cisterns.

A short discussion ensued with reference to the ventilation of the rooms in the new premises, after which the motion was passed unanimously.

REPORT OF THE BENEVOLENT FUND COMMITTEE.

The minutes of this Committee included a recommendation of the following grants:—

£5 to the widow (age 61) of a registered chemist and druggist, who died in 1875. Applicant has had four previous grants of like amount. (Essex).

£5 to the widow (age 57) of a registered chemist and druggist, who died in 1880. Applicant has had five previous grants, amounting to £35. She suffers from chronic disease, and is unable to earn her living. (Cheshire).

Another case the Committee had declined to entertain, the result of inquiries made being very unsatisfactory.

The Secretary reported the death of H. P. Catterns, whose name was placed on the approved list of candidates for annuities at the October Council meeting.

The VICE-PRESIDENT (as Chairman of the Committee) in moving the adoption of the report, said he had nothing to add to what had been already said by the President, in connection with the Finance Committee's report.

The PRESIDENT, in putting the motion, desired to add a word with reference to the late Mr. Catterns, whose death had just been reported. He was one of the older examined men who qualified in that institution. While an assistant to the late Mr. Howden, he was induced by Mr. Ince and himself (the President) to study for the examinations, and notwithstanding many disadvantages he not only passed the Minor, but one of the best Major examinations on record. In due course he went into business, with the encouragement and possibly substantial assistance of Mr. Howden, and prospered exceedingly well in Camberwell until he was attacked by illness, and coincidently his premises were taken for local improvements. When his case came before the Committee it was pointed out that he was asking for an annuity simply in order to be able to pay the expenses of a male nurse to lift him in and out of bed, as he was perfectly helpless from rheumatic arthritis. It was a source of satisfaction that the Society had been able to show its sympathy with him.

The motion was carried unanimously.

REPORT OF THE LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
July	Day . .	510	27	7	19
	Evening .	173	15	1	8
August	Day . .	110	8	1	4
September	Day . .	90	12	2	6

Circulation of books.	Town.	Country.	Total.	Carriage paid.
July	108	111	219	£1 5 9½
August	48	60	108	14 9½
September. . .	47	74	121	18 9

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Smithsonian Institution, Annual Report, 1886, part 2; 1887, parts 1-2.
From the INSTITUTION.
U. S. Department of Agriculture, Division of Chemistry, Bulletin, No. 27.
From the DEPARTMENT.
Chicago College of Pharmacy, Thirtieth Announcement, 1890. From the COLLEGE.
New York State Pharmaceutical Association, Proceedings, 1890. From the ASSOCIATION.
New South Wales, Department of Public Instruction, Wattles and Wattle-Barks, by J. H. Maiden, 1890. From the DEPARTMENT.
Notes on Indian Economic Products, vol. 2, Nos. 3 and 4.
From H. M. SEC. OF STATE FOR INDIA.
Dymock, Warden and Hooper, Pharmacographia Indica, part 3, 1890. From the AUTHORS.
Royal Dublin Society, Scientific Proceedings, n.s., vol. 6, parts 7-9. From the SOCIETY.
Glasgow University Calendar, 1890.
From the UNIVERSITY.
University College, Dundee, Calendar, 1890.
From the COLLEGE.
University College, London, Calendar, 1890.
From the COLLEGE.
Yorkshire College, Leeds, Calendar, 1890.
From the COLLEGE.
St. Bartholomew's Hospital, Statistical Tables of Patients during 1889. From the HOSPITAL.
Stewart (R.W.), Elementary Text-book of Heat and Light, 1890. From the AUTHOR.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Ostwald (W.), Outlines of General Chemistry, 1890.
London Catalogue of Plants.

For the Library in Edinburgh—

McAlpine, Botanical Atlas.

The Librarian reported that, at the annual revision of the Library in September, the undermentioned books were missing:—

Bernthsen, Organic Chemistry, 1889.
Bruce, Materia Medica, 1885.
Durham University Calendar, 1889.
Geikie, Geology, 1886.
Martindale, Extra Pharmacopœia, 6th ed., 1890.
Medical Register, 1888.
Newlands, Periodic Law, 1884.
Roberts, Materia Medica, 1887.
Watt, Soap Making, 1884.
Watts, Inorganic Chemistry, 1883.
Wills, Materia Medica, 11th ed., 1889.

The Librarian presented his report on the Annual Meeting of the Library Association, held at Reading in September last.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
July	Morning	654	41	7	24
	Evening	87	12	1	3

During August 43 students.

During September 732 students.

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens, preserved wet, of the aloe plants yielding Curaçoa aloes.
From Professor VAN EEDEN.
Specimen of the wood of *Sterculia platanifolia*, of the root of *Justicia Gendarussa*; and of the gum resin of *Balsamodendron Berryi*; and of the gum of *Khaya Senegalensis*.
From the DIRECTOR, Kew Gardens.
Fine specimen of dried belladonna leaves.
From Messrs. WRIGHT, LAYMAN and UMNEY.
Specimen of young roots of Sumbul and *Ferula fœtidissima* and seeds of the latter.
From Mr. CARL FERREIN, Moscow.
Specimen of seeds of *Smyrnium Olusatrum*.
From Mr. F. P. BALKWILL.
Fine specimen of the bark of *Rhamnus Purshiana*, collected in Senora County, California.
From Mr. J. MOSS.
Specimen of the Strophanthus seed used in his physiological investigation.
From Professor T. R. FRASER, F.R.S.
Specimens of rhizome of *Podophyllum Emodi*.
From Messrs. BERTIE SMITH and Co.
Specimens of the wood of *Celtis reticulosa*; Palembang benzoin as sold at Java; a piece of the wood of Styrax Benzoin with the benzoin on the surface of the bark; Dragon's blood in pipe and cakes from Borneo; and fruit of three different species of palm used in producing it; dragon's blood from Sumatra; a small hand sieve used for sifting the dragon's blood from the palm fruits; and a spike of cubeb fruits.
From Dr. TREUB, Director, Botanical Gardens, Buitenzorg.

To the Herbarium—

Specimen of *Althæa hirsuta*.
From Mr. G. W. WATTS, Rochester.
Abnormal specimen of *Mentha sativa*.
From Mr. F. P. BALKWILL, Plymouth.
Specimen of the Aloe, or Garoo wood tree of the island of Hainan.
From Mr. W. R. CARLES, H.M.C., Chintsiang.
Specimen of the Benzoin plant of Palembang.
Specimens of *Cubeba officinalis*, *Cubeba canina*, and *Cubeba mollissima*.
From Dr. TREUB, Buitenzorg.

The staff of the Society's School of Pharmacy had attended and reported on their respective classes.

A letter from Messrs. Churchill had been considered, and it was recommended that a special copy of the Journal for February 28 next be sent to each person on the Register of chemists and druggists, the usual arrangements to be made as to advertisements.

The Committee had held a second meeting at which a list of persons who had been nominated as Local Secretaries for the ensuing year had been drawn up.

The **President** in moving the adoption of the report and recommendations said he was glad to find that the altered arrangements suggested some time ago by Mr. Cross with regard to voting for Local Secretaries, had worked very satisfactorily. Formerly the voting papers for the Local Secretaries were issued with those for the Council and the annual report, but it was thought that perhaps the budget was rather too large for attention to be paid to all contained in it, and accordingly it was decided that separate voting papers for Local Secretaries should be issued in October. In the result, not only had there been a much larger number of votes recorded, but in many cases meetings had been held of members and associates in business; and as far as one could judge from the reports which had been made by the existing Local Secretaries, the result was very satisfactory. As the returning officer who had to deal with the voting papers, it was very satisfactory to him to find so much interest had been taken in the election, and he could not help thinking that this would have a stimulating influence on the gentlemen appointed, and induce them to do their utmost for the Society, in which they would also be doing the best for the trade at large.

Mr. **Evans** seconded the motion.

Mr. **Cross** was very pleased to find that the idea which had occurred to him some time ago had been found practically successful. He felt sure that the more the members realized the importance of appointing the very best men they could get to act as their local representatives, the better would it be not only for the Society but for all engaged in the business.

Mr. **Martindale** said he observed that a number of names selected were new, and being new brooms he hoped they would sweep well, especially in connection with the new Pharmacy Bill. He was very glad to see that a larger amount of *esprit de corps* had been evoked, which augured well for the future.

The **President** remarked in reference to the number of new names on the list, that no doubt in many cases this was the result of arrangement with the previous Local Secretary, and in reference to Mr. Cross's remark about getting the best men, he might say that it was not necessarily the best man for the purpose who had to be chosen, because it might often happen that one who would be considered the best could not give the time necessary, and would be obliged to decline nomination. He had no doubt this often occurred, and in fact it was the best man available who had to be selected.

Mr. **Cross** said he quite agreed in this view; moreover, it was not always the most representative man in a locality who would be the best Local Secretary.

Mr. **Atkins** said he understood there were a good many changes in the list, which he did not regret, but he hoped those who had served them well in the past, some of them for thirty years or more, and were now retiring, would have some recognition of their services now that they were retiring in favour of younger men.

The **President** quite agreed, and said he proposed to bring forward a resolution on the subject next month.

The motion was then put and carried unanimously.

APPOINTMENT OF LOCAL SECRETARIES.

A separate resolution was also passed appointing the persons named in the following list Local Secretaries for the ensuing year:—

LIST OF LOCAL SECRETARIES, 1890–1891.*

Towns eligible.	Names of persons appointed.
Aberdeen	Strachan, Alexander.
Aberystwith	Wynne, E. P.
Abingdon	Smith, William.
Accrington	Stanley, Thomas.
Altrincham	Clarke, James Thomas.
Andover	Bienvenu, John.
Appleby	Longrigg, John.
Arbroath	Robertson, John.
Ashbourne	Bradley, Edwin S.
Ashford	Ingall, Joseph.
Ashton-under-Lyne	Bostock, John W.
Aylesbury	Turner, John.
Banbury	Ball, George Vincent.
Banff	Alexander, William.
Bangor	Jones, Owen.
Barnsley	Eastwood, Lewis.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Bath	Appleby, Edward J.
Bedford	Taylor, James B.
Belper	Calvert, James.
Berwick	Lyle, William.
Biggleswade	Evans, John.
Birkenhead	Brookes, Alfred Fincher.
Birmingham	Thompson, Charles.
Bishop Auckland	Harburn, Alfred.
Blackburn	Garland, Alfred P.
Blackpool	Laurie, John.
Bodmin	Cardell, Richard T.
Bolton	Mason, William B.
Boston	Haller, Frederick Wm.
Bournemouth	Worth, Edwin.
Bradford (Yorkshire)	Rimmington, George.
Brechin	Hodgeton, David.
Brecon	Meredith, John.
Bridgnorth	Deighton, Thomas Milner.
Bridgwater	Basker, John Anthony.
Bridlington	Purvis, John B.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Bromley	
Broughty Ferry	Park, William.
Burnley	Cowgill, Bryan H.
Burslem	Blackshaw, Thomas.
Burton-on-Trent	Wright, George.
Bury	Heywood, William.
Bury St. Edmunds	Summers, Frank.
Buxton	Wright, Robert.
Camborne	Allan, Charles J.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Carlisle	Pattinson, Michael H.
Carmarthen	Lloyd, Walter.
Carnarvon	Jones, John.
Chatham	Morgan, Alfred William.
Chelmsford	Metcalfe, Wilson.
Cheltenham	Barron, William.
Chertsey	Ashton, Frederick Wm.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chester-le-Street	Brown, Joseph.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Chorley	Hill, William.
Cockermouth	Cooper, F. Ashley.
Colchester	Cordley, William Bains.
Coventry	Hinds, James.

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* Local Secretaries are appointed in all towns in Great Britain (except London and Edinburgh) which return a Member or Members to Parliament, and in such other towns as contain not less than three Members of the Society or Associates in Business.

Towns eligible.	Names of persons appointed.
Croydon	Clarke, Josiah.
Darlington	Robinson, James.
Darwen	Shorrock, Ralph.
Deal	Green, John.
Derby	Cope, John A.
Devizes	Edwards, Thos. Roberts.
Devonport	Stephens, Jonathan.
Doncaster	Howorth, James.
Dorking	Clift, Joseph.
Douglas	Brearey, Arthur W.
Dover	Bottle, Alexander.
Droitwich	Harris, Stephen.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Ealing	Curtis, F. G.
Eastbourne	Crook, Herbert.
East Grinstead	Tully, John.
Eccles	Howie, William Lamond.
Egremont (Cumberland)	Ireland, Edward J.
Elgin	Robertson, William.
Epping	Rowland, Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Lake, John Hinton.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	
Flint	Jones, Owen Williams.
Folkestone	Goodliffe, George.
Forfar	Ranken, John.
Galashiels	Walker, James.
Glasgow	Kinninmont, Alexander.
Gloucester	Foulkes, William Henry.
Grantham	Whysall, William.
Gravesend	Clarke, R. Feaver.
Greenock	McNaught, Archibald.
Grimsby, Great	Cook, Robert, Junr.
Guernsey	Nickolls, John B.
Guildford	Long, Alexander J. T.
Haddington	Watt, James.
Halifax	Dyer, William.
Hanley	Cornwell, T. C.
Harrogate	Davis, R. Hayton.
Harrow	Gunn, Samuel John.
Harwich	Worts, Augustine.
Hastings and St. Leonards	Tharle, Charles A.
Hawick	Maben, Thomas.
Helensburgh	Harvie, George.
Henley-on-Thames	Batchelor, Charles J. H.
Hereford	Williams, Walter.
Hertford	Lines, George.
Hexham	Gibson, John Pattison.
Heywood	Beckett, William.
Hitchin	Ransom, William.
Honiton	Dyer, Edward H.
Horncastle	Kemp, Herbert W.
Houghton-le-Spring	Rowell, R. H.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen.
Huntly	Chalmers, George.
Hyde	Billinge, Mark.
Hythe	Lemmon, Robert Alce.
Ilkley	Worfolk, G. W.
Inverness	Ogston, William.
Ipswich	Anness, Samuel Richard.
Jersey	
Kendal	Severs, Joseph.
Kilmarnock	Borland, John.
King's Lynn	
Kingston-on-Thames	Walmsley, Samuel.
Kirkcaldy	Storrar, David.
Knutsford	Silvester, Henry T.
Lancaster	Vince, James.
Leamington	Pullin, W. H.
Leeds	Reynolds, Richard.
Leicester	Clark, Walter Beales.
Leigh (Lancs.)	Bennett, John William.
Leighton Buzzard	Herington, Joseph.
Leith	Finlayson, Thomas.
Leominster	Sandiland, R. B.
Lewes	Saxby, Henry.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liverpool	Parkinson, Richard.
Llandudno	Winter, Joseph.
Loughborough	Scrase, Richard.
Louth	Dennis, Fred Woodrow.
Lowestoft	Clarke, Geo. Ernest.
Ludlow	Woodhouse, George.
Luton	Duberley, George S.
Macclesfield	Wright, John.
Maidenhead	Walton, Ralph.
Maidstone	Stonham, W. B.
Maldon	Wallworth, David.
Malton	Buckle, James.
Malvern	Coldwell, David B.
Manchester, etc.	Benger, F. Baden.
Mansfield	Patterson, Douglas J.
March	Davies, Peter Hughes.
Margate	Baily, John.
Market Harborough	Maynard, Henry R.
Melton Mowbray	Wing, Geo. N.
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Montrose	Davidson, Alfred.
Morpeth	Schofield, F. E.
Newark	Cherrington, Geo. W.
Newbury	
Newcastle-on-Tyne	Martin, Nicholas H.
Newcastle-under-Lyme	Poole, Weston.
Newmarket	Barrow, Frank Arthur.
Newport (Mon.)	Garrett, Thomas P.
Newport (Salop)	Barlow, John.
Newtown	Owen, Edward.
Northampton	Bingley, John.
Northwich	Humphreys, Griffith.
Norwich	Sutton, Francis.
Nottingham	Parker, William Henry.
Nuneaton	Iliffe, George.
Oban	Robertson, Alexander.
Oldham	Bates, Henry.
Oswestry	Evans, John.
Otley	Lockwood, Thomas.
Oxford	Prior, George Thomas.
Pembroke Dock	Williams, Cornelius.
Penrith	Cowper, Joseph.
Penzance	Shakerley, Benjamin.
Perth	Donald, David.
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Hunt, Freeman W.
Pontefract	Bratley, William.
Pontypridd	Cule, Taliesin.
Poole	Pomeroy, Francis T.
Portsmouth, etc.	Childs, James L.
Preston	Arkle, Charles A.
Prestwich	Mercer, Allan.
Radcliffe	Pollitt, Joseph Moore.
Ramsey (Hunts)	Palmer, Frederick Wm.
Ramsgate	Baily, Edward.
Reading	Bradley, Charles.
Rhyl	Lawrence, Geo. Richard.
Richmond (Surrey)	Hornby, Alfred.
Richmond (Yorks)	Walton, E. Bridges.
Ripon	Parkin, Joseph Brooks.

Towns eligible.	Names of persons appointed.
Rochdale	
Rochester	Watts, George Wm.
Romford	Lasham, John William.
Ross	Matthews, Thomas A.
Rotherham	Horsfield, John M.
Rothesay	Duncan, William.
Rugby	Brown, Frederic P.
Ruthin	Rouw, Theodore J.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur E.
St. Andrews	Govan, Alexander.
St. Austell	Binks, Burcham.
St. Ives (Cornwall)	Young, Tonkin.
Saffron Walden	Gilling, John.
Salisbury	Atkins, William Ralph.
Scarborough	Whitfield, John.
Sevenoaks	Pain, Edwin.
Sheffield	Ward, William.
Shields, South	Noble, John.
Shipley	Dunn, Henry.
Shrewsbury	Cross, William Gowen.
Southampton	Dawson, Oliver R.
South Molton	Swingburn, Richd. Hy.
Southport	Righton, James.
Spalding	Bell, E. Wightman.
Stafford	Averill, John.
Stalybridge	Simpson, Allwood.
Stirling	Shairp, William.
Stockport	Orton, Wm. Billing.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Selleck, W. R.
Stowmarket	Gostling, George James.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Coley, Samuel James.
Sunderland	Harrison, John.
Swaffham	Bell, Frederick R.
Swansea	Gross, Nicholas M.
Tamworth	Allkins, Thomas Boulton.
Taunton	Short, George William.
Tavistock	Gill, William.
Teignmouth	Maunder, William.
Tewkesbury	Fulcher, Herbert A.
Tiverton	Havill, Paul William.
Torquay	Shapley, Charles.
Totnes	Morse, Charles H. S.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Twickenham	Shelley, Henry.
Uxbridge	Waterhouse, Tom.
Ventnor	Weston, Charles.
Wakefield	Chaplin, John Henry.
Walsall	Elliott, George.
Warrington	Greenough, Hugh F.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wellington (Salop)	Bates, James.
Wellington (Somerset)	Windeatt, George John.
Wells (Somerset)	Manning, R. J.
West Bromwich	Eynon, C. J.
Westbury	Paine, Charles.
Weston-super-Mare	Hall, Edwin.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.
Wigan	Phillips, Jonathan.
Wimbledon	Spencer, William G.
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wokingham	Spencer, Thomas.
Wolverhampton	Gibson, Fredk.
Woodbridge	Betts, John.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wrexham	Edisbury, J. F.
Wycombe	Wilford, Josiah.
Yarmouth, Great	Poll, William S.
Yeovil	Maggs, Frederick R.
York	Sowray, Joseph.

PRELIMINARY EXAMINATIONS.

The Secretary submitted to the Council the following return:—

List of Centres and Table of Attendances of Candidates at each Centre.

	1888. Jan., Apr., July, Oct.	1889. Jan. Apr., July, Oct.	1890. Jan., Apr., July, Oct.	Total number of attendances at each centre at 12 examinations.
ENGLAND AND WALES.				
Birmingham	65	61	60	186
Brighton	20	12	9	41
Bristol	37	36	38	111
Cambridge	18	26	26	70
Canterbury	10	15	17	42
Cardiff	16	27	31	74
Carlisle	54	33	28	115
Carmarthen	49	46	33	128
Carnarvon	26	22	25	73
Cheltenham	17	23	11	51
Darlington	26	19	22	67
Exeter	28	33	36	97
Hull	26	32	29	87
Lancaster	19	20	22	61
Leeds	69	70	73	212
Lincoln	28	15	24	67
Liverpool	52	54	59	165
London	176	163	171	510
Manchester	86	113	118	317
Newcastle	49	47	60	156
Northampton	13	13	12	38
Norwich	21	21	17	59
Nottingham	47	44	59	150
Oxford	12	9	9	30
Peterborough	13	13	12	38
Sheffield	42	34	36	112
Shrewsbury	24	16	15	55
Southampton	29	30	31	90
Truro	13	22	25	60
Worcester	9	8	7	24
York	27	19	18	64
SCOTLAND.				
Aberdeen	46	82	45	173
Dundee	37	34	43	114
Edinburgh	105	77	97	279
Glasgow	66	43	54	163
Inverness	10	11	11	32
Douglas, I. of Man	0	3	2	5
Guernsey	4	1	3	8
Jersey	4	4	4	12

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

The **PRESIDENT** moved that the office of Superintendent of Written Examinations be offered in the first place to the Local Secretaries in the towns in the following list. It would be noticed that there were three new centres, Aberystwith, Penzance, and Plymouth. In the latter case a memorial had been sent up, signed by non-members as well as members, pointing out that Plymouth was a large educational centre and a place where many young men were apprenticed, and he had thought the best way to deal with it would be to submit it to the Committee on the previous evening, when the request was at once acceded to, and as a consequence of this addition Penzance had been substituted for Truro. He might add that when he in company with the Vice-President and others visited Plymouth something was said about this matter both at the meetings and privately, and he had assured the friends there that the matter should be considered when the question came before the Council. They accordingly adopted this method of sending a memorial, and he felt that the thanks of the Council were due to them for the interest they had taken in the matter. The motion was:—

> "That the superintendents of written examinations for the ensuing year—from January 1st, 1891—be appointed at the following centres, and that the appointments be offered to the Local Secretaries at those centres except London, Edinburgh and Jersey. *England and Wales*—Aberystwith, Birmingham, Brighton, Bristol, Cambridge, Canterbury, Cardiff, Carlisle, Carmarthen, Carnarvon, Cheltenham, Darlington, Exeter, Hull, Lancaster, Leeds, Lincoln, Liverpool, London, Manchester, Newcastle, Northampton, Norwich, Nottingham, Oxford, Penzance, Peterborough, Plymouth, Sheffield, Shrewsbury, Southampton, Worcester, York; *Scotland*—Aberdeen, Dundee, Edinburgh, Glasgow, Inverness; Douglas (I. of Man), Guernsey, Jersey."

In London and Edinburgh these officers were specially appointed, but in Guernsey and Jersey there was a difficulty in appointing any one permanently, as the Pharmacy Act did not apply to these places, and there was not a Local Secretary there. He therefore suggested that the President should be empowered to appoint some one to act there when there were candidates. This was what he had had to do at short notice on former occasions, although somewhat irregularly.

The motion was carried unanimously.

Mr. **Evans** expressed his satisfaction at Aberystwith having been added to the list of local centres, which would be a great convenience to many young men in Wales.

Proposal for Meetings in the Provinces.

Mr. **Schacht** moved the following resolution, of which he had given notice:—

> "That it is desirable that a meeting of the Society, under the auspices of its President and Council, be held once in each year at some appropriate centre other than London; and the Library, Museum, Laboratory and House Committee is requested to formulate a scheme for rendering such a meeting most useful to the general interests of the Society, and to report thereon to the Council."

He said he hoped it was not necessary to make any apology for asking the Council to adopt this recommendation. It was a very old idea of his, for the *Pharmaceutical Journal* about thirty or forty years ago contained a couple of letters from himself on this subject, the last of which was considered by some to have been the starting point of that very useful organization, the Pharmaceutical Conference. That organization had certainly been more successful than he had ever thought possible in meeting one of the wants which led him at that time to write the letters referred to. It afforded an opportunity for gathering pharmacists together for the discussion of scientific papers, and for the advancement of social intercourse amongst the members, but there was still one need left unsupplied, viz., that of giving an opportunity for those who were not near the great centre for ventilating their own ideas on questions of pharmaceutical politics, and discussing the proceedings of those who manage that Society. Those two points had not yet been quite sufficiently met, and the question was revived in his mind at the last annual meeting, when Mr. Balkwill, of Plymouth, suggested that it was highly desirable for the President and some of the leading members to make occasional visits to important centres in the provinces. They were all aware how happily that suggestion had been responded to by the President, who had already in many instances shown how useful the suggestion was, and how capable he was of responding to it, but they could not always expect to have a President so energetic and so capable of expressing the views of the Council, and even Mr. Carteighe himself would not always be so vigorous as happily he was at present. They might not always be fortunate enough to have a President so highly gifted in oratorical powers, and apart from that there was a great deal in the personal contact of numbers of influential leading men in any department of practical life, and he could not help thinking that if this should commend itself to the Council as a feasible scheme a very large amount of good might be done, if once a year, at a convenient season, when it would not interfere with any existing organization, a visit were paid to some important centre in the country where members of the Council might come into contact not only with members of the Society, but with members of the trade. His chief reason in writing the letters to which he had referred many years ago was the unfortunate falling off which was then taking place in the numbers of members, and though that might not be quite the case now, everyone would admit that a larger number of professors of pharmacy throughout the country might and ought to belong to the Society, and it appeared to him that the means suggested would be very likely not only to increase their numbers, but to enlist enthusiasm on behalf of the Society. He had purposely avoided indicating anything like a detailed scheme, preferring that that should be left for the consideration of the Committee, but he might suggest that the main object might be carried out in different ways. It might, for instance, be deemed most convenient that one of the periodical monthly meetings of the Council should be held in some place other than London, and attached to it there should be an open meeting. The advantages of that would be that it would not involve an additional tax on members of the Council in taking them from their homes and business. On the other hand, if it were possible to make such a further call on their energies he thought it would be desirable to do so. At any rate there was the other alternative of having a special gathering, when for one or two days at the most gentlemen might be asked to meet at Birmingham, Manchester or some convenient centre, when the day proceedings might be limited to a discussion of what might be called pharmaceutical politics, the course of proceedings of the Society, its claims on trade, etc., and in the evening there might be a meeting, not too convivial in its character, but stamped with a scientific element, at which they might enlist the services of some conspicuous man of science, so that it would be a legitimate occasion for local members to invite their professional friends to hear a discourse on some current topic of interest in science. He only put forward these hints as a justification for introducing a subject that he thought would be found practicable if it were deemed convenient. He would ask the Council to consider first whether such a movement was desirable, and if so to refer it to the Committee. The subject did not press for immediate settlement, and harm might be done if the Council were asked for too hasty a decision.

Mr. **Martin** in seconding the motion said it was not necessary to detain the meeting at any length, for he thought as an abstract resolution all would entirely agree with it. The only difficulty would be whether it was possible to carry it out in practice, and that was rather a matter for the consideration of the Committee.

All who had been in contact with registered chemists and druggists for the last twenty years knew the amount of apathy and even prejudice existing against the Society from the north of Scotland to Cornwall, and no doubt such meetings as were suggested would be one means of giving information to the body at large and of bringing members of the Council and executive into personal contact with chemists and druggists, and it was almost impossible to suppose that anything but good could result. The annual meeting in May was confined to members and associates, and on those occasions there was a large amount of business done which introduced a more or less contentious element, and discussion ensued which did not inform chemists and druggists throughout the country very much. He feared that the suggestion to hold one of the Council meetings in the country would be practically impossible, because a large amount of the business done was executive, and the secretary and staff would scarcely like to bring the requisite materials down into the country. He thought the Committee might very profitably employ its time in considering whether any such scheme was feasible or not.

The **President** thought there would be no difference of opinion as to the desirability of such a scheme, the only discussion really would arise on the details.

Mr. **Atkins** said probably Mr. Schacht would like to ascertain before the matter was referred to the Committee whether it would receive any considerable measure of support. He certainly supported the idea most heartily, the only question was its feasibility. With regard to the Council meeting being held in the country he thought the bye-law directing that the Council meeting should be held in the Society's house would bar the way in that direction. The meetings which the President had been holding in various parts had been attended with a great deal of benefit. He had recently had an opportunity of testing the feeling of the west, and he could say that that feeling was one of distinct encouragement and hopefulness, and of increased loyalty to the Society. Whether it was better to rest on voluntary and sporadic effort in that direction or to go in for a formulated scheme was just the question, and he thought there was a great deal in the argument Mr. Schacht produced for more definite action. They could not expect the President of the future, whatever might be his endowments, to continue doing what Mr. Carteighe had done voluntarily. He was quite certain the words "decentralization" and "devolution"—which he used in no political sense—would be found more and more to express the needs of the future. He hoped this movement would lead to the Society attaining a strength which it had not yet realized, and, therefore, he gave it his hearty support.

Mr. **Evans** supported the motion, which he thought would be very useful in giving members of Council an opportunity of ascertaining the requirements of the districts which they visited. They would not only be able to put their views before the members of the trade, but would be able to learn the views of others, which was equally desirable. He had been very much pleased at reading the excellent speech of the President at Manchester, and he thought if the Council had taken the members of the trade more into their confidence in years gone by, and had discussed questions on which there were doubts more openly instead of *in camera*, it would have been better, and a great deal of dissatisfaction which had occurred amongst members who were well disposed towards the Society would never have taken place. That, of course, was merely his individual opinion, and might not be exactly pertinent to the motion, but he had much pleasure in supporting it, and did not think it would be too much to ask members of the Council to go once a year to Sheffield, Manchester, Bristol, or even to poor little Wales.

Mr. **Richardson** thought this was an excellent suggestion. As one of the founders of the Pharmaceutical Conference he must say it had not altogether fulfilled the hopes of its originators. No doubt it afforded an opportunity for the interchange of scientific views amongst the savants of pharmacy, but he thought the Conference had dragged itself too much at the feet of the British Association; and had not done so much good as it might. He heartily supported the idea, the details being left to the Committee.

Mr. **Southall** also supported the proposition. He thought the meetings should be somewhat on the lines of the Conference, and that there should be papers read, not on scientific subjects, but on trade questions and pharmaceutical politics; and there would then be no lack of discussion. The scientific papers at the Conference were rather above the heads of the general pharmacist, and therefore he did not take as much interest in the proceedings as he otherwise would.

Mr. **Allen** thought the last two speakers had been approaching a subject which the proposer and seconder studiously avoided. The Conference had done a great deal of good, and it had at least fulfilled its social function in a way which was of the utmost value to pharmacists all through the country. It was desirable to know if these meetings were intended to be entirely independent of the Conference.

Mr. **Schacht** said he thought so.

Mr. **Allen** said in that case it was not necessary to discuss the Conference at all.

Mr. **Richardson** said he had a high appreciation of the work of the Conference; he did not wish to disparage it in the least.

Mr. **Hills**, as one of the poor unfortunate men who had to live in London, said it would give him great pleasure to pay an occasional visit to Wales and other parts of the country, and to learn the difficulties which were experienced by their friends in these districts. He thought all the difficulties in the matter would be those of detail.

Mr. **Hampson** said the matter would have to be considered from a financial point of view, as the expense would probably be considerable, but he welcomed the proposal, for if it could be carried out there was no doubt of its utility. But it was not by any means a simple thing or free from difficulties. If necessary he would be in favour of a pharmaceutical van to perambulate the country and enlighten the inhabitants, but he did not think it was, and he thought it was an absolute fiction to suppose that members of the Council were not acquainted with the wants of the trade in different parts of the country. The Council was thoroughly representative, and knew what was going on even in Wales. But, at any rate, this would bring people together, and it was by personal contact and friendly relationship that such a Society was made successful.

Mr. **Martindale** said he should be pleased to discuss the matter in committee, but he understood Mr. Schacht's idea to be that these meetings should be almost entirely political, and if that were so it appeared to him the business would require very careful handling. The meetings in London were not reported except in the trade journals, but in the country probably the meetings would be reported generally, and they would therefore be discussing matters in the eyes of the public, and harm might easily be done. It would be necessary, therefore, to consider the details carefully in committee.

Mr. **Schacht**, in reply, said he had simply to thank the members for the kindness with which they had received his suggestion; and he was very glad to find he had not misinterpreted what he believed to be the general feeling. He quite agreed with the observation of Mr. Evans, that they might not only be of service to their friends in the country, but would also be themselves benefited by coming into contact with those gentlemen. Experience had taught him that he could never come into contact with a fellow creature of tolerable common sense without being able to learn something from him. He was quite content with the expression of opinion, and though there might be difficulties in detail, he must say that the more he had looked at them the smaller they seemed to grow.

The PRESIDENT, in putting the motion, said there was no doubt that Mr. Schacht was the father of the Conference. So far as he recollected, the letters he had referred to were practically an appeal to the Council of the Society at the time to do something of this kind, and as that body did not see its way, a meeting was held at Newcastle, at which the Conference was founded by Mr. Schacht, Mr. Brady and others. This was not therefore a new idea which had dawned upon Mr. Schacht; he had watched the growth of the Conference and had been one of the most influential of its Presidents, and therefore they might feel sure that any proposition of this sort coming from him was likely to be useful. Mr. Schacht had sometimes advocated schemes which others thought rather ideal, but there was nothing of that sort about this—it was perfectly practicable. With regard to reporting the proceedings, he must say that when he saw anything in the general press about the meetings of the Conference, it was generally described as the annual meeting of the Pharmaceutical Society or of the British Pharmaceutical Association. There was a great deal of confusion about it in people's minds, and that was intensified when the President of the Conference travelled, as he sometimes did, outside the general lines of the Conference into political topics. It was desirable, as far as possible, to keep these questions quite apart from the Conference. As to the practicability of the scheme, he might remind them that a very analogous body—the Incorporated Law Society—a voluntary society which solicitors could join or not, and which had the duty cast upon it of examining all candidates for the profession—held a meeting every year in the provinces. He believed the chartered accountants did the same.

The motion was carried unanimously.

THE PHARMACOPŒIA COMMITTEE.

The PRESIDENT stated that the Pharmacopœia Committee of members of the Pharmaceutical Society appointed by the Council at the request of the Chairman of the Pharmacopœia Committee of the Medical Council would complete its work during the present month, and as the Medical Council was about to hold a special meeting late in the month to practically adopt the new Addendum, and he hoped approve the work that Committee had done, it would be his duty as President of the Committee to transmit the result of its labours to the Committee of the Medical Council direct, so that probably the report would be received, approved, and perhaps printed and published before the next meeting of Council.

Mr. HAMPSON thought it was unfortunate that the report of the Committee could not come in the first place to the Council.

Mr. RICHARDSON remarked that the Committee did not consist entirely of members of the Council.

Mr. HAMPSON said it seemed to him that as a matter of business the Committee should report to the Council. Of course, the Council could only adopt it; it could not interfere with the action of the Medical Council in any way.

The PRESIDENT said strictly speaking he did not think this Committee was bound to report to the Council at all. He only mentioned what was about to be done as a matter of courtesy and general interest.

THE PHARMACY BILL.

Sheffield.

The PRESIDENT reported the receipt of a letter from the Secretary of the Sheffield Society enclosing a resolution passed at a meeting of the Council of that Society to the following effect:—"That having carefully read and considered the draft Pharmacy Act Amendment Bill the Council of the Sheffield Pharmaceutical and Chemical Society are agreed to assist the Pharmaceutical Society in carrying the Bill."

Bournemouth.

The PRESIDENT said he had also received a letter from Mr. Bilson, of Bournemouth, saying he had much pleasure in sending a resolution in favour of the Bill, signed by all the qualified chemists in the town.

Mr. RICHARDSON asked if all Local Secretaries had been communicated with, and a request made to them to call meetings on this subject.

The PRESIDENT said that would be done on their appointment.

REPORT OF EXAMINATIONS.—*October*, 1890.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (15th)	4	2	2
" (16th)	4	2	2
" (17th)	4	3	1
	—12	— 7	— 5
Minor (15th)	25	13	12
" (16th)	27	11	16
" (17th)	25	9	16
" (22nd)	26	7	19
" (23rd)	29	13	16
" (24th)	28	9	19
	—160	— 62	— 98
	172	69	103

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (22nd)	3	1	2
Minor (22nd)	13	9	4
" (23rd)	15	13	2
" (28th)	15	12	3
" (29th)	16	9	7
" (30th)	14	9	5
	—73	—52	—21
	76	53	23

Preliminary Examination.

14*th.*—Candidates examined, 308. Passed, 135. Failed, 173.

24*th.*—Twenty-one certificates by approved examining bodies were accepted in lieu of the Society's examination.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor, reporting the progress made with cases which had been placed in his hands. In one case execution had been issued against a defendant who had not paid the penalty inflicted; another had paid £20 5*s.* for penalties and costs before action; and another £5 5*s.* Other cases were pending.

The Secretary had reported the result of a case in Glasgow (reported in the Journal of November 1). Defendant obtained leave to appeal, but had since withdrawn, and paid the penalties and costs imposed.

Two other cases of infringement were considered, and in each case proceedings were recommended.

The report was, as usual, read and considered in committee.

On resuming, the report and recommendations were unanimously adopted.

EXAMINATIONS IN EDINBURGH.

October, 22, 23, 28, 29 *and* 30, 1890.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was also present on the 22nd and 30th, on behalf of the Privy Council.

MAJOR EXAMINATION.

22nd.—*Three* candidates were examined. *Two* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Bennet, Andrew Russell	Uphall.

MINOR EXAMINATION.

22nd.—*Thirteen* candidates were examined. *Four* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Alexander, John	Aberdeen.
Bamford, William	Rochdale.
Baxter, Gilbert Buchanan	Blackburn.
Beattie, Frederick	Portobello.
Birch, John	Heywood.
Black, Robert	Aberdeen.
Calverley, John	Keighley.
Chree, Charles	Aberdeen.
Cooke, Lewis Ernest	Barnsley.

23rd.—*Fifteen* candidates were examined. *Two* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cowan, Joseph	Annan.
Crail, John	Dunkeld.
Dey, Alexander John	Edinburgh.
Dunn, Robert William	Dundee.
Ewing, Alexander	Chathill.
Falconer, William	Turriff.
Gass, William Herbert	Harrogate.
Gifford, James	Blackburn.
Harrison, Joseph	Keighley.
Hendry, Alex. John Garden	Turriff.
Holford, Samuel Skinner	Godley.
Honeyman, Edmund	Newcastle-on-Tyne.
Hulland, Arthur	Bath.

28th.—*Fifteen* candidates were examined. *Three* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ibison, Robert Johnson	Carnforth.
Innes, John	Dufftown.
Johnson, Herbert Mellor	Great Malvern.
Kinnear, James Arthur	Dundee.
Little, George	Falkirk.
Macleod, William	Nairn.
MacRossen, James Rollo	Brechin.
Mair, William	Dundee.
Martin, James	Glasgow.
Mason, David	Edinburgh.
Maudson, Charles Frederick	Leeds.
Petrie, James	Dundee.

29th.—*Sixteen* candidates were examined. *Seven* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Meldrum, Alexander	Leith.
Miller, William Gow	Wick.
Milne, James	Aberdeen.
Newton, Thomas Hill	Hull.
Oldfield, William	Denton.
Pennie, William	Aberdeen.
Perrett, George Stanley	Bath.
Richardson, William Jenkinson	Lonsdale.
Savege, Robert Maclure	Montrose.

30th.—*Fourteen* candidates were examined. *Five* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bolshaw, Albert Ernest	Crewe.
Schuhmacher, Claus Henry	Liverpool.
Simpson, John Fenwick	Newcastle-on-Tyne.
Sivewright, James	Aberdeen.
Small, John Andrew	Edinburgh.
Smith, John James	Otley.
Taylor, Henry Hylton	Middesborough.
Tocher, Robert	Peterhead.
Weall, George Alexander	Preston.

Proceedings of Societies in London.

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

The London Section of the Society of Chemical Industry held the first meeting of the session at the Chemical Society's rooms at Burlington House, on Monday, November 3. There was an unusually good gathering, both at the meeting and at the dinner of the Chemical Industry Club, which preceded it. After the new Chairman, Mr. T. Tyrer, had said a few words appropriate to the beginning of his term of office, including a very opportune plea for punctuality,—

Mr. A. G. Green read a paper, the joint work of himself and Messrs. Cross and Bevan, on the "Diazotype Process of Photographic Printing and Dyeing." The authors have found that bodies of the now well-known class termed the "primuline series" become, after being diazotized in the usual way, sensitive to light, and a sheet of textile material, cotton, silk or wool, or one of gelatine supported on a suitable substance such as xylonite or glass, when impregnated with the diazotized dye, is capable of receiving an ordinary photographic image. Development is accomplished by means of some suitable phenol or amine, such as the naphtholsulphonic acids, resorcin, and α-naphthylamine. During the action of the light the diazo group appeared to be split off, nitrogen being evolved. An attempt to show this interesting reaction to the general audience by means of the lantern unfortunately proved futile, owing to the slide being too large. Further details of the precise course followed by the reaction are still wanting, the investigation presenting many difficulties. It is noteworthy that plates of this character are sensitive to more of the rays of the spectrum than those prepared with silver salts, and that the maximum action occurs in the green. The delicate half tones given by this process, and the fact that the colour of the image is controlled by the nature of the developer used, and may therefore be different in different parts of the same fabric, give it many and wide applications. In the animated debate which followed the reading of the paper, a fear was expressed that prints made in this way might be somewhat fugitive, the fading of eosin being instanced as a parallel case. The possibility of iso-chromatic plates being prepared, which even if fugitive would allow of reproduction in some more permanent material, was suggested, and work in this direction is now being prosecuted. Greater sensitiveness is said to be attained by diazotizing with silver nitrite instead of the usual sodium salt.

Mr. Watson Smith then gave the gist of a paper by Mr. Franklin S. Clark (U.S.A.) on "The Permanence of Creasoting Agents," in which the author gave an account of numerous experiments which have led him to prefer wood creasote to any of the substances commonly used for preserving timber, considering it much better than coal tar creasote. Of greater pharmaceutical interest was the display of bye products other than creasote obtained by the distinctive distillation of pine wood, and the comments to which they gave rise. Specimens of grey acetate of lime, paraffin wax, creasote oils containing terpenes, and wood alcohol were exhibited, the latter being of very creditable purity. It was suggested that should it prove possible to obtain a regular supply of methyl alcohol of uniform and excellent quality its use would extend in many directions. Dr. Richardson has shown that its toxic effects are far less severe than those of ordinary alcohol, and a purified product would be decidedly preferable to fusel-laden whiskey as a stimulant. This view was endorsed by Mr. Tyrer from personal experiment. About fifteen years ago the question was on the point of settlement, and a spirit of unexceptionable character would have been put on the market, but for the interposition of the excise authorities. There are signs, however, which lead to the belief that the stringency of the regulations at present in force may shortly be modified, in which case a large consumption for perfumes and tinctures may be expected; it may prove, moreover, but a step to the boon of duty-free alcohol for manufacturing and scientific purposes. The meeting was adjourned till December 1.

FORMATION OF A CHEMISTS' ASSOCIATION IN THE NORTH-WEST OF LONDON.

A meeting, convened for the discussion of trade interests of chemists, and of the desirability of forming a North-Western Chemists' Association, was held, on Thursday evening last, at the residence of Mr. H. Hyne, West End-lane.

Although several gentlemen were unavoidably absent, there was a good attendance, Hampstead, Kilburn, St. John's Wood, St. Pancras, Paddington, etc., being represented.

The following gentlemen were present: Messrs. Bindloss, Bevan, Bowen, Davidson, Hall, Holding, Humphreys, Hyne, Hyslop, Long, Morrison, Parkes, Pettinger, Pinchen and Tebbutt.

Mr. H. Long, of Paddington (President of the Western Chemists' Association), having been voted to the chair, remarked that they were all much indebted to Mr. Hyne for taking such an interest in this movement. Speaking of the Association with which he (the Chairman) is connected, he said that the formation of that Association had been followed by very happy results, and it now had a membership of over fifty. He sincerely hoped, if an association were formed that evening, that it would equally flourish and bear much fruit. He believed Mr. Hyne wanted to form a Chemists' Association for the north-west district. He (the Chairman), however, did not think such an association would be sure of success, unless it was extended to Dalston, thereby including Islington, etc., otherwise its area would be too restricted.

Mr. Hyne was of a different opinion; he thought the area would be too wide.

Mr. Holding thought chemists ought to unite together more than they did. He knew as a fact that sometimes if one chemist met another in the street they invariably passed by without speaking. He regretted this, and said that, as sensible men, they ought to let good feeling exist between them. Speaking of the north and north-west districts, he suggested that they should be joined and made into one. With reference to including Barnet and Clapton within these districts, the distance was such that he questioned whether gentlemen would attend the meetings.

The Chairman said he did not see any objection to amalgamating in the way Mr. Holding had suggested; if they did so, they would have better meetings—they would be more largely attended. They could call it the "North-West London Chemists' Association," if they chose, but he suggested that they should not prevent anybody joining who came from, say, Stratford; by all means get them to join. If the district was a small one, the meetings would be necessarily small. Continuing, the Chairman stated that when he started the Western Society he got on very well, and managed to get about forty to join—some from North and South Kensington and South Paddington —and it was at present in a most flourishing condition.

Mr. Holding, like the Chairman, remarked that if they had a large society they would be able to have large meetings.

Mr. Hyne pointed out that the district could be easily split up if it proved too large.

Mr. Holding recommended that the whole district be brought together and called the "North-West London Association," and that visitors be invited to the meetings. He was certain they would have poor attendances at meetings if they had a small district.

The Chairman, in answer to a question, replied that, besides promoting friendship between chemists, the meetings would discuss their interests.

Mr. Parkes moved that an association be formed, and Mr. Hyne seconded.

On being put to the meeting the motion was unanimously carried.

Mr. Hyslop said it would be better, as the winter was before them, to have as large a district as possible, or it would be difficult to get a meeting together. He proposed that the Association be called the "North London Chemists' Association."

Mr. Bindloss seconded.

Mr. Hyne thought it would be too large, as they already included Hampstead, Kilburn, and St. John's Wood.

Mr. Bindloss moved, as an amendment, that it be called the "North and North-Western Chemists' Association."

This was seconded by Mr. Humphreys and agreed to on being put to the vote. This then became a substantive motion, and was carried *nem. con.*

The Chairman remarked that with such an influential meeting he thought the Association was fairly launched.

Mr. Hyne was unanimously elected President of the Association, Mr. Hall, Vice-President, Mr. Parkes, Honorary Secretary, and Mr. Holding, Honorary Treasurer.

A Committee consisting of the following gentlemen, with power to add to their number, was next appointed:—Messrs. Hyslop, Pettinger, Bindloss, Bevan, Davidson, Tebbutt, Humphreys, Morrison, Pinchen and Bowen.

The subscription was fixed at 2*s.* 6*d.*, payable on the 1st October.

It was decided to hold meetings on Thursday evenings at 8 o'clock, at a place to be decided on by the Committee at the next meeting.

With a vote of thanks to the Chairman the meeting terminated.

The next gathering will take place at Mr. Hyne's house.

All communications should be addressed to the Secretary (Mr. G. I. R. Parkes), 196, Belsize Road, South Hampstead, or 28, Circus Road, St. John's Wood.

MEETING OF CHEMISTS AND DRUGGISTS AT PADDINGTON.

A meeting of chemists and druggists in the western district was held on Wednesday evening, at Browning's Restaurant, Praed Street, the chair being taken at nine o'clock by Mr. Long.

The Chairman, in opening the proceedings, said he was only desirous of bringing before the meeting the views so well expressed by Mr. Carteighe at Manchester, which they had probably all read. It was, however, necessary to go a little more into detail. The Society was founded and was for many years purely voluntary. In 1866 the idea of a compulsory Pharmacy Act was put forward, but owing to short-sighted opposition it was changed into a Poisons Act. Having referred to recent legal decisions and to the preamble to the Pharmacy Act, he stated his opinion that companies carrying on a chemist's business was against the principle of the Act. He did not agree with the dictum that it did not matter who got the profit so long as a qualified man was employed. The Government entrusted the Society with the duty of examining the qualifications of men who were to sell poisons, but now turned round and treated it as a trade protection Society. However, as the Council had put forward this Bill after a good deal of consideration, it was the duty of all members to sink their individual differences and loyally support the Council in carrying it through Parliament. He was very glad that local associations had been formed and were doing good work, and hoped those present would now proceed to discuss the Bill clause by clause.

Mr. Andrews then read the Bill clause by clause, and explained them where necessary.

The Chairman also commented on some of the clauses as they were read. On clause 7 it was suggested that it would be very desirable to insert the words "or persons," but Mr. Andrews explained that it would be utterly impossible to carry a clause so worded, and pointed out that the "Widow's Clause" would be in itself an obstacle to any such attempt.

Several gentlemen expressed the opinion that it would be desirable to abolish the widow's clause and endeavour by that means to pass a clause making it unlawful for "any person or persons" to keep open shop, etc.

The Chairman thought that even if the widow's clause were repealed, it would not be possible to get clause 7 amended as desired. In order to test the feeling of the meeting, however, a vote was taken, when sixteen voted in favour of repealing the widow's clause and seven against it.

Mr. Bowles then moved that this meeting entirely approves the Pharmacy Act Amendment Bill, and is of opinion that the Pharmaceutical Council deserves the support of the entire trade in its efforts for further legislation in the interests of pharmacy.

Mr. Hine seconded the motion, which was carried unanimously.

The Chairman said that concluded the business of the meeting, but he would invite any gentleman present who had not yet joined the Western Association to send in his name, and it would be put before the Committee at its next meeting. He concluded with an appeal on behalf of the Pharmaceutical Society.

MEETING AT GREENWICH.

A meeting of the chemists of Greenwich, Woolwich, Deptford and Lewisham was held on Thursday evening at the Portland Hotel, London Street, Greenwich, to consider the draft Pharmacy Bill. The chair was taken soon after 9 o'clock by Mr. Brown, Local Secretary, when, notwithstanding the inclemency of the weather, there was a fairly large gathering. Mr. Michael Carteighe, President of the Pharmaceutical Society, was present to give any explanations which were needed.

The Chairman having briefly stated the object of the meeting, called upon Mr. Carteighe to explain the various clauses of the Bill.

Mr. Carteighe having expressed his sense of the honour done him in inviting his attendance, said the Council was anxious to obtain the opinion of the trade on this Bill, and he had come rather to meet objections and explain practical differences than to attempt to force his views on the trade. Having referred to the early history of the Pharmaceutical Society and the incidents attending the passing of the first and succeeding Acts, and especially to the self-sacrificing efforts of Jacob Bell to benefit the trade to which he belonged, he pointed out that there would always be a difficulty in obtaining Parliamentary action in favour of anything which savoured of protection, and appeared to interfere with free trade. Grocers had votes equally with chemists, and they were more numerous. The Act of 1868 was a Poisons Act, as he had already explained on many occasions, and was made so instead of a real Pharmacy Act by the opposition of the Society of Chemists and Druggists, who desired to obtain the privilege of using the title of pharmaceutical chemist without having fulfilled the preliminary conditions. That Act of 1868, with all its faults, did some good, but even with regard to the placing of poisons in the schedule the Council of the Society was powerless to act without the sanction of the Privy Council. Having next referred to the Curriculum Bill and the Bill of last session, the President came to the one now brought forward, which contained as much as the Council felt it would be useful to put forward at the present time. There were many things not there which he should like to see, but they were omitted deliberately, from the feeling that if they were included any chance of passing the Bill would be sacrificed. He briefly explained the object of the earlier clauses, dealing with the examinations, which his experience as an examiner had taught him were highly desirable, not only in the interest of the public and of the trade at large, but even of the candidates themselves. He dwelt on the importance of not taking apprentices who were not fitted by general education to pursue the calling, and who would in the end most probably become, especially if they failed to pass the examination, unfair competitors with the qualified man. A definite course of training, which would produce educated as well as examined men, would be best even from a trade interest point of view. Professional remuneration could only be claimed by those who possessed and exhibited professional qualifications. Sections 4, 5, and 6 were briefly touched upon, and their object explained to be consolidation of the interests of all engaged in the calling. A very few words were required on the remaining sections, the effect of the recent legal decision on the proposal for exemption from jury service being pointed out, and he concluded by inviting a free expression of opinion from those present.

Mr. Want moved a resolution approving the principle of the Bill, and affirming that the Council of the Society is deserving the support of the entire trade in its efforts to improve the Pharmacy Act.

Mr. Green, who seconded the motion *pro forma*, said he was one of the founders of the Pharmaceutical Society, though he had ceased to belong to it. He thought education was being driven rather too hard. He should feel more satisfied if there were a modified examination for assistants who had been many years in the trade, and could not turn to anything else. His experience was that members of the Society were some of the greatest undersellers in the trade. He had had unqualified assistants who were equally efficient with those who had passed the examinations; he could not support the resolution.

Mr. Tugwell thought that the present examinations were quite sufficient, and that a man who was a profound chemist, was thereby less fitted for ordinary trade. He did not approve of repealing the widow's clause, especially as there was no promise that any attempt would be made to check trading by corporations.

Mr. Carter moved a lengthy amendment, the purport of which was to permit unqualified assistants to sell poisons under certain conditions. He hoped a clause might be added to the Bill carrying out his views.

Mr. Atkinson said the educational part of the Bill had his heartiest concurrence, but the concessions proposed to be made to the chemists outside the Society required a great deal of consideration. He did not think the privilege offered was sufficient to induce many of these men to come in, unless something more were done to remedy the grievances under which they laboured. He had read the President's remarks at Manchester with reference to the widow's clause and company trading, and did not think the two cases were parallel. He thought it would be better to wait a little, if a better Bill than this could not be passed.

Mr. Green pointed out that poisonous prescriptions were often dispensed by unqualified surgeons' assistants.

A general discussion ensued, principally on the sale of poisons, on which the President explained the law in a way which seemed quite new to many gentlemen present. He also replied to some of the observations which had been made with reference to the Bill, especially with reference to unqualified assistants and modified examinations. There must be either a real qualification or none at all. If unqualified men could be employed, one might have any number of branch shops, and a man of large capital might monopolize the whole trade. They wanted fewer men to come up and more to pass. The men who failed and came up again and again entailed a loss on the Society. He concluded by giving some information with regard to prosecutions and other legal matters, which not being desirable to publish are not commonly known, and with an appeal for united action.

The motion was then put and carried *nem. con.*

Provincial Transactions.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of this session was held in Lockhart's Café at Nicholas Square, on Wednesday evening November 5, at a quarter past eight o'clock, Mr. Fred Park, President, in the chair. There was a good attendance of members, and the utmost enthusiasm was displayed in the discussion. The subject under consideration was the new draft Pharmacy Bill. The minutes of last meeting having been read and adopted, the President briefly explained the objects of the Bill, and upon the motion of the secretary, it was agreed that each clause should be taken by itself and criticized independently of the others.

The chief interest centred in clauses 2 and 7.

Mr. Peter Bell considered clause 2 as the most important one in the whole Bill, and in this view he was supported by the majority of the members present. He considered that the advantages far out-balanced the disadvantages, and urged the acceptance of the text as it stood.

Mr. Cormack thought that it would come hard upon country apprentices, who had no opportunities of attending any classes; but Mr. Merson recommended the intermediate examination to be conducted on the same principle as the science and art examinations are; and that holders of the Society's senior diplomas be competent to conduct classes in accordance with the syllabus in force in the larger approved schools of the Society.

Messrs. M. Bell, Pattinson, Pescod and Ord having expressed their opinions, the next clause which came up for consideration was No. 7, which was unanimously approved of; but the meeting expressed regret that the Council could not see its way clear to deal with the subject of drug stores without endangering the passing of the Bill, and hoped that the Bill as it stood would become law, and that the Council would then proceed to deal with other matters of pressing importance immediately it had power to do so.

A most successful meeting was brought to a close at 10 o'clock.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Draft Pharmacy Bill.

Sir,—I am told by a member of the Pharmaceutical Council that one object in publishing the draft Pharmacy Act Amendment Bill now is to elicit discussion, and further, that the Council is open to receive suggestions, which the member referred to hoped to see made through the Journal. Indeed, when mentioning some points to him he said, "Why do not you send a letter to the Journal?" So acting on that I send you this.

My present object is not to find fault with what the draft contains, but to make some suggestions as to what should be further contained, especially when clause 7, making it unlawful for unqualified persons to compound medical prescriptions is considered. It must be borne in mind that there are not a few middle-aged men who will be seriously affected by this clause if some provision is not made for them. There are unregistered men who have been for years dispensing in the shops of duly qualified chemists and medical men, and it has not been—nor is it yet—unlawful for them to do so, but it will become unlawful if the Act passes as drafted. More than that, up till the Wheeldon case, I do not think anyone would have said that even in selling on behalf of a qualified employer a poison, they were acting unlawfully, but if that be unlawful now, it must have been so every day since January 1, 1869, but why now deprive the man, who has been allowed by use and wont, the privilege—which I might say has developed into a right—to do these things?

I hold that the Pharmaceutical Society, having through its Council all these twenty-two years taken no action to stop them selling, as, according to the Pharmacy Act, it was the duty of that body to have done, has practically condoned these men. Thus it is not their fault that they are now found in the position they are. I know I shall be met by "Let them qualify;" but, sir, as you know, it is not so easy for a man getting on in years to begin all the Preliminary and Minor work necessary for his examination, especially when, besides supporting himself, he may have the care and burden (if I may so speak) of a wife and family. But apart from that I hold that owing to the state of things which has been allowed to go on, men in the position above referred to are entitled to consideration. I am sure Parliament would consider a clause dealing with them a fair and reasonable one. I quote in this connection, the ex-Premier (Mr. Gladstone), "It is my strong opinion, it is according to the precedents of our country in analogous cases, it is according, I think, to the considerations of equity and justice, that we should resolve that, so far as depends upon us when work has to be done, it shall be done equitably, and even so far as the nature of the case permits, tenderly. Liberality has always been the maxim of the State in putting an end to monopoly and privilege, and a long course of experience has demonstrated beyond the shadow of a doubt that such liberality is wisdom."

But, further, not only would it be unfair to deprive those who for years have been allowed to sell poisons and dispense prescriptions, but as regards those who did these things before passing of 1868 Act it would be manifestly unjust, for remember the latter went to the trade at a time when the registration of chemists and druggists was unknown. Therefore I suggest the Council should admit to the register of chemists and druggists (or frame a clause to this effect) all those who produce proof that they were selling poisons and compounding prescriptions before 1868 Act came into force, and that those not at the business then, but who have been for the last fifteen years and who are not under thirty years of age, be allowed to register as qualified assistants, so that they may continue dispensing, etc., in the open shop of a duly qualified chemist and druggist or medical man. If this or some such liberally devised clause is not framed the bread will virtually be taken out of the mouth of many, and rather than that this be so, we must, if the Council will not adopt some such clause, take the matter up with our respective members of Parliament.

When we consider the radical change proposed under the draft Bill, and the state of matters allowed to develop under the last Act, surely what is suggested herein is not too much, as it is not usual to make important changes without some give and take. ROBT. MCADAM.

TOO MUCH STUDY.

Sir,—Your report of the meeting of the Newcastle Chemists Assistants' Association does not accurately convey the advice which I gave on that occasion. If for the words "too much attention to study," you were to substitute "too much attention to mere book learning and preparation for examination," I could have accepted the paragraph as fairly representing my position.

The fact is I have *very rarely* found young men devoting too much time to study, though I have often found that time was devoted to books which ought to have been spent in work, and very constantly find that the reading of lessons, the passing of examinations, and the earning of prizes, leaves the so-called student incompetent to make useful application of the knowledge he has acquired.

I think I have known a score of times examined men, selling ʒj. of an article for a penny that they knew to be eightpence per ounce avoirdupois, and unable readily to see the inconsistency of so doing. This is only one of many illustrations of the want of readiness to make practical use of the knowledge of which they have a theoretical possession.

I told my audience that their passing the Minor examination was only taking out the licence to commence the battle of life, and that their success in the battle would depend but little upon their examination and very much upon their having acquired thorough business habits, and the power to make practical application of the knowledge, the theoretical possession of which their examination had indicated. BARNARD S. PROCTOR.

Newcastle.

MATHEMATICS AND CHEMISTRY.

Sir,—Let "captious cavil and complaint subside," but I should like to enter a mild protest against the general tone and drift of the letter signed "Teacher" in a recent issue.

The writer seems to totally ignore the keynote of Mr. Martindale's address, which an unbiassed reader would be more likely to find in the far-reaching idea of "comprehend" rather than in the word 'equation,' and so "Teacher" goes on to comfort poor brains with the assurance that "an 'acquaintance' with simple addition in arithmetic is all the mathematical knowledge required."

Let young men remember that all the best teachers of mankind have always led their pupils to pitch "behaviour low and projects high," and have encouraged their thoughts and aspirations toward the maximum of man's possible achievements instead of nurturing sloth by drawing a careful boundary around the minimum thereof.

I have sometimes stood aghast at a so-called "candidate" for the "Minor" who evidently had no idea whatever of a minus quantity. Is not that algebra? said one to me once in answer to my question, What is the sum of —5 and + 7? and, having enlightened him with the fact that it was a case of "simple addition," whatever he might call it, now, said I, for the *difference*: one moment's look of intense horror and he was off; never saw I him again.

Now, sir, what a pitiable sight such a one would cut in the presence of thermometric equivalents, corrections for temperature and pressure, sp. gr., gaseous diffusion problems, etc., which are found in every good elementary work on chemistry. And, indeed, do we not all know that, *cæteris paribus*, a man who has read a little algebra and euclid is in a better condition to "comprehend" almost any subject under the sun, and especially (if we except astronomy) chemistry, than he who has not?

West Marylebone. J. C. HYSLOP.

MILK OF SULPHUR PROSECUTIONS.

Sir,—From what appears in the Journal and in the daily papers it seems some analysts who know no better have commenced another crusade against that old and popular medicine lac sulphuris, confounding it with sulphur præcipitatum of the Pharmacopœia. Some years since there was not only a voluminous correspondence in your Journal which appeared to set the matter in a right light, but the veteran pharmacist, Dr. Redwood, and at least one eminent medical man, testified in a public court the essential difference between the two, and if I remember right, while pointing out certain defects and inconveniences in sulphur præcipitatum, spoke of lac sulphuris, which contains lime, *not* as an adulteration, but as an essential ingredient, as a well established and popular remedy.

To chemists acquainted with the country trade there can be no doubt of the truth of this. I venture to assert that at least nine out of ten customers who ask for milk of sulphur wish for and expect to have the genuine article, that is the old fashioned with the lime. Surely no one will question that this is the article which won for itself a popular reputation long before some one, no doubt from theoretical considerations, introduced sulphur præcipitatum as a supposed improvement. I am aware that an eminent pharmacist once said that in taking lac sulphuris a patient was loading his stomach with plaster of paris, but surely this was a thoughtless and unjustifiable statement. Plaster of paris is sulphate of lime with a definite quantity of water which gives it a peculiar character. The sulphate of lime in lac sulphur, intimately mixed with sulphuris, does not partake of the characteristics of plaster.

To what does lac sulphuris owe its reputation? To practical experience, just as quinine and nearly all our medicines do. The public at least believe in its beneficial character, and I am not aware that any one has yet proved the contrary. Then why should they be deprived of it through some chemical fad, founded on neither reason nor experience? Is it the lime which is supposed to give the old medicine its injurious character? Then why is lime water so generally administered to children by medical men? Are there not several syrups of undoubted reputation which contain lime as an essential agreement, and one at least in chemical combination with sulphur? That sulphate of lime can be decomposed and utilized by the animal system has been shown recently (vide *Journal of Chemical Society* for last June). Does not this justify the popular experience?

The magistrates and lawyers can hardly be blamed for the failure of justice in these recent decisions, but surely the analysts ought to know better. Perhaps the chemists deserve punishment for not being better up in professional topics and literature. My impression is that if any chemist summoned for this miscalled adulteration will look up the old journals and place them in the hands of a competent lawyer they will save their reputation and fine and help to educate the analyst. Of course if precipitated sulphur and not milk of sulphur were asked for, the chemist should point out the difference, but I venture to think that the new name will seldom pass over the counter except for an analytical catch.

Belbrook. W. SYMONS, F.C.S.

THE CHARGE FOR POISON.

Sir,—In reference to the subject of fair prices for selling poisons included in Schedule A of the Poisons Act of 1868, I beg to state that I have ever since expected a silver coin for retailing any poison. And I may add that it has always been understood and approved of by my customers.

Wandsworth, S.W. GEORGE NIND.

THE NEWCASTLE NITRIC ACID DISASTER.

Sir,—It would be a great pity if this melancholy accident should pass without an earnest consideration of its practical lessons by those who have to deal with nitric acid and chemicals of a like character.

A full discussion of possible means of dealing with similar occurrences, to the danger of which many of your readers are exposed, cannot fail to throw some light on the subject.

Very shortly after the brave and unfortunate firemen entered the building I was there, and have since had full opportunity for making myself acquainted with the circumstances, which I will endeavour briefly to place before you. A wood case (1 inch rough deal), with top screwed down, containing twelve winchesters of 1·420 nitric acid, had been received from the manufacturers. This stood temporarily in the middle of a cellar on the floor. Some of the firm's employees wishing to move some other goods shifted the case, and it would appear that it then received the jolt which started the disaster. In a few minutes it gave evidence of mischief within by the evolution of fumes. An alarm was given and unsuccessful attempts were made to drag the case to the hoist. These failed, partly from the fact that a cask blocked the way and partly from the dense fumes overmastering the plucky members of the staff who had tackled the case. The case was now a mass of flames within, with flames bursting out from its joints. The firm's fire-hose was brought into play, and then the city fire brigade was telephoned for, and after being at first baffled they ultimately so deluged the case with water that its flames and fumes were overcome; but the men had suffered such injuries as resulted in the death of three brave and useful men, whilst those employed on the premises were affected to such an extent that some have since undergone much suffering and eight have been under medical treatment.

Now what might have been done? Some correspondents have drawn attention to the power of ammonia in overcoming these fumes, and my first answer to them is that under the circumstances it was not possible to get at the stock of liq. ammon. fort., which was stored in a cellar, the only access to which was by passing the case of fuming nitric acid. Then if it had been possible to get at it, would it have been wise, or possible, to throw winchester after winchester of ·880 ammonia (twelve would have been required) upon a closed case in a confined cellar? The remedy, as it could not get into the case, might have been worse than that which it was intended to subdue, and the operator with his retreat cut off would have been in danger of asphyxiation from the ammonia. My own feeling is that it would have been a futile endeavour and might have ended in disaster, while dealing with a closed case, and with an open one I should prefer to try a deluge of water and perhaps a small quantity of ammonia to render the atmosphere breathable.

A more practical point I think arises when we consider the packing, and however common the practice may be, I say that under no circumstances whatever should sawdust be used. The manufacturer should have chosen a better material. In sending out acids Messrs. Mawson and Swan always use sifted cinders, which makes an excellent packing, and has only one objection, that is its weight. Kirselguhr would be a safe packing, so probably would boiler silicate, but here the question of cost comes in.

A question was raised here by some as to whether there was actual fire, and chemists answer that they would certainly expect it. I made a few experiments on the point, and will only trouble you with one result, that which most closely corresponded to the case which we are considering.

A 10-oz. wide-mouthed bottle was filled with 1·420 nitric and placed upright and open in a small deal box, with just sufficient sawdust (fine) to surround it; the box was then thrown over. Dense brown fumes appeared at once, and in about five minutes the fumes changed to grey, sparks flew out, and a minute later the box was in flames. During this and other tests I found a few drops of sal volatile on my handkerchief, covering my mouth and nostrils, an ample protection, and if I am ever called upon to enter an atmosphere of nitrous fumes I shall do so with such a provision.

Deaths from inhalation of nitrous fumes are more numerous than has been supposed. In addition to those recorded by Taylor I know of four or five, and to these must now be added the recent three.

I trust those who have had experience in similar accidents will afford us some information.

11, *Grey Street, Newcastle.* T. MALTBY CLAGUE.

HYOSCYAMUS.

Sir,—The question raised by Miss A. F. Squire whether my recent investigation is likely to influence the price of henbane, is one in which I have little or no interest. But now it is shown that both common varieties of henbane leaf are of the same alkaloidal value, it would certainly seem reasonable to expect that the price of the biennial variety would tend downwards; for the reason that many who have hitherto ignored the annual leaf will now use it. In my experience as an amateur grower of henbane, the annual, though a later, is a more certain crop than the biennial, occupying the land one as against two years, but whether one biennial crop outweighs two annual I have no figures to decide, and to settle the question fairly the cost of labour must be reckoned. As I believe Miss Squire is a grower she might perhaps settle the question; my opinion, from rough observation, is that two annual crops will outweigh one biennial. It may be interesting to know that it is not an easy matter to obtain annual leaf, and much that is sold as that article is the first year's biennial leaf. Quite recently I applied for quotations and samples of annual leaf; the two samples sent were both first year's biennial, and the price one-fourth that of second year's biennial leaf. With a knowledge of the facts before us it is difficult to believe that second year's biennial henbane can maintain its present high price, but that whilst the annual may rise in value the biennial will fall.

Mr. Corder, at the late Leeds meeting, spoke of the German henbane sent into the English market, and suspected it to be a different and inferior variety to *H. niger*. As regards variety such does not appear to be the case, for samples sent in have all the characters of *H. niger*. As regards quality it is undoubtedly low, due to bad harvesting and storage, for its colour is invariably brown and odour musty; were it otherwise it would compete seriously with the carefully harvested article of English growers. Messrs. Evans, Lescher and Webb are presenting me with some selected German henbane of which I shall make analyses and give a report.

The most interesting matter to me in Miss Squire's communication was her reference to the biennial roots which in the springtime were found richer in alkaloid than when gathered in the previous September. This goes to support my observation that some roots collected and sent me in December by Mr. Holland were richer than those gathered at an earlier period. Whether the roots may supersede the leaves it is not in my power to say, but if the question between them were one of strength and elegance of preparation then the root must win.

A. W. GERRARD.

SYRUPUS LIMONIS B.P.

Sir,—Although the above syrup when first made is a very nice preparation, it deteriorates and darkens by keeping. Might I suggest another formula which is not open to these objections. I have found the following answer well for some years past:—

Syrup, by weight	3 lb. 6 oz.
Tincture of lemons, fluid	2 oz.
Citric acid in powder	800 grains.

Dissolve the citric acid in the syrup, add the tincture of lemons and mix.

I have reckoned the water of the syrup and the tincture together will contain 40 grains citric acid to the ounce, equivalent to the average strength of lemon juice.

Harlesden. J. W. T.

Erratum.—On p. 366, col. i., line 27, in Mr. Carteighe's reply, *for* "three Manchester courses of cramming" *read* "three months' courses of cramming."

W. J. H.—*Sonchus oleraceus* and *Sonchus asper*.

Inquirer.—You will find the times when examinations are held in London and in Edinburgh stated in the official notice on the first page of this paper.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Rowsell, Browne, Robb, Hale, Blunt, Learoyd, Bain, Ewing, Cowie, Dymott.

STEREO-CHEMICAL THEORIES.*

BY T. P. BLUNT, M.A. (OXON.), F.I.C., F.C.S.

It is remarkable and somewhat humiliating to observe to what an extent the human mind is held in slavery by its own modes of expression. This is notoriously the case with words, which occupy definite points as it were in the curve of thought, and have always a tendency to modify, and even to distort the ideas which lie apart from them but still within the region of their influence.

We have another instance of an analogous kind in the effect of diagrams representing chemical constitution drawn upon a flat surface. It required the genius of two master minds, Le Bel and van t'Hoff, to raise chemists from their thraldom to the printed page to the broader conception of a chemistry of three dimensions, appropriately termed stereo-chemistry. One contributory cause of this supineness of intelligence certainly lies in the fact that where chemical affinities extend in one or two directions only they can be correctly included with their generating atom in a plane surface; when, however, other affinities are added, their direction may lie in different planes, and must do so if the condition of equidistance in space of the points towards which the affinities are directed is to be observed.

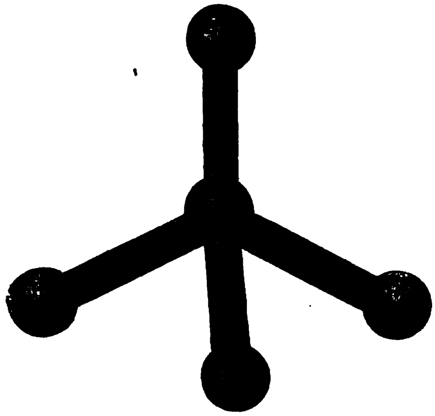


Fig. 1 represents a Viennese model, as recommended by Professor V. Meyer. The arms linking C with H, H, H, H, are made of india-rubber, and consist of tubes into the open ends of which can be introduced pins of different colours to indicate various monad elements. The tubes also enable the models to be attached to each other, or to balls representing polyvalent elements, in single, double or treble linkage by means of small pieces of glass rod.

In the use of models and diagrams to illustrate chemical constitution, it is necessary to be constantly on our guard against looking upon either as representing the exact conditions under which the atoms exist in a complex molecule. According to the kinetic theory these are in constant movement, and models and diagrams represent only the points of equilibrium towards which their movements tend. They serve, however, an excellent purpose in clearing and strengthening our views, and, as I hope shortly to demonstrate, they may even represent the general geometric positions of the atoms with respect to one another.

Carbon, the most important of the elements, since it forms the keystone which holds together the structure of organic substances, depends for this position upon the fact that its atom is a tetrad, and it was in considering the probable position in space of the atoms contained in its simplest molecular combinations, such as methane, or, in other words, the normal direction of its four affinities, that the two chemists already named, Le Bel and van t'Hoff, arrived simultaneously but independently at the theory to which their names have since been attached. Their views have been embodied by one of them, van t'Hoff, in a remarkable work entitled 'Dix Années dans l'Histoire d'une Théorie,' and as in this book the foundations and a good deal of the later superstructure also of stereo-chemistry are contained, we cannot, I think, do better than briefly follow the lines of argument and illustration taken by him in this work.

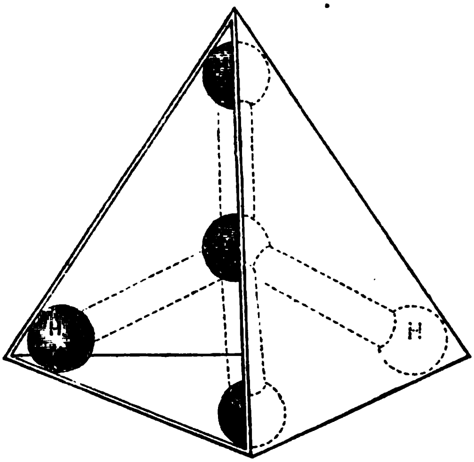
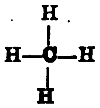


Fig. 2 represents the relation of the model shown in Fig. 1 to the tetrahedron, as used by Wislicenus.

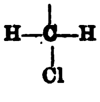
The new conception is intended to account for differences in bodies not only isomeric in the usual sense, but apparently also of the same chemical constitution, and it must therefore avail itself either (1) of differences of *movement* in the atoms of which the molecule is built up, or (2) of differences of *position* of the atoms in space. To the objection that the atoms are in constant movement (a point to which allusion has already been made), the answer is that their movement is probably periodical, and that a particular phase or position of the atoms is observed.

It is found on examination that the well-known plane constitutional formula for such a body as methane—



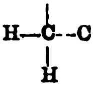
$$\begin{array}{c} H \\ | \\ H-C-H \\ | \\ H \end{array}$$

gives to its substitution derivatives too great a number of possible isomers. Thus, let us take the compound CH_2Cl_2. Here the following isomers are conceivable,—



$$\begin{array}{c} Cl \\ | \\ H-C-H \\ | \\ Cl \end{array}$$

and



$$\begin{array}{c} Cl \\ | \\ H-C-C \\ | \\ H \end{array}$$

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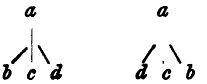
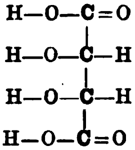
* Read before the Chemists' Assistants' Association.

But experiment does not bear out this view. Only one such body is known; and to escape this difficulty one conception alone suffices, which is that the four hydrogen atoms in methane are united to a carbon atom lying at the geometrical centre of a regular tetrahedron. One case of isomerism is then possible, viz., where each of the atomicities is associated with a different group. We then get, as in the models now shown, two non-superimposable figures, one of which is, in fact, the reflected image of the other. A carbon atom thus combined is termed "asymmetric."



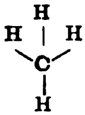
An instance of isomerism produced by an asymmetric carbon atom is to be found in tartaric acid, which may be represented thus:—



$$\begin{array}{c}\mathrm{H{-}O{-}C{=}O}\\ |\\ \mathrm{H{-}O{-}C{-}H}\\ |\\ \mathrm{H{-}O{-}C{-}H}\\ |\\ \mathrm{H{-}O{-}C{=}O}\end{array}$$

It will be seen that the two centre carbons are asymmetric.

In the case of the grouping of simple atoms, such as is represented by methane

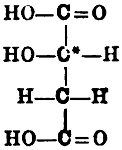


the tetrahedron is assumed to be regular, and the four atoms of hydrogen to be equidistant from the carbon. When, however, different groups are united with the carbon atom (as, for instance, in the case of tartaric acid just quoted) it is improbable that the forces involved are equal; hence the groups lie at different distances from the central atom, and the completed tetrahedron becomes irregular.

The kind of isomerism with which we are now dealing, manifests itself in two ways—in the rotatory power of the compound upon polarized light, and in the crystalline form. The isomers twist the plane of polarization to the right and to the left respectively, and their crystals show the phenomenon of "enantiomorphy," which means that the crystal of one is the reflected image of that of the other, as was found to be the case with the asymmetric carbon groups.

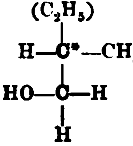
M. Pasteur some time since observed that the associated crystalline form and rotatory power of such isomers is due to want of symmetry in the molecule, and he suggests as one of three possible alternatives, in explanation, "the position of the atoms on the summits of an irregular tetrahedron;" thus showing a prevision of the present theory, at which he had arrived on *à priori* grounds. M. Pasteur was working with the tartaric acids and their derivatives. A large number of other cases may be cited, where optical activity is associated with one asymmetric carbon atom. The following are examples:—

Malic Acid.



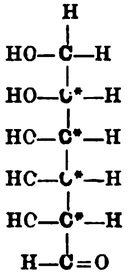
$$\begin{array}{c}\mathrm{HO{-}C{=}O}\\ |\\ \mathrm{HO{-}C^{*}{-}H}\\ |\\ \mathrm{H{-}C{-}H}\\ |\\ \mathrm{HO{-}C{=}O}\end{array}$$

Active Amylic Alcohol.



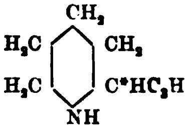
$$\begin{array}{c}(\mathrm{C_2H_5})\\ |\\ \mathrm{H{-}C^{*}{-}CH_3}\\ |\\ \mathrm{HO{-}C{-}H}\\ |\\ \mathrm{H}\end{array}$$

The Glucoses.



$$\begin{array}{c}\mathrm{H}\\ |\\ \mathrm{HO{-}C{-}H}\\ |\\ \mathrm{HO{-}C^{*}{-}H}\\ |\\ \mathrm{HC{-}C^{*}{-}H}\\ |\\ \mathrm{HC{-}C^{*}{-}H}\\ |\\ \mathrm{HC{-}C^{*}{-}H}\\ |\\ \mathrm{H{-}C{=}O}\end{array}$$

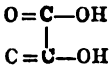
In the last case, that of the glucoses, it will be seen that there are no less than four asymmetric carbon atoms, viz., those marked with an asterisk. As a recent example *coniine* may be cited,



which shows optical activity, owing to the asymmetric carbon atom marked at the right hand corner.

Not only do we find an asymmetric carbon atom in such cases as the above, where optical activity was already known, but the converse proof has also been given, by the prediction of optical activity in a large number of substances in which it had not previously been observed, because they contained an asymmetric carbon atom; this prediction being subsequently verified by experiment.

Again, in the case of optically active bodies the activity survives in those derivatives containing the asymmetric carbon atom, and disappears when it is no longer present. This is excellently illustrated in the amylic series. An instance of such disappearance is also seen in the preparation of oxalic acid, which is inactive, from active glucose or active tartaric acid. It is hardly necessary to observe that neither of the two carbon atoms in oxalic acid are asymmetric, since two bonds of each are united with one oxygen atom.

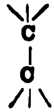


$$\begin{array}{c}\mathrm{O{=}C{-}OH}\\ |\\ \mathrm{C{=}C{-}OH}\end{array}$$

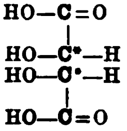
When a compound containing an asymmetric carbon atom is formed in the organism, whether vegetable or animal, it nearly always exhibits optical activity, but when formed by artificial synthesis such activity is always absent. Why is this? It is because in artificial processes a *mixture* in equal proportions of the right and left-handed isomers is invariably produced, and thus a body neutral to polarized light results. An example of this is found in the synthesis of tartaric acid from succinic, where the variety produced is racemic acid, an inactive mixture in equal proportions of dextro- and lævogyre tartaric acid.

In some of these cases the method of M. Pasteur may be utilized. He found that certain organisms have a greater liking for one of the isomers than for the other, and destroy it more rapidly. The residual solution is then found to have become active towards polarized light, the right and left-handed constituents being no longer present in equal quantity. There is an obvious analogy between the action of micro-organisms and that of the cells and plants of the animal body. There is, however, a form in which a compound containing asymmetric carbons may exist, where the neutrality cannot be destroyed, nor the substance resolved into two oppositely polarizing constituents; this case will be now considered.

If two carbon atoms are united by one bond,

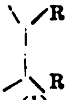


and the three remaining bonds of each be satisfied by different groups, it is clear we shall have a body containing two asymmetric carbon atoms, and active to light. If, again, the same three groups are present in each case and similarly arranged we shall obtain bodies like the active tartaric acids:—

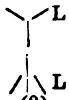


$$\begin{array}{c} \text{HO—C=O} \\ | \\ \text{HO—C}^*\text{—H} \\ \text{HO—C}^*\text{—H} \\ | \\ \text{HO—C=O} \end{array}$$

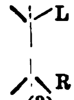
If, on the other hand, two non-superimposable groups are united, we shall have a body in which the asymmetry is in opposite directions within the molecule itself, and which is therefore at the same time neutral and not resolvable into active constituents; such is the neutral tartaric acid of Pasteur, which does not yield to the process by which he succeeded in other cases in producing from a neutral substance a dextro- and lævogyre variety.



(1)



(2)

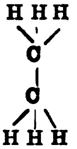


(3)

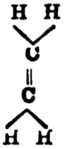
No. 1 represents a molecule of tartaric acid, built up out of two right-handed groups, and therefore exhibiting right-handed rotation. No. 2, in a similar manner, is built up of two left-handed groups and shows left-handed rotation; but in No. 3 we have a right-handed combined with a left-handed group, and the result is a molecule neutral to light.

The process referred to as used for the separation of racemic acid consisted in subjecting a weak solution of ammonium racemate, to which a trace of a phosphate had been added, to the action of *Penicillium glaucum*, the blue-mould fungus. The result was a solution of lævogyre tartrate, the dextrogyre having disappeared by the action of the organisms.

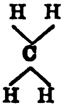
It may be noticed that as *methane* was the type from which the asymmetric carbon atom was derived, so the class of bodies last dealt with may be represented by *ethane*:—



We now proceed to consider the case of the unsaturated carbon compounds, of which the appropriate type is *ethene*, C_2H_4. This will be represented by our models thus:—

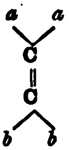


Here it is at once seen that we are approximating to the old "plane surface" formula for methane,

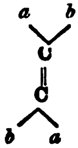


the place of the single carbon atom being taken by two doubly linked ones. We saw that there, if two similar atoms or groups replaced two of hydrogen there was a possibility of two isomers; the case is exactly the same here. Let us represent two pairs of atoms by *a*—*a*, *b*—*b*. We shall see that the following arrangements are possible,

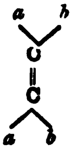
1.



2.

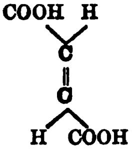


3.

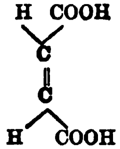


the arrangement 3 being identical with 1, as there is no evidence to show that the valencies of the combined atoms have different values. Here there is no asymmetric carbon atom, so we must not look for differences in the action upon polarized light in opposite directions, nor yet for enantiomorphy of crystals, but the distinction between the isomers will be shown in other ways. Now in the body $C_2H_2I_2$ diiodoethylene we have a simple and excellent test of the truth of the *à priori* view given above, and we find in fact that two bodies exist which have that formula, and they are neutral to light, but show a notable difference in specific gravity, volatility and fusing point. The view considered above offers a simple and natural explanation of an isomerism which had been previously unintelligible to chemists, though many attempts had been made to throw light upon it. Maleic and fumaric acids both have the formula $C_4H_4O_4$, and nothing has previously shown them to have a different constitution; it has, however, been recently suggested by Wislicenus that these two compounds are stereometrically represented thus:—

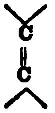
Fumaric Acid.



Maleic Acid.

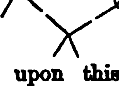


It will be well here to note that where carbon atoms are united by one bond only they are free to rotate upon the axis thus formed, but where two bonds are concerned, as represented by the model thus :—

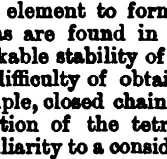


rotation is no longer possible, and therefore a special significance is given to the relative position of the groups in the molecule. Now in the case of fumaric acid the hydrogen atom (electro-negative) is in close proximity to the carboxyl (electro-positive), while in maleic acid hydrogen is most closely associated with hydrogen and carboxyl with carboxyl. Hence we should expect the fumaric to be more stable than the maleic acid, and such is in fact the case.

Hitherto we have considered only the case of one carbon atom or of two singly or doubly linked. We will now examine the conditions when three or more of such atoms are combined in a chain, such as we see in the usual plane graphic formula for propyl, butyl, and amyl compounds. On framing such a chain from our models we see at once the special significance of the stereo-chemical idea as influencing our views of such compounds, the chains are no longer straight, but curved, with a tendency to return upon themselves, and this general curved form is due to the angles at which the atoms are combined. The actual angles here under single linkage are about 109°, and approximate to the internal angles of a pentagon. Thus in this model held thus—

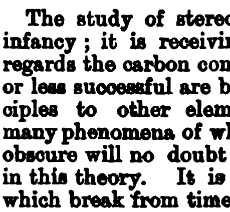


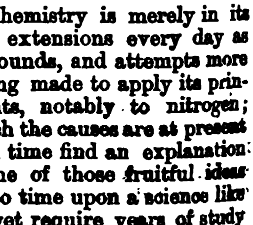
the angle *a*, *b*, *c* is about 109°, and the combination of forms gives a figure such as this—



In commenting upon this phenomenon, van t'Hoff remarks that some years since Victor Meyer, in summing up the general properties of the derivatives of carbon, drew attention to the striking tendency of that element to form closed chains of six atoms, such as are found in aromatic bodies, and to the remarkable stability of such compounds, considering the difficulty of obtaining bodies containing, for example, closed chains of three atoms. The new conception of the tetrahedric grouping explains this peculiarity to a considerable extent. It has been observed that compounds containing carbon combined in a chain consisting of several atoms are often capable of internal transformations which result from a preference for mutual reaction of the groups which are furthest removed from one another. As an example we may notice that among the oxybutyric acids it is just that one in which the carboxyl and hydroxyl groups lie apparently the farthest apart, *i.e.*, γ-oxybutyric acid with the formula—CO_2H, CH_2, CH_2, CH_2OH, which readily yields an anhydride $C_4H_6O_2$ resulting from a reaction between the two end groups, accompanied by the loss of water. These remarks will be rendered more intelligible by a reference to the models, as I now build them up, using silver balls for the hydrogen, red for the oxygen, and blue for the hydroxyl. It has been already shown that the five atom group of single linkage returns very nearly upon itself, and that this is owing to the angles formed approximating to those of the pentagon. Where double linkage occurs the angle is a different one, 125°, and the reason of this may be best understood by watching the operation of double linkage as I here perform it, each "bond" of the pair passes through an arc of a circle instead of approaching its fellow by a right line. Here, in the opinion of van t'Hoff we find an explanation of the well-known hexagon of Kekulé, as well as a corroboration of the correctness of his views, for the sum of the internal angles thus formed corresponds not, as in the case of single linkage, with that of the angles of a pentagon, but of a hexagon ; and this sum is the result, be it observed, of that alternate single and double linkage embodied in Kekulé's celebrated benzene figure. All this will be readily and at once intelligible on inspecting the structure of the models.

I may remind you that the alternative figure, which has received considerable support from some chemists, is that of Ladenberg. It consists of a right-angled prism on a triangular base. It is also shown as it appears projected upon a plane.





The study of stereo-chemistry is merely in its infancy ; it is receiving extensions every day as regards the carbon compounds, and attempts more or less successful are being made to apply its principles to other elements, notably to nitrogen; many phenomena of which the causes are at present obscure will no doubt in time find an explanation in this theory. It is one of those fruitful ideas which break from time to time upon a science like gleams of sunlight, and yet require years of study before their full significance is recognized. This is a field in which young and vigorous intellects should revel, and if I have succeeded to night in arousing an interest in your minds in a subject at first sight dry and abstruse, yet promising, as I believe, a rich reward to the patient investigator, I shall have attained the object I had in view in preparing this paper.

(*The discussion upon this paper is printed at p.* 407).

The Pharmaceutical Journal,

SATURDAY, NOVEMBER 15, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed* "*Pharm. Journ.*"

PURE SALICYLIC ACID.

THE paper read by Professor DUNSTAN at the Evening Meeting of the Society last Wednesday, dealt with a subject that has of late acquired considerable importance, and as circumstances prevent its publication this week, it will be convenient to give in this place a brief *résumé* of the facts which led to the investigation and of the results arrived at. It has long been suspected that the salicylic acid prepared artificially was inferior to that obtained from oil of wintergreen, and many years ago the late Mr. JOHN WILLIAMS demonstrated experimentally that the artificial salicylic acid as met with in commerce contained an admixture to the extent of some fifteen per cent. of another acid which he considered was probably derived from cresylic acid. The subsequent observations of Professor LATHAM that artificial salicylic acid had a different effect when administered medicinally from that of the natural acid increased the doubt as to the fitness of the artificial acid for medicinal purposes, but beyond that no great attention was paid to the matter. At a still later period Professor CHARTERIS ascertained from direct experiments with the artificial and natural salicylic acid that there was a distinctly different physiological effect when one or other of them was administered, and that while the natural acid produced no bad effects, the artificial acid was decidedly toxic. It therefore became important to examine more closely the characteristics of the adventitious substance or substances associated with the salicylic acid obtained synthetically from carbolic acid, and to seek for some efficient means of purification by which the objectionable admixture might be eliminated.

It is to this latter problem that Professor DUNSTAN has directed his attention, and he has succeeded in defining the nature of the above-mentioned impurity, separated from artificial salicylic acid by Mr. JOHN WILLIAMS, as well as that of another impurity subsequently obtained and sent to him by Mr. WILLIAMS. Professor DUNSTAN has also found a third impurity in the course of his investigation, and these have been submitted to physiological tests by Professor CHARTERIS with the result of showing that two of them produce poisonous effects when administered to animals. The experiments instituted for the purpose of separating these impurities from artificial salicylic acid have shown that the method adopted by Mr. JOHN WILLIAMS of fractional crystallization of the calcium salts is not well adapted for attaining that object, and after many unsuccessful attempts Professor DUNSTAN has devised a method of purification which appears to be capable of separating the true salicylic acid from the other acids which are associated with it in the artificial product met with commercially. The details of this method and the evidence by which it is shown that there is a separation of the several substances will be found in the paper. It is now only necessary to say that the method is sufficiently simple to be applied practically for the purification of artificial salicylic acid at a far less cost than the use of the natural acid entails.

Speaking on this latter point Dr. LAUDER BRUNTON referred to the results of this investigation as illustrating in a striking manner the value of the provision that has been made by the Pharmaceutical Society for the investigation of questions relating to the chemistry of drugs and medicinal preparations. He pointed out that although the utility of salicylic acid as a remedy for rheumatic affections has been thoroughly recognized by medical men, and the artificial production of the acid has been the means of furnishing a supply of the acid at a comparatively very cheap rate, the fear of prejudicial effects being caused by artificial product has hitherto operated as a barrier to its use, and has prevented medical men from pushing its administration to such an extent as would have been desirable had it not been for the fear of endangering the lives of their patients. The great importance of having a means of purifying the artificial salicylic acid, and thus being enabled to employ it with safety, was dwelt upon at some length by Dr. LAUDER BRUNTON, who particularized rheumatism and phthisis as being the two forms of disease with which medical men have most frequently to contend, and in regard to the former he considered a very great service has been rendered by the investigation which formed the subject of Professor DUNSTAN'S paper.

MILK OF SULPHUR AND PRECIPITATED SULPHUR.

THE letters of Mr. SYMONS and Mr. SHIELDS on the subject of milk of sulphur, though correct in the opinion they express that milk of sulphur should not be regarded as an adulterated article, appear to overlook the fact that in the case of the prosecutions referred to, as reported in the Journal of the 25th October, the article demanded by the purchaser was not milk of sulphur but precipitated sulphur. In both instances, however, milk of sulphur was supplied, and so far as the evidence given admits of an opinion being formed, there does not appear to have been any possibility of a defence against the charge of an infringement of the Food and Drugs Acts. One of the defendants indeed admitted that a mistake had been made by the strange manager of the shop where the article was purchased, while the other defendant stated that he supplied an article that was part of stock taken over from a former proprietor in the belief that it was genuine. Both of these answers to the charges are extremely unsatisfactory, and there can be little room for surprise that penalties were inflicted in both cases. In reality the question whether the presence of calcium sulphate in milk of sulphur is to be regarded as an adulteration was not raised. The breach of the Food and Drugs Act consisted in supplying an article that was not of the nature and quality of the article demanded, and much as we should disapprove of any attempt to treat the sale of milk of sulphur when it is asked for as an offence under the Food and Drugs Act, it cannot be contended that milk of sulphur should be supplied when precipitated sulphur is asked for. That would be as unreasonable as the reverse contention of the analyst. Though milk of sulphur is not now recognized in the Pharmacopœia, it is an approved and popular article with a large number of the public, and, as Mr. Shields states, many persons will not be persuaded to use the Pharmacopœia preparation of precipitated sulphur in the place of it. For that reason it would be a most undesirable thing to introduce into the Pharmacopœia the term milk of sulphur as a synonym of precipitated sulphur as Mr. Clower suggests. Nor do we agree with him in thinking that his experience, as stated in his letter, is in accordance with that of other chemists. The two things are essentially distinct, and if the requirements of customers are met with proper regard to that fact and to the nature of their demands, chemists need not be under any apprehension of being placed in the undesirable position of offenders against the provisions of the Food and Drugs Act. Mr. Shields' fear that a precedent may have been created by the cases referred to is, we think, unfounded in the face of the declared opinion of so high an authority as Professor Redwood on this subject, though we cannot suppose that even his testimony would have in any degree altered the decision of the magistrate who decided the cases now in question.

The Annual Conversazione of the Chemists' Assistants' Association was held at the Portman Rooms on Thursday, the 13th, and met with unusual success. Great credit was due to the excellent arrangement, by Mr. W. L. Williams, of the pharmaceutical and scientific apparatus lent by various firms to illustrate the various operations constituting the art of pharmacy. Among the rare drugs, alkaloids, etc., some fine specimens of both natural and artificial salicylic acid and salts were exhibited by Messrs. Hopkin and Williams. Messrs. Corbyn, Stacey and Co. contributed a collection of new synthetical remedies and a mediæval appearance was given to their table by a number of documents relating to the old literature of the firm. A fine exhibit of pharmaceutical apparatus by Messrs. Maw, Son, and Thompson, and of electrical and chemical apparatus by Messrs. Townson and Mercer were also to be seen. Besides various microscopical objects shown by members of the Association, Messrs. Watson and Son contributed a number of microscopes and other optical instruments. A concert and dancing added to the enjoyment of the evening, at which about 400 persons were present.

* * *

On Tuesday, the 18th inst., a meeting will be held at Birmingham to discuss the Pharmacy Bill. On Wednesday, the 26th, a meeting is to be held at Hull, and on Thursday, the 27th inst., a meeting will be held at Leeds for the same purpose. The President of the Pharmaceutical Society has accepted invitations to be present at these meetings.

* * *

We are requested to state that Messrs. Cullinan, Gulliver, Hickey, Pickard and Tupholme, the Divisional Secretaries for Hammersmith, St. George's, Hanover Square, Chelsea, Fulham and South Kensington have made arrangements for a meeting of chemists in the five Metropolitan divisions, to be held at 9 p.m. on Thursday, the 20th November, at Queensberry Hall, Harrington Road, South Kensington, to discuss the proposed Pharmacy Act Amendment Bill. The President of the Pharmaceutical Society has intimated his intention of being present at this meeting.

* * *

The next meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, on Thursday, 20th November, when the evening will be devoted to the reading of short papers by members of the Association.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, November 20, when Mr. W. Wilson will read a paper on "Milk of Sulphur," and Mr. A. J. Simons will read one on "The Chemistry of Photography."

* * *

The Eighth Annual Assembly of the Edinburgh Chemists will be held in the Assembly Rooms, George Street, on the evening of the 22nd January next. Application for tickets should be made to Mr. Duncan McGlashan, 174, Fountain-bridge, Edinburgh.

* * *

The *Druggists' Circular* reports that a Brooklyn pharmacist, having been "arrested" for a refusal to show his register of poison sales, at the suit of a man who thought his wife had been in the habit of purchasing opiates from him, the justice dismissed the case on the defence that no reason had been given why the book should be shown.

Transactions of the Pharmaceutical Society.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, November 12, at 1 p.m.

Present:—Messrs. Boa, Gibson, Gilmour, Mackenzie and Stephenson, Edinburgh; Fisher, Dunfermline; Frazer, Kinninmont, and McAdam, Glasgow; Hardie and Kerr, Dundee; Nesbit, Portobello; Patterson and Strachan, Aberdeen; Storrar, Kirkcaldy; and Watt, Haddington.

Apologies for absence were received from Messrs. Lawrence, Oban, and Maben, Hawick.

The minutes of the last meeting were read and approved.

The report of the General Purposes Committee, from which it appeared that the new book-cases in the Library had been fitted up at a cost of £31 15*s*., and that some necessary repairs in the stable in Duke St. Lane had been executed at a cost of £13 4*s*. 2*d*., was read and adopted.

The Chairman explained that he had written to Mr. Carteighe to the effect that he (the President) should open the session of 1890-91 with an address. A reply had been received from him to the effect that he could not accede to the desire of the Committee, but that he might attend a general meeting of the trade to hear statements and answer any questions that might be put to him. He further suggested that such a meeting might most conveniently be held when he was in Scotland attending the Board of Examiners meeting in January. Members of Executive would remember that at last meeting he had given notice of the following motions:—

(1) That the Executive take into consideration Professor Frazer's address delivered at the opening of last session, with a view to ascertain in what way his suggestions may be taken advantage of for the benefit of the Society; and (2), that the Executive consider what steps may be taken with a view to increasing the membership of the Society in Scotland. In connection with these motions he had to ask that the Executive should allow them to be deferred in the meantime. Mr. Carteighe might be down in January, and no doubt he would discuss these subjects. If they proceeded now to discuss them the probability was they would both limit themselves and Mr. Carteighe. There was not the slightest doubt that both these questions would be raised when the President appeared among them, and by deferring discussion it would be an advantage to both.

Mr. Mackenzie (Edinburgh): Does he mean to take up the question, or do we leave it for him to take up.

The Chairman: We can take it up ourselves if he does not.

Mr. Mackenzie: But is it a condition that he does?

The Chairman: No, far from it.

Mr. Nesbit (Portobello): Mr. Gilmour merely postpones his motion to the meeting to be held when Mr. Carteighe comes down.

Mr. Mackenzie: Well, I would suggest delay meanwhile.

Mr. J. B. Stephenson (Edinburgh): It will be a meeting of the whole body of chemists which Mr. Carteighe will address.

The Chairman: We can take the subject up afterwards in spite of any decision then come to, or of any suggestion that may be then thrown out. But to discuss the subject would be merely traversing the ground which will come up in January and thus probably hurt ourselves.

Mr. Nesbit: The motions might be moved at a meeting of the general body of chemists, though not members of the Society. They are as much interested as ourselves.

The Secretary then read the following extract from a letter from Mr. Carteighe to the Chairman:—

"If I interpret your desire aright, viz., that an address on general Society subjects is what is looked for, then I feel that it would be better to make use of me some time when in Edinburgh at examination or otherwise, to talk at a general meeting of the trade, whether connected with the Society or not, for we want to preach to the outsiders more than to those who are inside. Moreover, I find that the people outside prefer to have an opportunity of airing their grievances and attacking the Society and its President. After that the President can remove some of the cobwebs and the meeting is a success.

"To be brief I have written straight, but you will not, I know, mind that; so get someone else to deliver a suitable address on the scientific side of pharmacy, and consider the other suggestions. I am quite conscious that for whatever purpose I may go north, I shall receive, as always, the warmest of welcomes.—Yours very truly, M. CARTEIGHE."

The Chairman: You see that it is trade subjects Mr. Carteighe is going to talk about.

Mr. Mackenzie: Apparently he is going to carry a conquering band wherever he goes.

The Assistant-Secretary said he had replied on the instruction of the Chairman to that letter that it would be laid before the Executive that day.

The Chairman: Do you approve of the motion to defer consideration of the subjects mentioned at the present time? (Cries of "Agreed.") Then I think we should address an invitation to Mr. Carteighe to come down.

Mr. Mackenzie: But on the strength of that letter he is coming.

The Chairman: I do not think he will come unless he is invited.

Mr. Storrar, Kirkcaldy: From what I know he expects to be invited.

Mr. Mackenzie: But what to do?

The Chairman: To talk about trade subjects and other matters.

Mr. Peter Boa: He is to address meetings in other towns, I suppose.

The Chairman: I think he will accept invitations from Glasgow, Aberdeen and Dundee. I think Mr. Carteighe's presence will greatly help us to increase our membership and brush away the cobwebs. I would be prepared to invite him down to Edinburgh during the examinations. There is no doubt it will do a great deal of good if the President comes down, and gives us his opinion and hears our opinion in return.

Mr. Kinninmont: Perhaps the best part of it will be to get our opinions in return

The Chairman: I agree with you; we have not the President down as often as we desire. The only time he has addressed us during the eight years he has been President was at the opening of these rooms.

Mr. Patterson: But what about this invitation? Are we going to invite the whole trade; or who is to do it?

The Assistant Secretary: The plan is for the local secretaries to call a general meeting of the whole trade.

Mr. Frazer: It is not within the power of the Executive to call a meeting of the trade to meet the President.

Mr. Patterson: I do not see how we can, as an Executive, invite Mr. Carteighe down unless we are prepared to arrange a meeting or a series of meetings for him.

Mr. Frazer: I suppose nobody here would have thought of such a visit except it was on his own invitation.

The Chairman: No, no.

Mr. Nesbit: He probably wants to visit Scotland as well as various parts of England.

Mr. Frazer: Let him come then on his own hook.

Mr. Watt (Haddington): I wish those present would be very respectful in their remarks. Mr. Frazer is under a misapprehension. Mr. Gilmour asked Mr. Carteighe down.

The Chairman: To open the winter session. That was the only meeting I referred to.

Mr. Watt: Mr. Frazer, Mr. Gilmour asked Mr. Carteighe to open the session this year.

Mr. Mackenzie: Has he refused that?

The Chairman: Yes; but he offered to attend a general meeting.

Mr. Boa: He refused merely on the score of etiquette.

The Secretary: He thought it better to come and attend a general meeting of the trade rather than an evening meeting of the Society.

Mr. Frazer: But he gives a reason for it.

Mr. Kinninmont: Let him explain what he means by it.

The Assistant Secretary: Mr. Carteighe desires you to get someone to deliver a suitable address at the special meeting on the "Scientific Side of Pharmacy," and he would rather speak on trade questions at a general meeting of the trade.

Mr. Kerr (Dundee) said they should come to some decision on this point. It was evident they would not get what they wanted, in his opinion, unless they had a larger membership from outsiders. He had come there that day at a little disadvantage to himself to hear how this was to be brought about, but he was agreeable that the discussion should be put off until the President came. He would now propose that the Executive formed itself into a committee, and invite Mr. Carteighe in due form to come down, not only to Edinburgh, but to other towns in which it might be agreeable for him to address meetings of the trade. For himself, and for Mr. Hardie, their local secretary, he would say they would do their utmost in Dundee to make the visit a success. But it should be left to the Executive in Edinburgh to make all the necessary arrangements.

Mr. Fisher: Then we as an Executive would require to give notice to chemists in the various districts that such a series of meetings would be held.

Mr. Kinninmont: And is the Executive to be at all the trouble in the matter?

Mr. Watt: With reference to what Mr. Kinninmont has said, the representatives here from Glasgow, Aberdeen, and Dundee know that the President is coming, but I would leave it to them locally to invite Mr. Carteighe. I think I may state without hesitation, that perhaps I will not believe in all that Mr. Carteighe will say, and I would not like to be held responsible for all he may say. At the same time it is a great compliment to us all, however much we may differ from him, that Mr. Carteighe should intimate his readiness to visit us. You would all like to see the President, and very likely have some discussion on matters connected with the trade. I think it would be very desirable, therefore, on these grounds that you should hear him; but I do not think that the Executive, except for the Edinburgh meeting, should have anything to do with it. The matter should be taken up by the local secretaries.

Mr. Mackenzie said he would like to know whether Mr. Carteighe would take up a given line—education or some high-flown line, or descend to things they wished talked about. If not the latter, they would be useless meetings. Let it be a free and open discussion.

The Assistant Secretary: Mr. Carteighe says, "I find that the people outside prefer to have an opportunity of airing their grievances and attacking the Society and its President. After that the President can remove some of the cobwebs, and the meeting is a success."

Mr. Paterson: Why if you invite him you will have the chair, and he will have to take what he gets.

Mr. Storrar: I would beg to move a formal motion—

> "That the President be asked to visit Scotland, and that instructions be given to the Assistant-Secretary to this effect, that as soon as Mr. Carteighe intimates his intention to come that he will inform local secretaries in the various districts referred to, and suggest that a general meeting of the trade be called, at which Mr. Carteighe might be asked to be present."

That motion if adopted, I think, will leave the matter entirely in the hands of the local secretaries. The President's speech would be a portion of the programme, but it would not form the entire programme, so that there would be an open meeting of the trade, at which any question might be brought up. Mr. Frazer has said that we do not want the President's opinion on some points; but perhaps he has lost sight of one point, that we might influence the President. I believe the President does not know the feeling of the trade in Scotland; therefore it would be a decided advantage if he heard members and others in Scotland as they went over the various subjects. We must not lose sight of the fact that we might influence the President by these meetings.

Mr. Paterson: I am not very clear about the expression "the Executive" asking him, without knowing definitely the arrangement, and where the expense is to come from, and what expense. You invite Mr. Carteighe down; you will have to pay his expenses.

Mr. Kinninmont: He comes as a member of the Board of Examiners.

Mr. Watt: If you invite him to Aberdeen, Mr. Paterson, you must pay first-class fare there and back.

Mr. Paterson: Then if we are to work outside of the Executive the subject should be discussed outside of the Executive.

Mr. Frazer: It is quite *ultra vires* of our business.

Mr. Boa: This Executive may ask him to come to Edinburgh.

Mr. Paterson: I am told by Mr. Strachan that the trade in Aberdeen are prepared to ask Mr. Carteighe to a meeting. You are going to ask him as an Executive here, but you are to take no further concern, leaving the other meetings to chance. I do not think it is right. If it is an advantage to the Society to ask the President, let us do it on our own responsibility; but I do not think really as an Executive we should meddle with the thing.

Mr. J. B. Stephenson: That is how Mr. Storrar puts it.

Mr. Paterson: He says, ask Mr. Carteighe down and leave the success of the meetings to chance. If we, as an Executive, pass a motion asking him down we ought to take it upon us to see that the meetings shall be a success, or else we ought to pass no resolution here as an Executive.

Mr. Mackenzie: As far as expense goes, if it is to benefit the Society and increase our numbers, why should it not be paid by the Pharmaceutical Society?

Mr. Frazer was here understood to say, that if Mr. Carteighe was wanted in the several localities the individuals in those localities should ask Mr. Carteighe personally.

Mr. Paterson: I do not object to it as an Executive, unless we are responsible for the whole of the meetings.

Mr. J. B. Stephenson: The Executive can have nothing to do with meetings held in Aberdeen and Dundee.

Mr. Kerr said all he meant in his remarks regarding the Executive taking up the matter was that perhaps a circular might be sent to every chemist in Scotland announcing these meetings in the various centres. For instance, in Dundee they were a small body, but they could take in St. Andrews, Kirkcaldy, Arbroath, Montrose, and Perth, thus making a circle. Coming from the Executive in the form of a circular, it would have the effect of making chemists take greater note of it than if it appeared in the journals. This would have the tendency of making the meetings a success.

Mr. Kinninmont: Can the Executive not take advantage of Mr. Carteighe's visit to Edinburgh to give him an opportunity of explaining his views to the trade in general.

Mr. Fraser: In Edinburgh?

Mr. Kinninmont: Yes; and any other town can take the responsibility of inviting him there.

Mr. Frazer: If Aberdeen wants him, get him; if Dundee wants him, get him; but we as an Executive have no right to ask him on general principles.

The Chairman: I do not see any difficulty. The Executive can remit to a committee to be appointed the necessary arrangements. As to the matter of expense, all I can say is Mr. Carteighe will feel on this point more than anything else. I believe he has paid his expenses to all the meetings at which he has been present.

Mr. Storrar's motion was then unanimously adopted.

Mr. Mackenzie moved that the gentlemen who had acted as examiners during last term should be nominated for re-appointment.

This was seconded by Mr. Fisher and unanimously agreed to.

Mr. Strachan (Aberdeen) said there was one matter to which he desired to direct the attention of Mr. Watt and Mr. Storrar, their representatives at the Council. From the reports of last Council meeting he observed that Guernsey and Jersey were to be centres for Preliminary examinations. He did not see in these circumstances why Orkney and Shetland should be left out, for they were further from any other centre. Besides Guernsey and Jersey were outside of the Pharmacy Act, whereas Orkney and Shetland were within it. He thought it should be an instruction to them to bring this matter up and have some arrangement made. They should ask the President to exercise the same privilege in Orkney and Shetland as in Guernsey and Jersey. It took lads over a week to come to Edinburgh or Aberdeen, entailing no small expense.

Mr. Nesbit was also of opinion that Orkney and Shetland should have a superintendent, more especially as, compared with Guernsey, Jersey and the Isle of Man, they came within the Act.

The Chairman thought this was a very sensible suggestion, and he would cordially support it.

Mr. Watt said he would certainly support such a proposal. Of course it would be communicated to the Council by the Assistant Secretary.

This was agreed to and the meeting then closed.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 5th instant, at No. 11, Harcourt Street, Dublin, at three o'clock.

The President, Mr. Charles Evans, in the chair. The other members of the Council present were the Vice-President, Mr. Wells; Dr. Burnes, Professor Tichborne, and Messrs. Baxter, Merrin, Sumner (Cork), McCormack, Robinson, Whitla, Grindley, Beggs, Hayes, Hodgson and Simpson.

The President said the first business was the election of the President, Vice-President and officers for the ensuing year.

Mr. Grindley moved that Mr. Charles Evans be elected President for the ensuing year.

Mr. Beggs seconded the motion, which was put to the meeting by the Vice-President, and unanimously carried.

Mr. Evans: I am much obliged to you, gentlemen, for this renewed expression of your confidence. Under the peculiar circumstances of our position I have reconsidered my determination to resign, and agree to take the post again on the understanding that I am to give up office next April. I shall be glad to be of any service I can in the interval.

Mr. Beggs moved that Mr. W. F. Wells be elected Vice-President for the ensuing year.

Mr. Grindley seconded the motion, which was unanimously carried.

Mr. Wells: I am obliged for the confidence you have again placed in me. Like Mr. Evans, I should prefer to resign; but under present circumstances, as he is continuing in office, I shall have great pleasure in doing so also.

Mr. Beggs moved that Mr. Hodgson be re-elected Treasurer.

Mr. Whitla said he had much pleasure in seconding the motion. They were most happy in having Mr. Hodgson for their Treasurer, and they should re-elect him so long as he was willing to act.

The motion was unanimously agreed to.

Mr. Hodgson said he was obliged to them for unanimously reappointing him their Treasurer, and would do all in his power to conserve their interests.

On the motion of Mr. Beggs, seconded by Mr. Merrin, Messrs. Hayes and Simpson were unanimously re-elected auditors.

Mr. Hayes, in returning thanks, said his brother auditor and himself would do their duty.

On the motion of Mr. Sumner, seconded by Mr Whitla, the following were elected the Law Committee for the ensuing year:—Messrs. G. D. Beggs, G. H. Grindley, G. Lane McCormack, P. Merrin, Professor Tichborne, Andrew McNaught, Johnston Montgomery and Richard Sumner.

On the motion of Mr. Robinson, seconded by Mr. Whitla, the following were elected the House and General Purposes Committee for next year:—Messrs, Beggs, Grindley, William Hayes, E. M. Hodgson, McCormack, McNaught and Professor Tichborne.

On the motion of Professor Tichborne, seconded by Mr. Sumner, the following were elected the Certificates Committee:—Messrs. Beggs, Hayes, McCormack, Simpson, McNaught and Sumner.

On the motion of Mr. Beggs, seconded by Mr. Grindley, the Pharmacy Amendment Act Committee were re-elected, viz.:—Dr. Burnes, Professor Tichborne, and Messrs. Hayes, Sumner and McNaught.

The following were elected Examiners for the ensuing year:—Preliminary, Dr. E. MacDowel Cosgrave; Pharmaceutical and General Chemistry, Dr. Ninian Falkiner; Materia Medica and Botany, Dr. Robert J. Montgomery.

A report of the examiners stated that at the last October examinations twelve candidates passed and only one was rejected.

The Vice-President: That result shows an improvement of the candidates in chemistry. At the preceding examination eight out of nine passed.

The President mentioned that at the Preliminary examination in October four candidates out of six were successful.

A report from the Pharmacy Act Amendment Committee was read and signed.

Mr. Grindley asked if the difference with the gentlemen in Belfast as to the allowance to examiners there had been adjusted.

The President: We have received no communication from them since they went home.

The President said the following letter had been received within the last half hour:—"5th November, 1890. Sir,—I am directed by the Lords Justices to request that you will be good enough to state if any arrangements have been made by the Pharmaceutical Society under the 12th section of the Pharmacy Act (Ireland), 1875, Amendment Act, 1890. You will also be good enough to say if the Council have considered the question as to the examiners to be appointed under the Act and if they have arrived at any opinion as to the number that will be required and the times and places at which the examinations should be held, and also the question of remuneration to be paid to such examiners. Their excellencies will be glad to be favoured with the views of the Council in respect of these matters at your earliest convenience.—I am, &c., W. B. KAYE.—To the President of the Pharmaceutical Society."

A reply to the above was drafted and ordered to be forwarded.

A report from the Law Committee was read and adopted.

In reference to regulations to be drawn up for the examinations,

The President remarked that a feeling was generally entertained by the members of the Council that they had no right to retain indentures sent in by candidates.

The Vice-President said a resolution had been passed, requiring the filing of certificates of apprenticeship, in order that the Council might be provided with the means of detecting any want of *bonâ fides*. Some of the candidates had been sending their indentures instead of certificates. They always wanted the indentures back, and what was required was a regulation to the effect that only certificates would be accepted, and that these would not be given back.

Mr. Beggs: A great number of apprentices whose employers are dead, and who consequently could not get certificates, might only be able to send their indentures.

Mr. Hayes: In no case have we ever been deceived by indentures; it has only been by certificates. I think indentures ought to be returned, but we should see them.

Mr. Grindley: Could you mark the indentures before they are returned.

Mr. Merrin: That is a very good suggestion.

Mr. Hayes: Let a note be put in the regulations that both indentures and certificates are to be sent up, and that the indentures will be returned, but that the certificates will be retained.

Mr. Robinson: But if the employer be dead?

The Vice-President: In that case we can accept an affidavit.

The following letter from the Privy Council was read: "October 2, 1890. Sir, I have to acknowledge the receipt of your letter of the 25th ult., and to acquaint you in reply that the Privy Council have not yet come to any decision with regard to the School of Chemistry established by your Society. I am, etc., W. B. Kaye. The Registrar of the Pharmaceutical Society."

A letter was read from the City of Belfast Police Office Detective Department asking for an authentic list of all the pharmaceutical chemists in Belfast.

On the motion of Dr. Burnes, seconded by Mr. Baxter, it was ordered that a copy of the Calendar written up to date should be forwarded to the Belfast Detective Department, accompanied with an explanatory letter stating that there are others besides pharmaceutical chemists who have now the right to sell poisons, and who have up to the 18th of August, 1891, to register as chemists and druggists.

On the motion of Mr. Sumner the following gentlemen were nominated for membership of the Society: J. S. Short, Cork; J. J. Walsh, Cork; P. J. Fielding, Cork; J. R. Mulwood, Queenstown; and Frank Harley, Bandon.

A letter was received from Mr. Samuel P. Boyd, in which he urged that the printed schedules A and B which had been issued under the new Act required more proof of persons having been in business before 1875 than was necessary.

The President said no legal definition was given in the Act of a chemist and druggist, and it had been found very difficult to say who came under that designation.

Mr. Hayes: We do not ask anybody to produce a poisons book before 1875. Poisons books since that date will do as well.

Mr. Hodgson said that the Poisons Act only came into force in 1870; and in 1875 a great number of persons were selling poisons who had never heard of that Act, and who therefore did not keep poisons books; and it would be very hard lines on them to compel them to produce poisons books, the necessity for which they did not know of before 1875.

Mr. Hayes: We only require a poisons book as collateral evidence of the party being a chemist and druggist.

Mr. Hodgson: You could not insist on a poisons book kept before 1875 as a *sine qua non*.

A letter was received from Messrs. Casey and Clay intimating that they had received £20, the amount of four fines imposed on defendants in prosecutions in Belfast, which they had placed to the credit of the Society, and requesting a cheque for a balance due to them.

On the motion of the Vice-President, seconded by Mr. Hodgson, the letter was referred to the Law Committee.

A letter was received from the Principal of the Upper Sullivan School, Holywood, county of Devon, asking that the chemical department of the School should be recognized by the Society. The writer stated that he had had long experience as a teacher of theoretical and practical chemistry, and that his pupils had frequently taken honours in the examinations under the Science and Art Department. An inspection of the School was invited.

The Vice-President said he could speak from personal knowledge as to the excellence of this school. The principal had been a most successful teacher. He had classes open on four evenings of the week from seven o'clock until ten; and students who were disposed to do so could work for themselves every night in the week.

After some discussion, on the motion of Dr. Burnes, seconded by Mr. Merrin, it was resolved that no more applications from schools for recognition be considered for the present.

In consequence of the amount of business involving important details on the agenda paper, it was found necessary to adjourn until eleven o'clock on Thursday morning.

The Council resumed at that hour and proceeded in committee to draw up regulations under section 12, subsection 1, of the Pharmacy Amendment Act, 1890.

Professor Tichborne postponed the consideration of the following notice of motion, which stood on the agenda paper in his name:—That from this date the outgoing President and Vice-President of the Society shall not be eligible for re-election after having held one of the said offices for three years.

The following notice of motion had been given by Mr. Hodgson, the Treasurer:—

"That a Committee be selected from members of the Pharmaceutical Society to control and manage the Chemical School; that they elect out of their members one gentleman to act as Secretary and Treasurer to the School who shall receive all fees and make all payments in connection with the School; that the

Pharmaceutical Society shall in future have nothing to say to the monetary affairs of the School; and that a cheque for £7 9s. 9d., being the balance in the hands of the Society to the credit of the School, be handed over to the Secretary to the Committee of the School as soon as he is appointed."

Mr. Hodgson moved that the above notice of his be referred to the House Committee, including Dr. Burnes, and that that Committee should meet on Wednesday, the 12th instant.

Mr. Hayes seconded the motion, which was unanimously agreed to.

On the motion of Mr. Whitla, seconded by Mr. Merrin, indentures were ordered to be returned to Mr. V. G. L. Fielden, and a certificate which had been sent by him to be filed in lieu thereof.

Letters were read from Messrs. W. P. Ryan, licentiate, and J. J. White and A. H. Bolton, asking for the marks awarded to them at the examinations.

The Registrar was directed to comply with the requests.

A letter from Mr. Theophilus Harper tendered a matriculation certificate from the Royal University for acceptance in lieu of passing the Society's matriculation examination.

The certificate was accepted.

Donations were received from the Smithsonian Institution of their Annual Report, 1886, part 2 (U. S. Museum), and of their Annual Report, 1887, parts 1 and 2 (U. S. Museum).

On the motion of Mr. Simpson seconded by Mr. Whitla thanks were voted to the Institution for their donations.

A few letters having been disposed of—

The Council adjourned.

Proceedings of Societies in London.

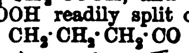
CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting held on Thursday, October 23, Mr. A. Campbell Stark, President, in the chair, a paper was read on "Stereo-Chemical Theories," by T. P. Blunt, M.A. (Oxon.), F.I.C., F.C.S. The paper is printed on page 397.

The President said that members of the Association should feel particularly favoured by Mr. Blunt's lecture, because it was the first time that the subject had been treated of in England, in the English language. The whole lecture seemed to be evidence of the tendency there was in many branches of science, not based apparently on mathematics, to finally base themselves on the only axioms which would appear to be quite incontrovertible, the axioms of mathematics. It was, in a sense, a corollary to the lecture delivered in England some time ago by Professor Mendeleef "On the Application of Newton's Third Law of Motion to Chemical Combination," and during the whole lecture, cases of chemical equilibrium, exactly analogous to the equilibrium expressed in such propositions as the triangle, the parallelogram of forces, &c., continually occurred. This was particularly noticeable in the explanation given by Mr. Blunt of dextro and lævogyrate properties in isomeric compounds. Here, it seemed, was an analogous case to that of similar or opposing forces in the same or different planes, and the diagrams quoted from Victor Meyer were just those used in works on mechanics to explain parallel and opposing forces. The whole subject was so new and so revolutionary to many preconceived ideas, that it was impossible to discuss it adequately without first seriously grappling with it alone, but Mr. Blunt would, he was sure, be glad to explain anything he had stated which was not clear to any member of the Association.

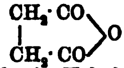
The President then asked Dr. Passmore, a member of the Association, to discuss the points Mr. Blunt had raised.

Dr. Passmore congratulated the Association upon having commenced the present session so auspiciously in endeavouring to stimulate English chemists to the study of stereo-chemistry, so much neglected in this country, and complimented the author of the paper upon his clear and concise introduction to the subject. The study of isomerism had been defined by Professor Victor Meyer in his recent address to the Chemical Society in Berlin as synonymous with the study of organic chemistry, in contradistinction to that of inorganic chemistry, and of all forms of isomerism perhaps that occasioned by varying geometrical conditions within the molecule was the most alluring to the student. Though stereo-chemistry was inseparably associated with the names of Le Bel and van t'Hoff, the speaker emphasized Mr. Blunt's opinion that it was well to remember that the representation of the carbon atom by a tetrahedron, of which the four corners correspond to the valencies of this element, was an idea that had been mooted among chemists generally, some years before the publication in 1874 of Le Bel and van t'Hoff's first communication, *La Chemie dans l'Espace*. One need but refer to Kekulé's paper in 1867, in which he propounded the now well-known benzene formula to the scientific world, or to Wislicenus's address at the meeting of the Naturforscherverein in Innsbrück in 1869, to be convinced that both these chemists had at that time very definite views on the subject, whilst Victor Meyer had affirmed that he had himself since 1871 employed model tetrahedra in his lectures to illustrate the existence of the three dimensions in the carbon atom. It was due to the first-named two chemists, however, that the hypothesis developed into a theory, and that the value of this theory had been recognized in rendering intelligible instances of isomerism that cannot be explained by ordinary one-dimension graphic formulæ. Before further discussing the paper, Dr. Passmore said that he wished to draw attention to the models upon the table. The solid form advocated by van t'Hoff was cumbrous to handle and not well adapted for illustrating the formation of chain or ring molecules, but possessed some advantages over the Viennese models recommended by Victor Meyer. The latter form was very convenient, especially to show the geometrical conditions obtaining in a molecule containing two or more carbon atoms, but by its use the beginner was liable to entertain the erroneous notion that the four valencies or chemical forces are actual projections from the carbon atom, equidistant from one another, which would imply that forces do not always act in a straight line. The point was therefore of sufficient importance to warrant a caution, but this source of error might be eliminated if the carbon atom were considered as a body of definite, though unknown, dimensions and shape, on the surface of which the valencies occur, as it were, as four centres of force. The introduction of models of the Viennese form had probably lent much weight to Baeyer's theory on the existence of tension in molecules containing doubly- or trebly-bound carbon atoms, as in ethylene and acetylene, due to the direction of the valency force being altered under these conditions, and to the stability of the compound being affected by the tendency to revert to the normal condition. It was true that compounds containing a double bond might be split most readily in that position; but the formation of acetylene by the passage of a strong electric current between two carbon poles in an atmosphere of hydrogen, an unique instance of the direct synthesis of a hydrocarbon from the elements, did not indicate that any exceptional tension accompanies a triple bond. Victor Meyer had suggested that the tendency to decomposition might arise from other causes. Thus: that in Baeyer's diacetylene, $CH \vdots C \cdot C \vdots CH$, and polyacetylene-dicarboxylic acid, $COOH \cdot C \vdots C \cdot C \vdots C \cdot C \vdots C \cdot C \vdots C \cdot COOH$, the latter of which exploded violently if disturbed even by the ether vibrations of light, the reason might be looked for in the large percentage of carbon and the readiness of the bodies to oxidize. Indeed, if van't Hoff's models were used it would be seen that double or treble bonds do not necessarily involve "spannung." With reference to Mr. Blunt's remarks concerning the explanation of the tendency of polycarbon molecules to assume a ring formation, Dr. Passmore mentioned that in the case of lactones, or inner anhydrides, ring bodies are actually formed, the tendency being especially marked in acids containing an hydroxyl group in the γ-position to a carboxyl group within the molecule. Thus both γ-oxybutyric acid, $CH_2(OH) \cdot CH_2 \cdot CH_2 \cdot COOH$, and succinic acid $COOH \cdot CH_2 \cdot CH_2 \cdot COOH$ readily split off water and form butyrolactone



$\underbrace{CH_2 \cdot CH_2 \cdot CH_2 \cdot CO}_{O}$

and succinic anhydride



$\left.\begin{matrix} CH_2 \cdot CO \\ | \\ CH_2 \cdot CO \end{matrix}\right\rangle O$

respectively. The agreement of the angles in Keknlé's theoretical benzol ring with those that obtain when, as had been shown, a ring is made with six Viennese models joined alternately by single and double bonds, was very interesting; but perhaps the more frequent occurrence of benzol derivatives, although the angles of a penta-carbon ring more nearly approximate those that the lines joining the equidistant corners of a tetrahedron to the centre make with each other, was due to the advantage in point of symmetry that the *hexa*-methylene has over the *penta*-methylene ring in the struggle for existence. Further, it must be borne in mind, that although Kekulé's formula has driven most of the rival formulæ from the field, it also has its weak points, and that the perfectly symmetrical "central" formula of Baeyer, in which the carbon atoms are united by single bonds, and the six "unsaturated" valencies are regarded as causing a strong inward pressure, is looked upon with great favour. In the latter formula there was also theoretically a certain amount of molecular tension set up by the tendency of the resultant force between each carbon atom to resolve into two components, as might be readily seen in the model, and this deduction was by no means at variance with the results of recent investigation. Time allowed of only a mere reference to the much disputed cause of isomerism among the oximes of benzil and benzaldehyde, but the speaker drew attention to some remarks of physiological importance made by Mr. Blunt in the earlier part of his paper. In the preparation, by the agency of *Schizomycetes*, etc., of active from inactive modifications of compounds containing an asymmetric carbon atom in the molecule, it was curious to observe that the *dextro* modification was nearly always decomposed by the fungus, leaving the *laevo* intact, since in chlorophyll plant life the dextro variety was generally met with as food or reserve material, whilst it might be assumed that the laevo modification, which is probably manufactured by the plant, as in the laboratory, simultaneously with the dextro, has been utilized for the preparation of albuminoids or analogous products. Before concluding his remarks, Dr. Passmore referred to the stereochemistry of nitrogen, which element, according to the theory of Hantzsch and Werner, may be represented by a tetrahedron, one corner of which is occupied by the nitrogen atom itself, the other three by the three valencies. This theory had been employed to dispute Victor Meyer's deductions concerning isomerism among the oximes, but without success, and it had recently been shown that, except in cases where nitrogen is incorporated within a ring, as in pyridine, chinoline, etc., it can be sufficiently expressed by a one-dimension graphic formula. With regard to the stereochemistry of other elements, little was at present known. Silicon as a tetrad probably obeys the same rules as carbon, but only one compound containing an asymmetric silicon atom has yet been synthesized. Concerning oxygen and sulphur, from the greater chemical similarity of the thiophene to the benzene than to the furfuran group, and from the existence of an ethylene oxide and an absence of a corresponding sulphide, it had been inferred that the dimensions of the sulphur atom, or at least its sphere of action, are greater than those of the oxygen atom.

Mr. Dymond said that he would not attempt to discuss the subject, which had been to him extremely interesting. Mr. Blunt had given them a lucid introduction to a theme which at first sight appeared abstruse, and he felt sure that if the English chemists would follow up the clue that had been given them that evening the time and trouble would be richly rewarded by their fresh acquisitions of knowledge.

Mr. W. Lloyd Williams said he could scarcely hope to add much to the subject under discussion, for it had been most lucidly treated by Mr. Blunt; still as he had had occasion to study the subject to a certain extent, he supposed he ought not to remain silent. A good deal of misconception existed in the minds of many English chemists upon the subject of "stereo-chemistry," for he had inquired of several of his chemical friends the precise significance they attached to the term, and though the answers were widely divergent, in no case did he receive a completely satisfactory definition. He attributed much of this misconception to the belief that up to the present time no English edition of Le Bel and van t'Hoff's theories had been published, and referred to the impending publication of an English translation as being likely to remove this difficulty. Naturally, no sound grasp of the science of chemistry could be attained without an intimate acquaintance with the principles upon which the science was in part constructed, but to many minds the acquisition of theoretical principles was a less grateful task than the absorption and assimilation of facts and inferences. In such cases he thought the use of the old-fashioned glyptic formulæ rightly held a place, and he was sure the demonstrations by Mr. Blunt had enabled them all to follow his arguments with much greater precision than a mere verbal statement would allow, and personally he was much indebted for the way in which the different theories had been stated.

Mr. Strother said he also wished to express his thanks to Mr. Blunt for his most interesting and scientific paper, and they were all obliged to Dr. Passmore for his able criticism, which was almost a second paper on the subject. It had been remarked that the subject was comparatively little known amongst English chemists, and it called to mind the statement of the President in his inaugural address how necessary it was for the ideal chemist to keep well abreast of the times.

Mr. Blunt in acknowledging the complimentary remarks that had been made, thanked Dr. Passmore for his speech, which had yielded him much information and had added much to the interest of his paper, and also the members of the Association for the welcome they had accorded him.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the session was held on Monday, November 3, Professor Attfield, F.R.S., President, in the chair.

The following officers were elected:—Vice-Presidents, Messrs. J. C. Umney and W. F. Shepheard; Secretary and Treasurer, Mr. F. W. Short; Assistant Secretary, Mr. H. D. Fuge; Executive Committee, Messrs. H. Garnett, F. F. Riches, T. M. Taylor, and E. F. Webb.

Mr. N. H. Martin then delivered the following:—

INTRODUCTORY ADDRESS.

Mr. President and Fellow Students,—I am deeply sensible of the honour conferred upon me at being invited to deliver a short address to the School of Pharmacy Students' Association, and wish that my power were equal to my desire to do justice to the occasion. When, Sir, you asked me to deliver this address, my first impulse was to refuse, because of the many duties which absorb so large a portion of my time, and also of the honest doubt which existed in my mind as to whether or not I could find anything to say which would worthily claim your attention. In the few days I took to answer your question my thoughts reverted to the time—twenty-three years ago—when I took my seat as a student on those benches, and all the hopes and fears and pleasures of that season came back to me, and fanned into flame my sympathies with and love for the student to such an extent that I could not refrain from accepting the invitation. Deep will be my regret if I have made a mistake, and if, through my error in judgment, someone or other of the students whom I now see before me, shall fail to receive from me that inspiration, that baptism of enthusiasm which he would have got had another than I occupied this position to-night. To that one and to all of you I would plead for your kind indulgence and ask you not to criticize the individual, nor to cavil at the want of literary excellence in the address, but to follow what I say, and search if haply there may be some seed of truth contained in the words which, falling on the good soil of your minds, may bring forth fruit into an abundant harvest. In such a consummation should I receive my justification and reward.

The practice of delivering an inaugural address to students is of very ancient date, and although in these latter days it has not escaped criticism, with the result that some bodies have abandoned it, the custom is still upheld in connection with many of the colleges and hospitals at the commencement of their definite college or academic course. The line of criticism has usually been that at such times nothing new can be said, and that it is so far a waste of time to repeat an oft told tale, and to say again what has been said, and better said, a dozen times before. True, gentlemen, we have no new gospel to preach, but we have to tell the old story to a new set of men, and the words we utter have never before been said to you collectively as the students of a particular school. For this reason alone I think the custom is a good one, and that it is well to continue to receive from the alembic of different minds the words of welcome, of encouragement, and of hope which it is the mission of the speaker to deliver to you.

In considering upon what subject I should address you, there were many which suggested themselves. I might talk to you about the pleasures to be found in the highways and bye-ways of science, or have gleaned from the rich fields of English literature some of its choicest flowers and presented the sweet smelling posy to you to-night. The latter would possibly have been a graceful act and a suitable return, if our business had been to receive and to pay compliments; but this is not the case, and I conceive I should be guilty of a dereliction of duty if I departed one hair's breadth from the straight and narrow path of addressing you as students of the School of Pharmacy, as members of the School of Pharmacy Students' Association, and as the future pharmacists of this country, those upon whose shoulders must in the course of time fall the mantle of pharmacy, for weal or for woe.

Let me congratulate you most heartily that you have, by your own wise choice and the liberality and foresight of your parents and guardians, solved the "to be or not to be" of a curriculum, and having decided the point so wisely, that you have determined to come to Bloomsbury Square, the best equipped and best prepared School of Pharmacy within reach, as I believe, of any English speaking student, to pursue your studies. As an old pupil of the School and a loyal son of this institution and of the Pharmaceutical Society I might descant with filial affection upon the merits of the Pharmaceutical Society's School, but it needs no praise from me, and in another place I have even offered my share of criticism towards making it more nearly approach my ideal. For all the purposes of your student life, however, the School is already perfect and complete, and if at the end of the session you have not obtained all the good you ought, the fault will be your own.

To each of you the day of your entrance into this School marked an epoch in your career, the importance of which cannot be exaggerated. I can imagine how your pulses thrilled and your hearts beat high as the time approached for you to come and take your places on those seats, and at the benches in the laboratories. Let me hope that you have taken up your task with a bearing and a seriousness consistent with the deepest intensity of purpose and with the determination of standing some day in the fore-front, side by side with the best of those who have gone before you.

You have in a school of this kind with its past associations and its present advantages the possibility of developing something of much greater importance and value than merely amassing a large amount of positive information, which may exist with a low degree of mental culture and intelligence. You are undergoing a process of training, the result of which should have an elevating and humanizing effect upon you, and tend to bring you into intellectual sympathy not only with the educated members of your own profession, but with the wider circle of that great republic of true science of which we in this institution justly claim to be members.

You are to-day the product of heredity and environment, and the circumstances under which your present condition of mental development has been attained being as various as the individuals, it follows as a necessity that you are in different states of receptivity for the education which is to be presented to you. Your teachers are men of wide experience, with their minds saturated with the knowledge which it is their business and their desire to communicate to you. They will choose the language and the phrases with consummate care; but when all that is done the words will not convey to such different minds the same conception of fact, or, in many cases, not even a conception of fact at all. I am sure I shall interpret aright the mental condition of some of you, if I assume that without a guide you have read and re-read a good many pages of botany and chemistry, with the result that you have in your brains a heap of terms jumbled together in almost inextricable confusion, and you have been tempted to cry out in despair as to what is the meaning of it all. It is the purpose of your coming here that you shall begin at the beginning, and endeavour to form a clear mental conception of it, and in doing so your teachers are ever at your side to help. They are not here to preach new and strange doctrines; they have probably nothing to teach more than can be found already printed in manuals. And yet who can value at its true worth the priceless service of the living teacher? He will not only save you many a weary march into barren lands of reading, but if you will seek his help and let him be to you the friend and guide and counsellor he wants to be, he will make sure that with your mind you understand and grasp and know that which you see with your eyes and hear with your ears. There is an intellectual blindness and deafness which can never be reached by books alone, and in such a case the voice of the living teacher is an open sesame to the meaning of the author.

You are to be felicitated upon the vastly improved methods of teaching and of demonstration now as compared with twenty years ago; and this is probably most conspicuous in the two subjects of biology and organic chemistry. When I was a student we had no practical work in biology, and in the lecture-room small hand-microscopes were handed round with a mounted slide of a cell or of some cell contents; but I will confess to you that even after I had passed the final test of the Major examination, I knew very little more about internal morphology than to be able to answer any question on the subject in the language of the book. For you all this is changed, and you work with razor, dissecting needle and microscope, and the life-history of the cell is no mere abstraction of your mind, but it has become a living tangible entity. The same occurs in organic chemistry. With us it was the chemistry of the carbon compounds, and a long string of substances were classified according to whether the molecule was found to contain any given number of atoms of carbon from one upwards. Now when your minds have grasped the elementary principles and facts of organic chemistry, each compound falls into an orderly sequence, charming in its simplicity and valuable in giving so much information as to qualities and properties.

With regard to books it is not a part of my duty to recommend to you individual authors or specific text books; your teachers will do this. But let me caution you to avoid the books of second and third rate authors, who are generally feeble and incorrect, and advise you to go to the fountain head of those who are original for your knowledge. Even then, accept no statement as fact which it is possible for you to verify, merely because it is in your text books, but learn as much as possible direct from the object and from nature, using your book merely as a finger-post to suggest to you what to observe and to know. In this way, having determined for yourself the accuracy of a statement, you have impressed the fact upon your mind and made it educationally of far more value than by merely committing to memory from written sources a score of paragraphs.

In your studies you will come across many technical terms which are new to you, and which it may be your classical knowledge will not enable you to refer to their origin. In every such case consult a good dictionary, and having got the roots and derivatives of the word commit them to memory. This is laborious at first, but you will be rewarded not only in the power which it will give you to recognize and understand the meanings of other combined words from the same root, but it will enable you to use such words and terms with a clear conception of their meaning invaluable to the scientist.

You are students of the first session since the publication of the extended schedules of the examinations, but I hope that this will not lead you to think more about the requirements of the examiners, than you do about acquiring a sound knowledge of the subjects. If it does, the result will inevitably be that you will exert your powers in the direction of crowding your brains with details to be reproduced in the examination room, rather than to obtain a broad grasp of principles and of science. You are naturally anxious, and well you should be, to exhibit to your friends such evidence of your having been diligent during your period of study as may be indicated by an examination certificate, but let me say to each one of you, if you have worked honestly and have taken reasonable precautions to ascertain that the area of your work is commensurate with the area of the examinations, do not be afraid of being plucked. The best systems of examination are not quite infallible. Better, a thousand times better, for the honest manly student to be plucked in consequence of the failure of the machinery of the examination to be able to pass him, than for a well crammed ready witted ignoramus to be passed. It is the ambition of some of you to pass your Minor and Major examinations in one session. And if the work which you have done before coming here enables you to do this satisfactorily, all is well; but if not, my advice to you is to work on for the work's sake, and do not fret yourself whether you are ready for the Major examination in July or not. If you are really learning and acquiring that education of your minds which will develope your intelligence and give you the real power to think and to do things rightly, never be afraid to trust to a period of digestion after your full meal, and come back to present yourselves at a future day to the Board of Examiners. But do not on any account fail to come back and pass the Major, or any other higher examination which the Pharmaceutical Society may require. Even then do not regard the examination as the consummation of your training. Your true way of advancing your position, of keeping yourselves alive and alert amidst the circumstances of your future career, will be to regard the certificate of having passed the Pharmaceutical examination, as a mere indispensable guarantee of competency and not as a scientific distinction. True distinction in your calling must be sought for from other and wider sources.

The man who has deliberately prepared himself for the examination, with the intention of treating the certificate as the climax of his attainments is dishonest to himself, a disgrace to the Society, whose guarantee of competency he has obtained, and a fraud upon the public.

I have now to speak to you as members of this Association, the object of which I see by your rules is "to promote study and original work." For students of the first year the first part of this two-fold object is the more valuable. We often hear of a solitary student. There are times and seasons when a student must do his hardest brain work alone, and without help; but he is not wise if he does not seek opportunities to bring his studies to the touchstone of other intellects, that all sides of the truth may be viewed and discussed. In this way he will receive the assurance that he knows the truth about the subject, and that it has not been perverted or warped by the initial bias of his own mind. The Association gives you these opportunities, and "as iron sharpeneth iron, so a man sharpeneth his friend;" and so you, gentlemen, in mutual discussion of the difficulties which present themselves to you, will find that new thoughts will be struck out from the "flint" of one student's mind by the "steel" of another student's remark. I should advise you to make notes of all difficulties in theoretical, as well as in practical work, and there can be nothing more valuable than to bring them to a meeting of the whole of the students for discussion and elucidation.

With regard to the other part of your object, "original work," I see the Association is composed of "past" and "present" students. I hope the former is the class who concern themselves most with original work and that the "present" students bend their energies towards acquiring a knowledge of the known before they venture to explore the regions of the unknown. This is not said to damp your ardour; there is work to do, discoveries to make, honour to win; but if you have the spark of genius your original work will be all the better the more prolonged and careful the preliminary training, and the world can wait. Even when you become a "past" student, and keep up, as I hope you will, your connection with this Association, do not write papers for the mere sake of writing or publish inconclusive and immature results merely because you are asked to do so. It is one of the drawbacks of conferences, societies and associations which hold periodical meetings, as well as of periodical literature, that the necessity for pabulum creates the supply, and we have so many papers concluded with "the author regrets that the time at his disposal has not sufficed to enable him to complete his experiments;" if he had, gentlemen, the paper might never have been written. Work, work, work, and if you are fortunate enough to make discoveries or to see old truths in a new light which may be useful to your fellow men, publish, but if not do not be tempted or goaded into the publication of unfinished results.

Before alluding to your future as pharmacists I should like to say a word as to the provision which the Council of the Pharmaceutical Society has made for the continuance of your education in this building. I allude to the Research Laboratory. The Pharmaceutical Council, in the desire to promote education always leans to the side of liberality and generosity. The Research Laboratory is a good thing, and if men who have leisure and means and the love of their work will come there great good will ensue. But for that purpose a second year's complete academic course in all the subjects of the School should, in my opinion, be taken. In some session I should like to see a group of half a dozen students send in a memorial, to the Dean of the School, to the effect that they were willing to pay the full fees over again and to remain here a second year if he and his colleagues would give them an advanced course of instruction.

Although I fear I am rapidly approaching the limit of your patience, I feel I shall not have discharged my duty unless I refer to the future of pharmacy in your hands. In the almost universal complaint about hard times and unrewarded merit, it would be a strange thing if pharmacists were absent, but to those who look at the dark side of the picture and by so doing suggest to the rising generation that the prospect, from a pecuniary point of view, is not worth the time and money spent in education, I should like to ask what educating and qualifying body does guarantee to its graduates and examinees the certainty of even a livelihood, much less of a competency, as the result of the examination. Who has not heard of "briefless barristers" and "impecunious clergymen," and there are members of the sister profession of medicine whose services are ofttimes ill-requited. This is a question which may legitimately occupy your thoughts before you decide on your choice of a calling, but having decided to embrace pharmacy, your paramount obligation is to become competent to discharge its duties.

Success or failure must largely depend on the individual, but if any of you look forward to money as the standard by which your success is to be gauged, I am afraid I cannot promise you a brilliant future. There is no room in pharmacy for the application of the current jargon of commercial life, "to buy in the cheapest market and sell in the dearest," to turn over your stock quickly, so that you may have "small profits and quick returns." With regard to the first of these axioms the primary duty of the pharmacist is to make sure that every article he receives into stock is the best and purest of its kind which he can obtain and that is absolutely antagonistic to "buying in the cheapest market." As to the second axiom, if the pharmacist is properly equipped to perform his duty to the community in which he lives, he must keep in his stock many articles to be ready for any emergency which may happen, but which things are not required perhaps once in a lifetime and may even have to be destroyed and the stock renewed before they are required at all, so that it is equally impossible for the honest pharmacist to command the "quick returns." No, gentlemen, so far as mere money is concerned and the evidences thereof, you must be content to see the butcher, the grocer, the draper, the tailor, and most other trades go past you and make fortunes, and if you envy them or feel tempted to imitate their methods, it is a pity you ever embraced pharmacy.

When you go into business and become principals, the thing above all others I should like to impress upon you is to have "patience." The training which you have received and the services which you are prepared to render to the community are valuable, but your neighbours will not appreciate this all at once. You must be prepared to wait and to win by slow and sure degrees the respect and confidence of your clients, and in doing so you may demand to be paid a reasonable sum for your services. England is a wealthy country, and we are surrounded in every town and village by those who spend more on idle luxuries than they do on drugs, but they do not and will not grudge one fraction of what they spend on the latter if they have confidence that they get the best.

Trust absolutely to education and it is certain that as ignorance and superstition disappear before it, so will the credulity of the public in quackery disappear and the handling of medicines will return to the trained individual.

At the conclusion of the address the Chairman proposed a vote of thanks to Mr. Martin, which was seconded by Mr. J. Ince and carried with enthusiasm, Mr. Martin having replied and the thanks of the meeting having been voted to the President, the meeting adjourned.

Provincial Transactions.

THE PHARMACY ACT AMENDMENT BILL.

Discussion at Sheffield.

A meeting of the registered chemists and druggists of Sheffield and district, to discuss the draft Pharmacy Act Amendment Bill, was held on Wednesday evening in the lecture room of the local Pharmaceutical Society's premises. The President of the Society, Mr. J. H. Bradwall, was elected to the chair, and among those present were Councillors J. T. Dobb and J. M. Furness, Messrs. G. Ellinor, J. F. Eardley, A. R. Fox, E. R. Learoyd, Job Preston, G. T. W. Newsholme, J. Appleton. G. A. Grierson, H. E. Ibbitt, A. Fallding, E. Willis, P. Davy, C. O. Morrison, W. Ward, E. Haining, D. A. Cargill, X. Jepson, J. H. Hewitt, G. H. Lodge, Robert Watts and F. Wood.

The Secretary reported that letters apologizing for absence had been received from Mr. Howarth (Doncaster), Mr. R. Greaves (Cemetery Road), Mr. Tompkin (Barnsley), and Mr. Windle (Chesterfield).

The Chairman said the council of the local society, in arranging for its monthly meeting, thought the subject of the Amendment Bill was sufficiently important to warrant it being considered by a general meeting of the registered chemists of Sheffield and the neighbourhood. As they knew, the Pharmacy Act proposed to be amended had been in operation for twenty-two years, and the Council of the Pharmaceutical Society of Great Britain had come to the conclusion that it was time there should be fresh legislation. He believed that opinion was very generally held by the pharmacists and chemists and druggists. The Act referred to had been called in very high quarters "The Poisons Act," and the draft Amendment Bill, prepared some few years ago, was commonly known as "The Curriculum Bill." They had all been looking forward to obtaining further legislation, being anxious to conduct their business in a manner satisfactory to the public, the law, and to themselves.

The Secretary, in reply to Mr. Dobb, said he received forty copies of the draft Bill and sent them to those who were not members, relying on the members getting the *Pharmaceutical Journal* or the *Chemist and Druggist*.

The meeting then proceeded to deal with the clauses of the Bill *seriatim*.

On clause 2 Mr. Preston said he was afraid he should occupy a somewhat anomalous position, because the Council of this Society, of which he was a member, had unanimously approved of the Bill. He intended to swing pendulum-like on some matters, not with any disrespect to the resolution of his colleagues, but in order that the clauses of the Bill might be well discussed. He then proceeded to eulogize the principle of the clause, but pointed out that it would operate rather hard upon country chemists, fearing that it would prevent their taking apprentices at all, because of the difficulty of allowing them to have the prescribed course of study.

Mr. Haining remarked that at present apprentices came to the Sheffield School of Pharmacy from Worksop, in Nottinghamshire.

Mr. Preston went on to say they did not know what the curriculum might be in the future. It might happen that the ruling body would require such stringent regulations to be conformed with that many who had hitherto been legally recognized, could not get within the conditions.

Mr. Ellinor was surprised that so much had been made of this point of the country chemists, seeing that in the smaller towns there were both medical men and dental surgeons, and that they had a compulsory curriculum. These did not complain about inconvenience and all the rest of it, and their curriculum did not prevent them taking apprentices at such places as Bakewell. A dentist had a curriculum, and why should not the chemist?

Mr. Haining said the Bill stated definitely that it had to be shown a candidate for examination had duly attended a course of instruction in chemistry, botany, materia medica, and so on. That should be quite sufficient for Mr. Dobb.

Mr. Newsholme admitted that there would be some little hardship with regard to apprentices in the country, but if they, as a body, were to advance at all they must do something to merit confidence. With regard to the curriculum, Mr. Preston had more than once held it up as a sort of bugbear to the trade throughout the country. He should like to point out to him that although the curriculum would in the first instance be defined by the Council of the Society, it would have to be read at three meetings of the Council, and at a special general meeting of the Pharmaceutical Society, and also approved by the Privy Council. So he failed to see what possibility there was of the Council of the Society hoodwinking any member of the Society or anyone who wanted to come in.

Mr. J. M. Furness: Is that the general law, that it shall be submitted to the Privy Council?

Mr. Newsholme: Yes.

Mr. Dobb said of course it was a difficulty, but it applied to every scientific society. They could not have professors in country villages, and he believed that the object of the Society was to promote the establishment of schools of pharmacy in different parts of the country. He hoped these schools would increase to a large extent, because they saved students the heavy expense and trouble of going up to London to study.

On the motion of Mr. Ward, seconded by Mr. Newsholme, the clause was approved of.

When the fifth clause was introduced Mr. Newsholme, replying to Mr. Dobb, said if it were passed it would not compel the payment of an annual subscription to the Society.

Mr. Learoyd proposed the adoption of clause 6 with great heartiness. He said it would have the effect of bringing in many who had not been subscribers to the Society, and there would be one united body. It might appear an act of graciousness or condescension to take in associates, but he was strongly of the opinion that if the Society was going to advance and be a real power, it should have all fully qualified men within its borders.

Mr. Lodge seconded, and Mr. Appleton supported the proposition.

Mr. Ellinor approved of the clause, but he said the pharmacists should not be blamed for what they did not beget. The door had been opened many times, and he was willing it should be opened again. It was the chemists and druggists who "abandoned their children."

Mr. Dobb boasted of what the Sheffield chemists and druggists did many years ago in protesting against the action of the pharmaceutical chemists of that day.

Mr. Furness moved as an amendment that the words limiting the number of members on the Council of those who were not on the Register of pharmaceutical chemists to ten be deleted. He contended, seeing how large the number of chemists and druggists were, that they should not have their representation in the Council limited, but that it should be left to the general constituency.

Mr. Wood seconded the amendment.

Mr. Learoyd admitted that Mr. Furness had raised an interesting point.

Mr. Newsholme said there were about four thousand inside the Society and about ten thousand out. There was nothing offensive about limiting the number of representatives to ten. But it should be remembered that the pharmacists were the founders of the Pharmaceutical Society; they found the money, had run it, appointed examiners and conducted the examinations. The chemists and druggists had simply held aloof, and although they had the opportunity of having seven seats on the Council they had not availed themselves of it. Therefore they ought to look upon it as magnanimous of the Society to give ten seats to the chemists and druggists.

Mr. Furness said the reason why the privilege of occupying seven seats had not been exercised was that the associates had never had the opportunity of sitting on the Council. Still, he could not see why the proposed embargo should be placed on them.

The clause was adopted by a considerable majority.

Mr. Ward moved the passing of clause 7. He remarked that for some time he had the impression that it should read "person or persons," but he had altered his opinion after reading the magnificent speech of Mr. Carteighe at Manchester. If they attempted to extend the operation of the clause they might jeopardize the Bill.

Mr. R. Watts seconded the motion.

Mr. J. M. Furness said he would not oppose the clause, and there could be no doubt whatever that had it read "person or persons" it would have been an ideal clause. The President's speech at Manchester was based upon the section of the Act of 1868, in which it was enacted that the widow of a deceased chemist and druggist might carry on the business of her husband with the assistance of a qualified man, and he urged that limited companies should logically be allowed to do the same. Well, he (Mr. Furness) could not see the logic of this argument, and considered it was cowardly that limited companies were not attacked in this clause of the Bill. He would prefer the widow of a deceased chemist should only be allowed to carry on the business till her husband's affairs had been wound up, rather than that their profession should be impaired and the safety of the public endangered by the existence of companies which were being established on all sides.

Mr. Learoyd said they were not met to discuss about trading, but to consider how they could improve their professional status. When the President spoke at Manchester about interfering with stores and that sort of thing, he had in his mind the proprietors of stores as trading firms, and did not regard them from the professional standpoint.

The remaining clauses having been adopted,

Mr. Preston said with regard to clause 7 the public might be thankful to the Society for taking such care of them, and to consider that they were acting very generously in supporting the Bill when they remembered the opposition which chemists and druggists would have to meet with as the result of this clause. He moved the following resolution:—"That this meeting of registered chemists and druggists of Sheffield and district entirely approve of the Pharmacy Act Amendment Bill, and is of opinion that the Pharmaceutical Society is deserving of the support of the entire trade, and hereby pledges itself to further the same."

Mr. Ward seconded the motion. In doing so, he said he should like to have seen the Bill contain some further provisions, but it was wise to secure what it was possible to get.

Mr. Grierson expressed the opinion that the 7th clause was the finest in the Bill. Chemists and druggists had, he said, been crying out for protection for years, and the protection given in this clause was as much as they were likely to get and as much as they could reasonably ask for.

Mr. Furness said he was desirous of moving an amendment. He should not like it to go forth that the chemists and druggists of Sheffield were unanimous, because he believed the bulk of them were not. All the members of the trade he had spoken to had expressed some doubts, and there was certainly not that unanimity of opinion which seemed now to prevail in the meeting. His amendment was, "That this meeting is of opinion that the Council of the Pharmaceutical Society, in repeatedly proposing Bills for the amendment of the Pharmaceutical Act, does not do justice to the trade or give proper protection to the public by neglecting to insist on the personal responsibility and individual qualifications of every person carrying on the business of a chemist and druggist; also that an amended Pharmacy Act should contain a provision for an unrestricted representation on the executive of all examined men in business." He argued strongly against the competition of limited companies, and said personal qualification should be essential for every proprietor of a druggist's shop.

Mr. J. T. Dobb seconded Mr. Furness's amendment.

The Chairman expressed his agreement with Mr. Furness as to the competition from the stores, which they all experienced, but supported the original motion.

On the amendment being put it was found that only seven members supported it, and the original motion being put was carried by a considerable majority.

The meeting was then closed with a vote of thanks to the Chairman.

MEETING OF CHEMISTS AND DRUGGISTS AT BRISTOL.

A meeting of the chemists and druggists of the locality was held on Tuesday, November 11, at the University College, Bristol, to discuss the provisions of the proposed "Draft Pharmacy Act Amendment Bill."

Mr. J. W. White, the President of the Bristol Pharmaceutical Association, was requested to take the chair.

Mr. Schacht, acting as secretary, announced that he had received three communications from gentlemen expressing regret at not being able to attend.

The Chairman then rose and said the Bill might be described as a modest measure in some respects. Its framers had apparently proceeded on the belief that it was better to make tolerably sure of a little beneficial legislation than to risk a more ambitious scheme and perhaps get nothing. Very probably the Bill would not satisfy the aspirations of the trade; but it was to be feared that the yearnings of the struggling druggist were ever toward the attainment of a monopoly more or less complete; ever hoping that such restrictions might be placed upon the sale of drugs that the whole business might be lodged in the hands of his craft, and the competition from grocers, oilmen and so on entirely disappear. And when one considered the condition of pharmacy in nearly all other civilized countries of the world one could not feel surprise that his brethren entertained a longing to share the great advantages enjoyed abroad. In England, however, it was hopeless to attempt legislation on those lines. It was useless to introduce to our legislators any project that could not be distinctly shown to make for the good of the entire community rather than for the benefit of a small section. After briefly reviewing the clauses of the Bill, which he said were calculated to be of material service to the trade, Mr. White proposed, and invited discussion upon, the following resolution:—"That this meeting declares its cordial approval of the provisions of the 'Draft Pharmacy Act Amendment Bill,' and promises support to the Council of the Pharmaceutical Society in its efforts to pass it into law."

The motion was seconded by Mr. Berry.

The discussion was continued by Messrs. Stroud, Plumley, Turner, Chandler, Keen, and Williams.

The Chairman then called upon Mr. Schacht, who could perhaps explain the views of the Council of the Pharmaceutical Society on the points raised.

Mr. Schacht said he was glad to find from the discussion that had taken place a general approval of the proposed Bill as far as it went. With regard to some of its suggested deficiencies he wished to say that he sympathized with them very much himself, and believed that many of his fellow councillors of the Pharmaceutical Society did so with equal earnestness. He referred especially to the smallness of the penalty against old and repeated offenders, to the limited character of the poison schedule, and to the uncontrolled sale of poisonous patent medicines, and he assured those who had spoken on these matters that they had all been anxiously considered by the Council, and that he believed some at any rate were in process of rectification by other and better methods than by fresh legislation. It had been further suggested that a clause should be introduced making it illegal for any fresh limited liability company to carry on our business. He was bound to say that he thought it now hopeless to attempt to pass such a clause. The fiat had gone forth that the public safety was secured in the due qualification of the man who dispensed or actually handed over the poisonous article, and the attempt to throw the responsibility of the transaction on the employer of the assistant had failed. Much as some might regret the fact, such was now the accepted view of the Courts, and the only course was to make the best of it. One way of turning it to account had already been named. All alike, pharmacists and companies, must employ registered assistants. If no registered assistant would accept employment except with a registered pharmacist, the matter would be settled. This appeared to him an excellent suggestion, and he wished every examined assistant would adopt it as his rule of life; but a little thought would show that no clause having such an object could be introduced into an Act of Parliament. The subject must remain a question of moral duty on the part of young pharmacists themselves. Much was now in their hands, and he hoped they would adequately feel their responsibilities.

It had been hinted by more than one speaker that pharmaceutical legislation, even including this projected Bill, did not secure to the pharmacist the full privileges to which his sacrifices entitled him. Here he ventured to differ from those who had so expressed themselves. He thought if they gained the exclusive right to vend and dispense poisons, the exclusive right to dispense physicians' prescriptions and also the right to claim exemption from jury service, they had good compensation for all their labour bestowed in qualifying.

Finally he would urge upon them all the absolute necessity, moral as well as legal, of making that qualification real and full, so that every professed pharmacist might be worthy of the trust and confidence of the public; and as to the matter formally before them he hoped all who entertained even strong opinions upon minor points of policy would deem it wise at the present moment to ignore them and to do their best to help the Council of the Pharmaceutical Society to help the trade.

The motion was put from the chair and carried unanimously.

A vote of thanks to the Chairman terminated the proceedings.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The first ordinary meeting of the session was held on Thursday, 23rd ult., the Vice-President, Mr. J. R. Johnson, in the chair.

There was a large attendance of members.

A paper was read—

ON PLASTERS AND PLASTER SPREADING.

BY T. S. WOKES.

As one of the objects of our Society is the introduction (by paper or otherwise) of such subjects of trade or professional interest, as are met with in everyday pharmacy, I thought that a short paper on the subject of plaster spreading might be of some interest to our members and friends.

The extensive introduction of machine spread plasters has taken a great amount of practical work out of the hands of the retail chemist of to-day. One result of this is that the majority of apprentices and assistants do not get sufficient practice to enable them to become anything like proficient in the art of spreading a plaster.

This is evidenced by the fact that the average candidate for the Minor views the prospect of having a plaster to spread during his examination with considerable apprehension. This lack of opportunity for much practice is a misfortune which the bulk of Minor students endeavour to surmount by extensive practice on brown paper, which is certainly an inexpensive method of acquiring some skill in wielding the plaster spatula. Many men who are now qualified have to thank their brown paper efforts for most of the skill they possess.

In spreading a plaster the chief object to be aimed at is to use the least possible amount of heat. This holds good in all cases, though of course the medicament and other substances of which the different plasters are composed, vary in their liability to be affected by heat. We have one instance in which heat must not be used, namely, Emp. cantharides, which is spread with the thumb, etc. Belladonna and opium require the least amount of heat, containing as they do principles which are liable to be affected by high temperature. Any method, therefore, which tends to keep down the temperature at which plasters are spread is worthy of serious consideration. I will speak of this again when treating of the different methods used in the melting of plasters.

On having a plaster given you to spread, the first thing that occupies your attention generally is the medium on which it is to be spread. So we will consider that first. Blisters are invariably spread on *adhesive* plaster (that is lead or resin plaster spread on thin glazed calico). They are sometimes ordered to be spread on adhesive swansdown, or other material; and in public institutions they are even spread on brown paper (as mentioned by Dr. Whitla in his well known work), this latter material being used because of its inexpensiveness. The best material is undoubtedly the adhesive plaster which I first mentioned.

Ordinary plasters, unless otherwise ordered, are spread on prepared sheepskin, known as "plaster leather." Certain plasters are ordered to be spread on chamois leather, particularly those for the breast, and when intended for use in bandaging (in the latter case a large piece being spread and afterwards cut into the requisite size); chamois leather being particularly adapted for such cases on account of its great pliability and softness. I might mention here that these qualities render it much more difficult to spread.

Other materials are very occasionally used.

Plaster-Shapes.—These are invariably made of paper, cut to the requisite size and shape. Zinc shapes of definite sizes can be purchased cheaply, and are useful for those who spread their own stock plasters. The method of marking and cutting out the paper shapes, requires little explanation, but I would draw your attention to one or two points. The first is the width of the shape, which regulates, as you will observe from this model, the width of my margins, which is one inch for all plasters over a certain size (such as four by six inches). This shape is exactly an inch wide, and after spreading my plaster, before taking off the shape, I trim the leather to the outer edge of the shape. The *second* is the treatment of the corners, some leaving them square and others cutting the angle off. My custom is to round the corners of both plaster and margin, which I do by the aid of a coin on the shape.

For attaching the shape to the leather, etc., water is generally used, and with certain exceptions is undoubtedly the best. In those cases in which water is found not sufficiently adhesive, a little soft soap is perhaps the best.

The plaster spatula is a familiar object to most of us. The one generally used is very antique. It is made of iron, the blades varying in length from a little over two inches to five inches. There are several improved forms of the old plaster spatula, perhaps the best of them being the one I now show you. The principle of it is that it is self heating, the handle and blade being hollow, enabling it to be connected by means of an indiarubber tubing to a gas supply. It has a number of minute holes on its upper surface; when required for use the gas is ignited at these, and the number of small jets produced effectually warm the spatula. This self-heating spatula, which is made of brass, possesses undoubted advantages over the old fashioned iron one, seeing that with proper care it can be kept at an even temperature for any length of time, thus obviating the necessity of rewarming the spatula when an extensive surface has to be spread.

In melting the plaster one of two methods is generally followed, the old fashioned way being to melt sufficient plaster by pressing the warm spatula against the end of the roll of plaster and allowing it to fall on a piece of card or strong paper, and then transferring it by means of the spatula on to the leather or material to be spread. A newer method is to cut off from the roll sufficient plaster and melt it in a small evaporating dish by means of a spirit lamp, using the least possible amount of heat. Each method has its advantages and disadvantages. The majority, who have always followed the old way and, perhaps, have never tried the new, argue that their way is quicker and cleaner. In spreading small plasters it doubtless is, and if the spatula is not made too hot in the first instance, there is nothing that can be reasonably urged against it. For large plasters, however, this method has its serious objections. In the first place the spatula has to be made hotter than usual in order to melt the large amount of plaster required. And again, the time occupied in rubbing off the requisite amount of plaster allows some of the melted plaster to become partially set, and therefore requires additional heat from the spatula to remove it on to the leather, necessitating either the rewarming of the spatula or the use of a second one. This is a decided disadvantage, as the colour of many plasters is affected by varying temperatures. The plaster soon shows this.

The newer or second method, while on the one hand giving more trouble and occupying a little more time, has the decided advantage of enabling you to have, at once, the whole of your plaster melted at an even temperature. So that the spatula can be used at a lower temperature, and, as a result, a fair sized plaster can be spread without any rewarming of the spatula, or the use of a second one. This great advantage must be obvious to all of us.

Never melt the plaster directly on to the leather, for one or two reasons. The spatula might be too warm and so discolor the plaster, and the hot plaster collected in one place is apt to show colour at the back of the plaster. Select your leather, etc., with as even a surface as possible, as all defects in the leather will be reproduced in the plaster. Begin spreading your plaster with firm, quick strokes, from left to right, taking care to get the corners properly and evenly covered. Belladonna plasters are now frequently ordered to be spread on wash leather, and I have two samples here to show you, as they illustrate first the inadequate adhesiveness of water in using the shapes, something more adhesive being necessary. In this instance I used a little soft soap. Secondly, I wish to point out a disadvantage in the use of the soap. It stains the margins, and something that answers equally well, without staining, is desirable.

One of the breast plasters shown has a section taken out to enable it to adapt itself better to the part for which it is intended.

In concluding these short notes I will just add that the best results are not always turned out with the most convenient appliances. The thing most necessary to turn out good work in plaster spreading is practice, without which the most convenient appliances are not a success. With it the best work is turned out with the most antiquated appliances.

Those gentlemen who have wielded the spatula with the happiest result have, in my experience, been one or two oldfashioned operators, who have had plenty of practice in their younger days, when the spreading of a plaster was an everyday occurrence.

It would be a little bit too conservative on my part to ignore the undoubted convenience of modern appliances.

Some of you may think that if our predecessors had had the benefit of them they would have turned out still happier results.

Mr. Wokes then showed a small gas furnace for heating the iron plaster spatulas kindly lent by Messrs. Maw, Son and Thompson; also some spread pitch plasters, illustrating a fault sometimes made in spreading them, caused by not taking the shape off immediately after spreading, therefore bringing away a little of the edge of the plaster with the shape.

The paper was listened to with great attention, the President, in proposing a vote of thanks, remarking that practical papers of this kind were of more use than elaborately got up essays, and urged members to bring forward papers upon subjects of everyday occurrence.

The third meeting of the Session was held on Thursday, 6th inst., Mr. W. Brinson in the chair. A paper was read by Mr. J. R. Johnson on "Protophyta."

Mr. Johnson commenced his paper by showing the analogy between the most elementary vegetable and animal organisms, and the difficulties experienced by biologists in assigning them to their proper kingdoms. The characters necessary for referring an organism to either kingdom were then sketched out. The paper proceeded to deal more fully with each class of protophyta, tracing some of the various forms in the scale of development. The paper was illustrated with lantern slides, exhibiting the appearance of microbes, bacteria, bacilli, etc., their life histories, connection with diseases, putrefaction and ptomaines being described. Other minute forms of fungi and algæ were discussed, and at the conclusion of the paper microscopic slides of various diatoms were exhibited.

The next meeting will be held on Monday, November 17, when a paper will be read by Dr. George Tate, F.C.S., F.I.C., on "The Use of the Microscope in Chemical Analysis."

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The first ordinary meeting of the above Association was held in Waterloo Rooms on Wednesday, Oct. 29, Mr. Jas. Robb presiding, when Mr. Alexr. Laing read a paper on "The Charms of Science." In the course of his remarks Mr. Laing said the object of science was to grasp facts and pin them down; but facts did not stand forth always pure and unadulterated, hence there was great difficulty in isolating absolute truth. It was only in these days that science had been able to break from old trammels and lay truth to truth and make a revelation more wonderful than any fairy tales which were ever written. Mr. Laing thought it due chiefly to the chemist that so much progress had been made, as it was he who declared, *ex nihilo nihilum fit*, and the indestructibility of matter was the chief pillar in the temple of science, as it set the mind free so that it could peer into the dim past and dissipate its gloom, utilize the present and anticipate the future. He then adverted to the labours of the geologist, the nebular hypothesis of the creation of worlds, the rise and progress of life revealed in different rock formations. One science led on to another, or they beautifully interlaced and enhanced the charms of each other. Biology was a field of great interest; from the lowest form of animal life to the highest they had birth, marriage, and death in common, and *omne vivum ex vivo* held good throughout. Botany might beguile them into the country, and in studying the flowers they would be brought into association with many curious insects, and in learning to know them by name and nature they would become more attractive and alluring. In concluding his essay Mr. Laing said, in these days of education and enlightenment how necessary, at all events, how becoming it was for young men to have intelligent ideas concerning the world they live in, and its relations with other spheres.

Some discussion followed the reading of the paper and a vote of thanks was awarded to the author.

The ordinary meeting of this Association was held on Wednesday evening the 5th inst. Mr. A. Laing presided. The minutes of former meeting were read and sustained. Mr. Robb read a paper on "Sir

Robert Christison." Reference was made in introducing the subject to the opportunities for scientific research afforded to one whose life extended over the first eighty years of the present century, which had been so remarkable for achievements in all the arts of peace. Sir Robert Christison reached manhood just as the period of peaceful progress began and after the warlike period which terminated with Waterloo. He was born in 1797, and claims to have had "a pirate at one end and a robber at the other" end of his line of descent. He was also a son of the city and university of "Modern Athens," and reaped all the advantages of such a connection, being educated first at the high school and afterwards at the university, of which his father was then one of the professors. During his "arts" course he also studied chemistry and botany, and had to supply practical chemistry and field botany in conjunction with some kindred spirits, neither being then taught in the University "of Edinburgh or, indeed, anywhere else in the United Kingdom." When his arts course was finished circumstances prevented his own desire to become an engineer being given effect to. He chose medicine instead. From the beginning he showed his preference for the medical over the surgical department of the healing art and remained loyal to his choice throughout. His studies were pursued under—among others—Munro, Hamilton, Duncan and Gregory, for the last of whom he had particular respect and admiration. After a profitable and happy residence of three years in the Royal Infirmary he proceeded to London to study in the hospitals. In St. Bartholomew's he had many opportunities of putting his already acquired knowledge to use on account of the medical practice there being "the oddest possible;" but he learned nothing. In surgery his experiences were similar, and his praises of Abernethy are due to that surgeon's practice being "conservative surgery," the only kind that Christison had the least sympathy with. In his consulting practice Abernethy's methods were more those of a physician than a surgeon. For the purpose of adding to his "Scotch grinding a little French polish," Christison proceeded to Paris. "As in London, so in Paris, he got no lesson in medicine" or surgery. With chemistry the case was altogether different. This science was being pursued with great energy and success in Paris at that time. A chair of pharmacy had been newly instituted and was occupied by Dumas. A few of the alkaloids had been discovered, and a boundless field was opened up to the imagination of the ardent young Scotchman, who was brought into contact with, among others, Laplace, Cuvier, Ampère, Pelletier and Orfila. His studies were conducted under Robiquet, who like "all the eminent analysts of Paris" was a druggist, and whose establishment "consisted of his 'Pharmacie' or drug shop and his scientific 'Laboratoire,'" which were, however, quite distinct. With great pleasure and profit to himself, as well as satisfaction to his teacher, Christison pursued first proximate and afterwards elementary organic analysis. In both departments great improvements had lately been made by French chemists in the methods and apparatus employed. In both branches opium and its alkaloids were the subject of his researches. Having followed Christison through the steps of his education the essayist proceeded to notice that part of his work which was more or less connected with the calling of those present. Shortly after his return from Paris he was appointed to the Chair of Medical Jurisprudence, and during his incumbency of it chose toxicology as the branch of his subject which offered an almost uncultivated and promising field of study. In this connection his work on oxalic acid, arsenic, laburnum and elder poisons, etc., was noticed. His work in materia medica and pharmacy was then passed in review, and reference made to his contributions on such drugs as opium, rhubarb, coca and gamboge. Those desiring to become better acquainted with this branch of his work were recommended to consult his 'Dispensatory,' in which most of his work is recorded. Similarly his 'Poisons' had been recommended as even yet a standard work on toxicology. His eminence in pharmacy, shown in the 'Dispensatory,' was recognized by his being made Chairman, first of the Committee which prepared the last Edinburgh Pharmacopœia, and also of that to which the preparation of the first B.P. was entrusted.

His early recognition of the importance of ascertaining the physiological effects of pharmaceutical preparations led to his advocacy and practice of vivisection under proper precautions being referred to, and also his experiments on himself with coca and calabar bean. From an over-dose of the last he only saved himself by drinking the water he had been using in shaving. The simplicity of his prescriptions was also referred to, his endeavour being to "secure that as few remedies rather than as many as possible should be in operation at once." His goodwill to pharmacists and the measures he considered for their benefit were shown by reference to his address to the Society in Edinburgh, as recorded in the Journal at the time and quoted on the occasion of his death in 1882. His fondness for mountaineering, his confidence in himself, his patriotism, his devotion to his city and university and his sterling character were referred to in conclusion, as well as to the rewards bestowed on him by his sovereign, his political opponents, universities and scientific societies. The essayist urged his hearers to make the motives which actuated Sir Robert Christison the guide of their endeavours. Their reward might not be equally conspicuous, but it would be not less valuable.

The criticism which followed was taken part in by the Chairman (Mr. Laing), Messrs. Gilmour, Robertson, Scott, Bruce, Blair, etc. The speakers expressed high appreciation of Sir Robert Christison, both on account of his personal character, scientific researches and the literary style which marks his record of the work which he did.

A vote of thanks to the essayist closed the meeting.

The next meeting will be held on Nov. 19. Subject, "Spiritus Ætheris Nitrosi," by Mr. Robertson.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the thirteenth session, being the first open meeting, was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, Nov. 5, at 9.15 p.m., Mr. Donald McEwan, President, in the chair.

The minutes of last meeting having been read and approved the Secretary read the report of the committee on the Association Prizes Competition. Four competitors had entered for examination and had made a very creditable appearance. The prizes had been awarded as follows:—First prize (value £2 2*s.*), to Mr. Alexander Murray, 139, Princes Street, with 95 per cent. of marks; second prize, to Mr. Alexander Cruikshank, 56, Newington Road, with 90 per cent. of marks; third prize, to Mr. William Smith, 119, George Street, with 86·5 per cent. of marks. Only one essay on the botanical excursions had been sent in, and it was judged of sufficient merit to obtain the special prize offered by the Secretary, which was therefore awarded to the author, Mr. Alexander Murray, 139, Princes Street.

Mr. J. B. Stephenson, Chairman of the Board of Examiners for Scotland, then presented the prizes to the successful candidates, the first prizeman receiving a class ticket for Dr. Stevenson Macadam's lectures on chemistry and a copy of the 'British Pharmacopœia;'

the second prizeman, Bentley's 'Structural Botany,' 'The Art of Dispensing,' and Balfour Stewart's 'Physics,' and the third prizeman Squire's 'Companion to the B.P.' Mr. Stephenson said it gave him great pleasure to accede to their request that he should present these prizes. It was a deeply interesting thing for an older man to come among a company of younger men. He never did so without being reminded of the saying of an aged statesman by which he had been greatly struck at the time it was uttered a few years ago. He had said he never viewed an audience of young men without being filled with a strong feeling of yearning induced by the thought of the infinite possibilities of good and success, or of failure and dissatisfaction wrapped up in the life of each individual. He did not feel disposed to say much in the way of advice. They had abundance of that in the numerous inaugural addresses which appeared at this season. He always read these addresses with much interest, and of all that had recently appeared he would commend to their thoughtful attention the address given to the Dundee Association by Mr. Storrar, of Kirkcaldy. There was just one point on which he would venture to say a single word. They would have observed that in all these addresses a very high ideal was set up, at which they were invited to aim. They must have felt sometimes that such ideals were very ideal, and therefore difficult to grasp. He thought it was a great advantage to have their ideal presented to them in some concrete form. It was easier to feel admiration for real men and copy their example. Therefore, he would suggest to them to set before themselves as patterns for imitation, and sources of comfort and hope in moments of weakness and despondency, the noble character and high example of great and good men. There were many such in their own department of science. He would mention such, for instance, as Scheele, Faraday, William Allen and George Wilson.

The remainder of the evening was devoted to the reading of the prize essay on Botanical Excursions, by Mr. Alexander Murray, a practical demonstration of the methods employed for the determination of specific gravities, illustrated by scientific apparatus and also by apparatus extemporized from articles commonly found in all chemists' shops, by Mr. John Findlay, and a series of experiments entitled "Back Shop Experiments," illustrating the detection of copper in extracts, glass blowing, the separation and recognition of alkaloids, etc., by Mr. J. Rutherford Hill.

On the motion of the Chairman a cordial vote of thanks was awarded to the contributors, and also to Mr. A. Russell Bennet, who had charge of the arrangements.

It was intimated that the next meeting would take place on Wednesday, November 19, when a paper on "Pharmacy Notes," by Mr. J. H. Hoseason, will be read.

LEEDS CHEMISTS' ASSOCIATION.

The twenty-second annual meeting of the above Association was held at the Church Institute on Oct. 30, Mr. Geo. Ward, F.C.S., President, in the chair.

The annual report and financial statement, showing a balance in favour of the Association of £9 8*s.* 0*d.*, were read and adopted, and the following officers and members of the Council elected for the session 1890–91:—

President, Geo. Ward; Vice-President, E. Yewdall; Hon. Treasurer, S. Taylor; Hon. Librarian and Curator, W. D. Pollitt; Hon. Sec., F. W. Branson; J. H. Beacock, Geo. Briggs, C. G. Catterall, P. Jefferson, R. Reynolds, G. W. Worfolk.

The next meeting of the Association will be held on Thursday, Nov. 27, at the Philosophical Hall, Park Row, at 3.30 p.m., to discuss the draft Pharmacy Act Amendment Bill. Members of the trade of Leeds and district will be invited.

Mr. Michael Carteighe, President of the Pharmaceutical Society, has accepted the invitation of the Council to be present.

British Pharmaceutical Conference.

MEETING AT LEEDS.

(*Concluded from page* 345.)

The following two papers were then read—

Laboratory Notes on Extracts of Malt, Semi-Solid and Liquid.

BY JOHN C. UMNEY,

Pharmaceutical Chemist.

Notwithstanding that extracts of malt are by no means novel, having been used more or less as medicinal and dietetic substances for the past twenty years, still it cannot be said that at the present time the preparations as met with in trade are either uniform or satisfactory. Uniformity may be absent because no preparation has been made official in Great Britain, and it has been the custom of some manufacturers to produce these preparations with wholly unsuitable apparatus and without due regard to the chemical properties of the constituents of malt which make these extracts valuable as a medicinal agent. The extracts were first introduced in a liquid form and professed to be made from malted barley entirely. They contained an appreciable quantity of alcohol, which was said to be the result of a partial fermentation, were flavoured agreeably by aromatics, and were possibly consumed as much on account of the alcohol contained in them as for the nutritive extractive of the malt itself.

The public taste, influenced by advertisements in the press, is now evidently in the direction of some semi-solid extract, but such a preparation in my opinion is not so convenient for use, neither does it always reach the public in such an uniform condition free from change or decomposition as is desirable.

Suggestions have been made from time to time for perfecting these extracts, the object specially in view being to obtain a product which should contain the maximum percentage of diastase, to which its medicinal value is mainly attributed.

The difficulty of preserving semi-solid extract of malt was first pointed out as far back as 1870 by Ebert, and it continues up to the present, for extracts of high diastasic power that will keep perfectly and remain free from fermentation and acidity seem to be rare.

Many of the extracts of trade whose keeping properties are noteworthy have been rendered so by the addition of glycerine or salicylic or boracic acids. These latter, when present even in very small proportion, have a destructive action on diastasic ferment. Moreover this action of mineral and very many organic acids on diastase should not be lost sight of, and due regard paid to the statement of physiologists that the extract should be taken about two hours after a meal, when the acid of the stomach has been almost entirely exhausted in the process of digestion.

A recent examination of trade samples shows the extreme variation in diastasic power of some of the extracts now in trade, the results being shown in a table on the next page.

(According to Jungk, a good malt extract should convert its own weight of starch into sugar and dextrine in ten minutes at 100° F.).

Objections other than the variability of the semi-solid extracts are chiefly those of viscosity and the

Sample.	Sp. gr. at 60° F.	Diastasic power. 10 grams of extract will convert 10 grams of starch at 100° F. in
1. English manufacture	1·373	4 minutes.
2. " "	1·403	18 minutes.
3. " "	1·393	not finished in 2 hours.
4. " "	1·392	12 minutes.
5. " "	1·375	not finished in 2 hours.
6. " "	1·375	4 minutes.
7. German "	1·395	35 minutes.
8. " "	1·410	15 minutes.

extreme difficulty in pouring or using an extract of such a consistence.

Experiments were made to produce a liquid preparation of malt that would contain the full diastasic power of the grain, and at the same time be easy to take, palatable, and elegant in appearance.

I have made the following notes when working on a fairly large scale, using generally a quarter of malt for each operation. Five points in this manufacture deserve special attention.

(1) Selection of the malt.
(2) Crushing by suitable machinery.
(3) Temperature for infusion (mashing).
(4) Filtration.
(5) Evaporation.

The palest malt is preferable for the production of the extract, as a light coloured preparation is more elegant and has these two advantages, the one that the yield of extract from pale is greater than from more highly roasted, and consequently deeper coloured malt; the other that a higher temperature may be safely employed for its infusion. This latter is so well known to brewers that a difference of several degrees in the temperature of the water used for mashing is always allowed between pale and deep coloured malt.

The malt should be crushed but a short time, say a few hours at the most, prior to infusion, otherwise it rapidly absorbs water, becomes heated, and consequently damaged. It has been my custom to use a rapidly rotating mill, consisting of small steel rollers which bruise the malt and produce no appreciable quantity of flour, which is troublesome to deal with after infusion, on account of its proneness to form a magma, which inevitably results if the grain be crushed too finely, and hinders, not only the action of the diastase upon the starch but also the rapid filtration of the infusion.

The temperature of the water used for the infusion or mashing (as brewers term it) should not exceed, when using fine pale malt, a temperature of 165° F. The quantity of water used may be increased or lessened in proportion to the help that may be given to the digestion and extraction of the malt by a mechanical agitator and also to the machinery at disposal for removing from the marc the whole of the saccharine fluid. Prior digestion of the malt in cold water as recommended by some authorities (United States Pharmacopœia for six hours and the German for three hours) has been tried, but in my hands has not proved of any special advantage; on the contrary, I have come to the conclusion that when once the process is started the greater the acceleration of the exhaustion, filtration and evaporation, the better the final product. The water used in the manufactures I have conducted has been that of a London water company. It is well known, however, that distilled water, or even water containing but small proportion of calcium salts gives a product containing less albuminoids than a water charged with lime salts, especially sulphate.

It will be found convenient to continue the mashing with agitation for not less than two hours, every opportunity for subsidence is then given, the supernatant liquor siphoned from the exhausted grain, this latter rapidly transferred to a powerful press and deprived of all moisture possible, the infusion being then filtered through suitable material by the aid of a vacuum, finally boiled in vacuo, the temperature of which need never exceed 125° F.

The filtration is a most important point, and without the aid of a vacuum filter would be next to impossible, and further, unless this part of the process be carried on rapidly, acetification sets in and the value of the product is seriously impaired.

The extract is concentrated until it reaches a specific gravity of about 1·375 at 60° F., when it is withdrawn from the apparatus, transferred to a suitable vessel, and without any delay sufficient spirit of wine, previously diluted with water, gradually added so that the final product shall contain 7·3 per cent. of alcohol by weight, equal to about 15 per cent. of proof. It is important that the spirit be diluted and added slowly, because it is well known that strong alcohol is a ready precipitant of diastase.

The completed product will have a specific gravity when filtered of 1·250. Filtration of such a viscid fluid as liquid extract of malt is by no means easy, and it is all important that it should be carried on as free as possible from atmospheric influence, if only to prevent thickening of the extract, loss of alcohol and consequent acetification. Finest selected pale malt will give a filtered product of about 95 per cent. by weight of fluid extract, the yield of semi-solid extract being from 80 to 85 per cent.

A liquid extract prepared according to the foregoing, provided attention be paid to every detail, will give an average indication of diastasic strength equivalent to a semi-solid extract, converting its own weight of starch in six minutes, bearing a favourable comparison with the best of the extracts referred to in above table.

This liquid extract is elegant in appearance, possessed of maximum diastasic value, and exceedingly palatable.

It is not prone to fermentation, solidification or any of the changes to which the semi-solid extract is liable, and keeps perfectly at all seasons.

In my opinion the fluid will at no distant date supplant the semi-solid extract.

EXTRACT OF MALT.

BY D. B. DOTT.

Malt extract is of great value on account of its peculiar nutritive properties and its diastasic power. Increased importance is attached to the latter property, some one even asserting that without diastasic power the extract is worthless—a statement which is certainly beyond the evidence. Yet there is no doubt that the diastasic property is an important one, and ought to be possessed in fair degree by a good malt extract. Hence it becomes of importance to have an accurate means of estimating that power, and it seems desirable to fix a standard for the same. It is scarcely correct to speak of "the estimation of diastase," as pure diastase has never been prepared, and the gravimetric relation of sugar produced, to pure diastase, is unknown. What we estimate is the effect, that is the amount of starch converted into maltose and dextrin, although, of course, the effect is due to a compound or mixture of compounds called diastase. There are two general methods of determining the diastasic value of an extract: 1st, by allowing a given quantity of extract to react with a given quantity of starch-paste, at a certain temperature, noting the time required for the conversion of the starch, as indicated by its ceasing to give a blue colour with iodine: 2nd, by the action of a given amount of extract on excess of starch at a certain temperature in a given time, the amount of sugar produced being then determined. The latter is undoubtedly the more accurate and reliable method, and is that adopted by the best authorities. O'Sullivan uses potato starch, and determines the amount of alteration with the polariscope; but from a pharmacist's point of view, the process as described by Duggan (Year Book, 1886, 259) is preferable; 5 c.c. of a 5 per cent. solution of the extract is mixed with 250 c.c. of a 3 per cent. solution of arrowroot, at a temperature of 55° C. After digesting for half an hour at that temperature, 5 c.c. of a 10 per cent. solution of soda is added, and the whole diluted to 500 c.c. This is then added to a measured quantity of boiling Fehling's solution until complete reduction, whence it is easy to calculate the amount of maltose (two-thirds the reducing power of glucose) which is present in the solution. The reducing power of the malt extract solution itself is next determined, and the necessary deduction made from the number first obtained, the net result showing the amount of maltose formed from the starch by diastasic action. I think it is preferable to use 400 c.c. of a 2 per cent. solution of arrowroot, as a 3 per cent. solution is inconveniently thick; and to stop the reaction by adding at least double the above amount of soda. As regards the time during which the action should be allowed to continue, half an hour seems most suitable. There is a slight but inevitable error arising from the fact that the reaction does not commence or stop instantaneously, so that it is not desirable to make the period of digestion too short, as that course would simply multiply the error; on the other hand, there is no advantage in continuing the digestion beyond half an hour. The importance of employing a definite kind of starch is recognized, and has been emphasized in an excellent paper by R. A. Cripps.* There may be difference of opinion as to what the diastasic value of malt extract ought to be, but there will be general agreement that the standard should be fairly high. The tendency of most writers on the subject has been to accept too low a limit. Setting aside the diastasically worthless samples, and leaving out of account exceptionally high results, a good extract of malt may be expected under the above conditions to produce not less than three times its own weight of sugar from starch, calculated on the basis that 10 c.c. of Fehling's solution are equal to ·0807 gram of maltose. According to the accepted equation (which I know is near the truth) that 7 parts of maltose represent 10 parts of starch, such an extract would convert 4¼ times its weight of starch into maltose and dextrin in half an hour.

Mr. **Hasselby** inquired if cod liver oil could be incorporated with the fluid extract of malt.

Mr. **Cripps** said Mr. Umney's paper was full of important matter, and he quite endorsed his remark as to the importance of rapidity of work in every portion of the process, on account of the rapid acetification. He did not quite catch the temperature at which Mr. Umney worked in determining the diastasic power, but that which he used was 98° F., when he found good extract of malt could digest its own weight of starch in from ten to twelve minutes. No doubt the method Mr. Dott described was really more like what went on in the human frame after taking a starchy meal.

Mr. **Gerrard** said he had noticed that Mr. Umney mentioned that infusion took place at a temperature of 165°. Of course there was a lowering of temperature in adding water of that heat to malt, but he should not have thought it would have fallen to any great extent. He used a temperature of 125° for evaporation *in vacuo*, and thought 165° rather high for diastase.

Mr. **Conroy** said he was about to ask the same question. No doubt Mr. John Umney had depended on the lowering of the temperature by the addition of the malt. He should like to know if he had tried the effect of any other preservative, for 15 per cent. of alcohol was a serious matter, especially as this medicine was given in large doses, so that it was an appreciable amount to give to young children. If glycerine could be used instead of spirit it would be a great advantage.

Mr. **Clague** suggested it might be possible to find some volatile oil which would not hinder digestion, and yet be a sufficient preservative. The essential oils did not hinder materially the solution of starch by extracts of malt. Another point deserving attention was that in certain fluid extracts of malt there was a considerable tendency to cause irritation. Some persons felt it more than others, but very frequently a fit of coughing was the result of taking a dose. This was very undesirable, and appeared to him to arise from some irritant matter being used or produced in the manufacture, because it was not found in all cases. He had known people have to give up taking the extract of malt until they could procure one free from this quality. Besides this there were many people to whom it was a great comfort to be told that the extract contained no alcohol. A statement had been made that some of the leading extracts of malt had considerable quantities of alcohol present; and it was desirable that pharmacists should be able to give an alternative preparation to those who had conscientious scruples about it.

Mr. S. M. **Burroughs** said it was a very good thing that the study of malt was in future not to be left entirely in the hands of brewers' chemists, whose experience was used usually entirely for the benefit of brewers. Malt was a very changeable product in the presence of moisture, and it was obvious therefore that the process of manufacture should be expedited as much as possible. He heartily concurred in the desirability of having the extract in a semi-fluid condition. No doubt in many cases the addition of alcohol was desirable, but where that was contra-indicated or where teetotallers objected to its use, liquidity might be secured by the substitution of glycerine for some of the alcohol. As to the temperature in some recent experiments the best results had been obtained by mashing at a temperature of 140° instead of 165°. If the malt were heated so much as it usually was for brewers purposes, the diastase was likely to be destroyed before it reached the hands of the manufacturer of extract of malt. Moreover, it was desirable that it should be not only light in colour, but as there were many germs adherent to the husk that it should be thoroughly brushed before being milled and should be mashed as expeditiously as possible after milling. In the semi-solid extracts there should be a large proportion of dextrin, but it was desirable to have as much diastase as could be secured. It was important that the sweet wort should remain long enough in the mash tun to convert all the starch into dextrin. If he understood the desire of the medical profession in this matter, it was to have a preparation which should be first a powerful aid to digestion; secondly, that there should be sufficient dextrin to stimulate the gastric secretion; and thirdly, that there should be a good amount of nutriment. Then came in the consideration of the convenience of handling, which might be secured by the addition of alcohol. He was pleased to see a general feeling in favour of a standard being adopted for the diastase and also for the nutritive properties of extract of malt. It appeared that some makers on the continent had a very poor opinion of the extract made in this country, for he had had a sample sent him as being specially suitable for the English market, and on looking at it he should think it was the custom in that part of the continent to evaporate in an open pan at a rather high temperature.

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* *Pharm. Journ.*, Dec. 21, 1889.

The **President** said the brewer nowadays was a very scientific man; and the first thing he did in the morning was to take the temperature of the outer air, and on that depended very much the temperature to which he would raise the water, but as to 164° brewers mashed many degrees beyond that. In brewing some of the fine Burton ales they went much higher, but it wholly depended on the state of the malt. If it were of a very pale special character a very high temperature could be used, but on the other hand if it were highly roasted it could not or the whole thing set into a perfect magma in the mash tub. Physiologists were not quite agreed whether there was any value at all in diastase, simply because it was said that the acid of the stomach destroyed it altogether; others said the preparations of malt were of great value if taken at the proper time, viz., about two hours after a meal when the acid of the stomach was almost exhausted.

Mr. **Cripps** asked if Mr. Umney found on adding spirit to the aqueous extract there was any precipitate of albuminous matter.

Mr. J. C. **Umney**, in reply, said he did not think it would be difficult to emulsify cod liver oil with liquid malt extract by the aid of acacia or tragacanth, but it could be done more readily with solid extract if it were desired. As to temperature for the determination of diastasic strength he employed 100° F. The best samples of malt extract converted their own weight of starch in four minutes. The temperature of the water used, the quantity for a quarter of malt being about 120 gallons, was about 165°, and in getting that on to the malt he found the temperature had fallen about 10°, so that it reached the malt at about 155°. The diastase would stand a temperature of 158° without destruction, and the best proof of its not being destroyed was the fact that he had determined it, and found the extract made at that temperature did convert its own weight of starch in four minutes. He had tried glycerine as a preservative and found it answer very well both for the liquid and solid extracts. The irritation Mr. Clague referred to might be due to salicylic acid, which he had found in a few extracts. He had always been careful to dilute the spirit before adding it, owing to strong alcohol precipitating diastase as well as albuminous matters.

The **Senior Secretary** then read the following:—

Note on the Comparative Medicinal Values of the Three Official Buchus.

BY C. J. S. THOMPSON.

Some doubtless may have noticed in preparing the infusion of buchu leaves B.P. from time to time, that the product when made from the *serratifolia* variety often differs slightly both in colour and taste from that prepared from leaves of the other official sources, viz., the *betulina* and *crenulata*. My attention was further directed to this matter by a medical friend noting that in the case of a patient who had been in the habit of taking the infusion made from the broad leave varieties, on an infusion prepared from the narrow leaf being substituted, the difference in the medicinal action was very marked.

The characteristic appearance of the leaves of buchu are well known. The chemical composition, according to Hanbury and Flückiger, mainly consists of a volatile oil, of peppermint-like odour, which deviates the ray of polarized light considerably to the left. On exposure to cold the oil furnishes Barosma camphor, which forms needle-shaped crystals, having almost the exact odour of peppermint. They found the leaves of the *Barosma betulina* to contain 1·56 per cent. of volatile oil. Spica, on making an investigation of the leaves of the *Barosma crenulata* as to their therapeutic value, believed the medicinal action to depend on the presence of a volatile oil, and a bitter resin. On extracting the oil, and separating it into its soluble and insoluble portions, from the former by means of hydrochloric acid, he obtained the crystalline camphor. The eleoptine he describes as a colourless oil, boiling at a temperature of 204°–206°, and resembling peppermint in odour. The result of analysis seemed to indicate that this compound was an isomeride of borneol, $C_{10}H_{18}O$. On distillation with sodium, it is converted into a phenolic substance, a slightly yellowish oil, sparingly soluble in water, and resembling thymol in taste and colour. On submitting the several varieties of buchu leaves to microscopical examination, it was noticed that the circular cells containing the oil on the underpart of the leaf, were closer together and much larger in the *crenulata* and *betulina* than in those of the *serratifolia*, the oil glands of the latter being both smaller and fewer in number. Assuming the therapeutic activity mainly to depend on the quantity of the volatile oil and resinous matter the leaves contain, a number of samples from the official sources were procured with the object of estimating the average proportion of these principles present in each variety.

The leaves of the *Barosma betulina* were first examined with the following result. Several samples having been treated with ether were found to yield on an average 4·25 per cent. of resinous matter, of a dark, olive-green colour, aromatic, but bitter to the taste, and having the characteristic odour of buchu. It was found to be but slightly soluble in hot water, more so in alcohol, and easily soluble in chloroform. From the same samples I extracted by distillation on an average 1·45 per cent. of volatile oil, which developed after a time the strong peppermint-like odour.

Samples of the *Barosma crenulata*, on being submitted to similar treatment, an average of 3·75 per cent. of resinous matter of similar colour and taste was obtained, and yielded 1·6 per cent. of volatile oil.

The samples of *serratifolia* treated in like manner, gave an average of 3·45 per cent. of resin, but different in colour and taste to the others, and barely 1 per cent. of volatile oil could be obtained.

On incineration, the leaves of the *betulina* gave an average of 4·5 per cent. of ash, those of the *crenulata*, 4·6 per cent., and the *serratifolia* yielded 5·30 per cent.

It has been suggested that the medicinal action in some instances is greatly assisted by the presence of the mucilage, which buchu leaves contain in a considerable quantity, and which probably acts by allaying the irritation of the mucous membrane, and assists the volatile oil in chronic inflammation, and other diseases of the genito-urinary organs. This suggestion would seem to be borne out by the fact, that the fresh infusion of the leaves is preferred, and regarded as more effective than the tincture in the treatment of such cases. If the mucilage be precipitated from a freshly prepared infusion of the *serratifolia* leaves, it will be found to contain a less quantity than an infusion made with either of the other official species.

The result of this somewhat rough investigation would seem to indicate that the leaves of the *Barosma serratifolia* are probably inferior, as regards their medicinal value, to those of the *Barosma crenulata* or the *betulina*, and we would do well to employ the latter varieties only in making the official preparations.

The **President** said they had always been taught that the leaves of *Barosma serratifolia* were the strongest, but they now heard they were mistaken, and that those of *betulina* were the more powerful. It only showed the necessity of investigating these matters, and not accepting what they were accustomed to read, which was copied from one text book into another, oftentimes to their own disadvantage.

Mr. **Gerrard** said he should have liked to ask the author what was the active principle of buchu.

Mr. **Martindale** said there was more mucilaginous matter in the leaves of the *serratifolia*, and on that he thought the activity of the drug depended.

The following paper was then read—

Note on Syrup of Hypophosphite of Iron.

BY JOHN MACINTYRE.

I have a demand for syrup of hypophosphite of iron, B.P.C. On several occasions I have had it returned to me, with the invariable complaint of its becoming milky in appearance after the lapse of a period varying from a few hours to a day or two. Such instability led me to adopt means by which to prevent it.

In the first instance I tried the addition of hypophosphorous acid, with the following results. Having prepared four 1-oz. bottles of the syrup, I added to No. 1, two drops of the acid, to No. 2, three drops, to No. 3, six drops, to No. 4, twelve drops. All developed the objectionable cloudiness, the only improvement being that it was less, and its appearance somewhat retarded; on the bottles returned to be refilled I noted even a greater deposit, but the more frequent removal of the cork naturally accounted for the additional quantity.

In my second experiment I directed my attention to the solvent effect of citric acid. To each of five 1-oz. bottles I added ⅛ gr., ¼ gr., ½ gr., ¾ gr., 1 grain of citric acid, respectively, all of which, with the exception of No. 1 (containing only ⅛ gr.), have stood for over four months without the slightest cloudy appearance or deposit. This would show that ¼ gr. citric acid to the ounce of syrup is sufficient to make it a stable preparation.

A trial of similar quantities of citrate of sodium did not prove so successful; for, as shown by samples, deposit was only absent in Nos. 4 and 5, while they all developed a yellowish colour.

I would add that of the citric acid preparation, ¼ gr. of acid to the ounce of syrup. I have kept a 10-oz. quantity in a twenty-ounce, wide-mouthed bottle for about three months, without depositing, but latterly assuming a yellowish tint, and of which sample is shown, No. 6. This is to be expected from exposure to the air, and can be avoided by keeping in bottles quite full, as in other samples which are colourless.

I am therefore of opinion that a thoroughly stable preparation can be made, and my object in bringing it forward is to elicit the experience of others on the subject.

Mr. **Linford** said this preparation was one he had had a great deal of experience of. There was no difficulty in preventing the cloudy appearance in half a dozen ways. In fact there was no need to have a cloudy appearance at all if the syrup were made according to the suggestion of Mr. Martindale, from iron wire. It was even better to use ordinary blue tacks, which presented many more points and edges to the action of the acid, and the iron was purer than any wire he could easily obtain, unless he used piano wire. The liquor should be made considerably stronger than the syrup, and put into full bottles with waxed corks, and it would keep very well for six months. It could then be made into syrup in small quantities as required. Also for making Fellows's syrup, it was only necessary to use an excess of hypophosphorous acid, to be neutralized on adding the quinine, etc., avoiding too much sugar, and that would also keep without changing colour, or depositing for at least three months.

Mr. **Abraham** said it seemed to him more correct to say that the citric acid hid or covered the change than prevented it. Whether covering the change in any way was objectionable was another matter.

The **President** said he was sure the Conference would thank the author of the paper. There were only two remaining which would be better read in print than abstracted.

Chemical Notes on Mannas.

BY DAVID HOOPER.

Mannas are concrete saccharine exudations from plants, occurring naturally on the stems and branches, or after incisions have been made in the bark. These secretions are yielded by plants growing in a dry climate, or if in countries where monsoons prevail, in the intervals of dry weather. They have been found in widely distributed natural orders, but more conspicuously in the following species:—Ash, coloneaster, tamarisk, alhagi or camelthorn, eucalyptus, oak, plaintain, willow, cedar, larch and pine. Of these mannas a large proportion are produced in the East, and if they are not natural productions of this country, most of them are found as articles of commerce in Indian bazaars, where they have the same medicinal reputation as the ash manna in Europe.

Each manna contains a characteristic crystalline sugar, forming the chief feature of its chemical composition, with one or more crystalline or amorphous sugars, a small quantity of mucilage, resin, organic acid, insoluble impurity and mineral matter. Although two or three are analogous in their constitution, they all vary in their solubility in water, rotatory power, melting point, and in their reducing action upon Fehling's solution.

The official ash manna, the type of these exudations, contains 70 to 80 per cent. of mannite, 16 to 20 per cent. of dextro-glucose and 10 per cent. of moisture. The principal sugar belongs to the class of hexatomic alcohols, and has the formula $C_6H_{14}O_6$. Mannite dissolves in five parts of cold water, scarcely soluble in cold alcohol, but readily dissolved when hot and deposited when cool. It does not reduce alkaline solutions of copper, and when uncombined exercises no influence on polarized light. Kresnel's test for manna is to add one part to one part of hot water, and then boil with ten volumes of alcohol at 95°. The boiling solution is then filtered through wool, and after evaporation of the alcohol there remains pure mannite, which should form 75 per cent. Old manna becomes soft, especially if kept exposed to the air; and this, unlike the fresh drug, undergoes vinous fermentation in contact with yeast. The change is probably due to the absorption of enough oxygen to unite with the excess of hydrogen of the mannite, and convert it into glucose. Mannite is not confined to the ash, but exists in other drugs, as the barks of canella and pomegranate, and in the roots of dandelion and couch grass.

The manna of *Cotoneaster nummularia*, known in India as "Shirkhist," is not always pure, and the sample alluded to in the 'Pharmacographia' and that examined by Ludwig were certainly of distinct origin. Some uncertainty and confusion existed about this when Dr. O'Shaughnessy compiled his 'Bengal Dispensatory,' as he gives "Shirkhist" as the bazaar name for ash manna, and says it is soluble in three times its weight of water. M. Raby has lately (*Union Pharm.*, May, 1889) cleared up the chemistry of this manna after examining an authentic specimen from Persia. It contains 8·3 per cent. of glucose, 4·1 per cent. of cane sugar, or an analogous sucrose, and about 50 per cent. of a new sugar, *Chirkhestite*, $C_6H_{14}O_6$, apparently belonging to the mannite group. Chirkhestite melts at 112°, slightly effects polarized light, and dissolves in less than half its weight of cold water. It is thus related to sorbite, which melts a little below 100° and does not affect polarized light.

The author of *Makhzan-el-Adwiya*, speaking of onions in their diet. It consists of onions in large quantity, while the other ingredients form smaller proportions. These are garlic, cumin, fœnugreek, mustard, turmeric, and curry leaves. These are well beaten down in a stone mortar and made into a mass, from this a number of large balls are rolled up and dried in the sun. They are smeared with castor oil every morning as they are exposed, and after a few days will become dry enough to store. Curry leaves are also used for flavouring chutneys.

Persons suffering from dyspepsia and diarrhœa resulting from indigestion, make a broth from the leaves. They are first broiled with ghee, and after the addition of a little tamarind and salt, water is added, and the whole boiled. I have found this decoction check the complaint at once.

A useful preparation for allaying vomiting and purging in children is the following. Curry leaves, tamarind, neem, country gooseberry, morinda, of each one ounce, sweet flag and ajwain, of each one drachm, water ten ounces. The dose of this is half an ounce twice a day.

The green leaves rubbed up to a paste and mixed with buffalo's tyre (butter-milk) have been given with success in adult dysenteric cases. The dried leaves enter into a compound powder largely used as an astringent. The seven articles are as follows, with their botanical, English, and Tamil names.

Murraya Kœnigii	Curry leaves, dried	Karuvepillai.
Mangifera Indica	Mango seeds	Manga palavirai.
Solanum pubescens	—	Soonday kavathu.
Trigonella Fœnum-græcum	Fœnugreek	Vendayam.
Phyllanthus Emblica	Country gooseberry	Nelli-kai.
Feronia elephantum	Wood apple	Velampalam.
Carum copticum	Omum	Omum.

Equal parts of these drugs are finely powdered separately and then mixed. The dose for children is 3 to 5 grains in honey, and for adults 15 to 30 grains in buffalo's tyre. This powder is much resorted to by native physicians in the treatment of dyspeptic diarrhœa of children attended with flatulency. It is very singular that native doctors, ignorant as they are of the therapeutic action of medicine, never combine opium or other narcotic preparation in their administration of remedies in diseases of children.

Dr. Roxburgh mentions that the bark and root of the plant under reference are applied externally to cure eruptions and the wounds made by the bites of animals. A decoction of the leaves is used in fever mixtures, mixed with other aromatics and bitters.

A clear transparent yellow oil is sometimes extracted from the seeds and is known as Simabolee oil.

A chemical examination of the leaves has been made by Mr. J. G. Prebble, and will be found in the *Pharmacographia Indica*, vol. i., p. 263-265. From the analysis it appears that the leaves yield to distillation a small quantity of volatile oil resembling that obtained from the leaves of *Ægle Marmelos*. Ether extracted 7½ per cent. of resinous matter, and a further quantity was removed by alcohol. The resin was greenish black in colour, amorphous, and freely soluble in chloroform, bisulphide of carbon, benzol and amylic alcohol, less soluble in glacial acetic acid and petroleum ether, and almost insoluble in acetic ether. It gave an emerald green coloration with sulphuric acid, and yielded picric acid when oxidized by nitric acid. The aqueous solutions of the ethereal and alcoholic extracts contained an acid principle darkened by iron salts, but not precipitated by gelatine. The bitterness of the leaves is due to a glucoside provisionally named *Kœnigin*. The crystals were sparingly soluble in water and alcohol, and the solution was precipitated by tannin, lead acetate, and fenoso-ferric salt, but not by alkaloidal reagents.

PRESENTATION FROM THE BELL AND HILLS FUND.

At the conclusion of the reading of the papers—

The President called on—

Mr. Naylor, who said he had a very pleasing duty to perform in calling attention to the presence on the table of nine vols. of books provided by the generosity of Mr. Thomas Hyde Hills, which he would ask the President to hand over to the local association in Leeds. He was glad to be able to say that that association was an active body, and had already something more than the nucleus of a library. The executive of the association had made a very wise selection of books, and in addition to those he had mentioned there was a copy each of the 'Science Papers,' and the 'Pharmacographia' by Daniel Hanbury, which were presented by Mr. Thomas Hanbury in memory of his brother.

The President then formally presented the books to the Leeds Association, which he said he felt sure would continue to do good work, and he had no doubt would find these volumes useful, not only for senior members but also to the students.

Mr. G. Ward said it gave him great pleasure on behalf of the Leeds Chemists' Association to accept the very handsome gift which was left as a legacy of the visit of the Conference to the town. He was sure the books would be highly appreciated by the members and would form, not to the Committee only, but to all, including the associates, a very pleasing memento of the occasion.

THE FORMULARY COMMITTEE.

The President next moved that the following gentlemen form the Formulary Committee for the ensuing year: Messrs. Martindale, Naylor, Abraham, Greenish, Groves, Maben, Martin, Reynolds, Symes, Wright and Ransom.

Mr. Savage (Brighton) seconded the motion. The gentlemen named were so well known and so much esteemed that all would have full confidence in them.

Mr. Linford thought the motion ought to include an expression of thanks to the Committee for what had been done during the past year.

The motion was carried unanimously.

PLACE OF MEETING IN 1891.

The President said the next business was to decide on the place of meeting for next year. An invitation had been received from Cardiff and Mr. Alderman Yorath and other gentlemen were present as a deputation to support it.

Mr. Alderman Yorath said he appeared in company with Mr. Coleman and Mr. Munday to give a cordial invitation to the Conference to the Metropolis of South Wales—of Wales, he might say—a town which had sprang up within the last few years, perhaps faster than any other in the United Kingdom. About thirty years ago its population was about 30,000 but to-day it was nearly 130,000. It had some of the finest docks in the world, and the Barry dock, which was close by, was the finest single dock in the world. There were many other objects of interest in the neighbourhood of Cardiff, which was one of the oldest places in the British Isles; there was Cardiff Castle and also Caerphilly Castle, and many other places which he was sure they would all like to see. The people of Cardiff and the neighbourhood would give them a hearty welcome, and endeavour to make the visit as pleasant as to any other place they had been to.

Mr. Coleman had much pleasure in supporting the invitation. Ten years ago the Conference visited Swansea and had no reason to regret it, and he hoped it would be equally well pleased with Cardiff.

Mr. S. Taylor (Leeds) moved that the invitation to Cardiff be cordially accepted.

Mr. Riddle (Hexham) seconded the motion. Cardiff was a place of great interest to those in the north, seeing it was a very keen competitor in the coal trade, and they were all anxious to see what sort of a place it was.

The motion was put and carried unanimously.

The **President** said he had received a telegram from Mr. Gilmour, of Edinburgh, the Chairman of the Executive of the North British Branch of the Society, in the following terms:—"Sorry unable to be present at Conference. In name of chemists of Edinburgh and neighbourhood give you most hearty invitation to meet here in 1892. All in our power will be done to make meeting here a success." In connection with that, he might say that the Committee on Monday evening had discussed, as it had done more than once before, whether the time had not come, after following the British Association for twenty-seven years, for the members of the Conference to choose a place of meeting for themselves [cries of Hear, hear, and No, no]. Those expressions showed how desirable it was to have the question considered. The British Medical Association did not follow the British Association but chose another town. It might seem rather inappropriate to make the suggestion after the very kind and appreciative words the Conference had heard that morning from Sir F. Abel, the President of the British Association, and it was not necessary to decide the question now, but it was desired that some thought should be given to it during the year, and that it should be thoroughly ventilated amongst the members and perhaps in the press. As he had said it had been discussed by the Executive, which because it could not come to a conclusion as to what would be best for the Conference on the whole, for that was the important point, wished the members to consider the subject. Perhaps an intermediate course might be adopted of holding the meeting rather earlier, so as to be concluded before the Association met, but at any rate he would ask the members to think the subject over.

OFFICERS FOR THE ENSUING YEAR.

Mr. Naylor then read the following list proposed by the Executive:—

President.—Mr. W. Martindale (London).

Vice-Presidents.—Mr. Carteighe (London); Mr. Kinninmont (Glasgow); Dr. Thresh (Chelmsford), and Mr. Munday (Cardiff).

Treasurer.—Mr. Davies (London).

Hon. Gen. Secretaries.—Mr. Naylor (London), and Mr. Ransom (Hitchin).

Other Members of the Executive Committee.—Mr. Gerrard (London); Professor Green (London); Mr. Kirkby (Manchester); Mr. Dott (Edinburgh); Mr. Martin (Newcastle-on-Tyne); Mr. Holmes (London); Mr. Branson (Leeds); Mr. Ward (Leeds); and Alderman Yorath (Cardiff).

Auditors.—Mr. David Anthony (Cardiff), and Mr. E. Yewdall (Leeds).

Hon. Local Secretary.—Mr. Alfred Coleman (Cardiff).

VOTES OF THANKS.

Mr. Schacht moved—

> "That the cordial thanks of the non-resident members of the British Pharmaceutical Conference be given to the Local Committee, and especially to Messrs. Branson, Ward, Taylor and Bowman, for the very successful manner in which all the arrangements connected with the visit of the Conference to Leeds have been carried out."

It had fallen to his lot to move a similar resolution on former occasions, and it always gave him great pleasure to do so, but never more so than on the present occasion. He did not forget that the labours of the Committee were not quite concluded, and that this was to some extent an expression of gratitude for favours to come as well for those which were now matters of history; but they would be all quite satisfied to trust to the guidance of the Committee until the end, and anticipated much pleasure therefrom. He must not omit to say, on behalf of the lady visitors, how much gratified they were by the arrangements which had been made for their comfort and pleasure, the precedent inaugurated last year having been most successfully followed on this occasion.

Mr. Kinninmont had much pleasure in seconding the motion, though he could hardly add anything to what Mr. Schacht had said. On behalf of his compatriots, of whom he was sorry to see so small a contingent present, he joined in thanking the local committee and especially Mr. Branson for the very admirable way in which the arrangements had been carried out. He could only hope that the weather—which was beyond the control of the Committee—would be propitious on the morrow, and then the visit would terminate as pleasantly as had ever been the case.

The motion having been carried unanimously,

Mr. G. Ward, on behalf of the local committee, said he was extremely pleased at the very generous and enthusiastic manner in which the resolution had been proposed and carried. It had been to the committee a labour of love, and all difficulties seemed to have melted away before them. They had had the advantage of receiving the help of Mr. Reynolds, who might almost be termed a patriarchal pharmacist, one of the founders of the Conference, and who knew exactly what was wanted. It was the opinion of every one but Mr. Reynolds himself that he ought to have been the Chairman of Committee, but he overruled them. The Committee had an indefatigable secretary, however, and if things were worked properly, a good secretary was the committee and the committee was very much the secretary. They had all worked harmoniously to produce a result which he hoped was satisfactory on the whole, though Leeds was a smoky town. One of the Secretaries of the Conference, he believed, was going to preserve a sheet of paper which he had carried across the street that morning as a specimen of the amount of carbon which could be washed out of the atmosphere by a shower of rain in a few minutes, and no doubt it would be an interesting memento. Mr. Branson suggested that he should also take a little water from the river as a sample of fairly good ink. But in spite of these trifling drawbacks he trusted the visit had not been an unpleasant one.

Mr. Branson said he had much pleasure in responding jointly with Mr. Ward and his other colleagues and wished also to mention the names of Mr. Yewdall and Mr. Worfolk, of Ilkley, who had helped him greatly in arranging for the excursion. The Committee had not found their responsibility an onerous one, and if the meeting had proved a success, they were as much gratified as the visitors. He could only say he hoped the Conference would pay another visit to Leeds, when the pleasure would be renewed.

Mr. S. Taylor, Treasurer to the Local Committee, also briefly acknowledged the vote of thanks.

Mr. Mason moved—

> "That the best thanks of this meeting be given to the authorities of the Yorkshire College for the reception held at the College, and to the Leeds Literary and Philosophical Society and the Leeds Mechanics Institution Literary Society for the use of their halls during the meeting of the Conference."

The members of the Conference had received a very genial and courteous reception from Professor Bodington who showed them all that was to be seen in that very important institution, and he was sure that all would retain a very pleasant remembrance of the visit. They were also much indebted to the officers of the other bodies named in the resolution, without whose assistance all the kindly efforts of the Committee would have been in vain.

Mr. **Hodgkin** in seconding the motion said the place of meeting had been most convenient in every way; and he had been especially gratified at seeing the beautifully arranged laboratories at the Yorkshire College.

The motion was carried unanimously.

Mr. **Reynolds**, on behalf of his colleagues on the Councils of the Yorkshire College and the Philosophical Society, begged to thank the Conference for its appreciation of the help they had been able to give, and he would specially include Principal Bodington and the staff of the Yorkshire College, who most thoroughly accepted the desire to make the reception pleasant and instructive. Many who saw the College for the first time must have been much impressed with this new factor in the machinery of technical education, which was a matter of great interest to their body. These laboratories were a type of what might be found in eight or ten colleges now spread over the country, which would be able to supply the education which their calling would require when the curriculum became compulsory. He therefore felt the greatest satisfaction at the success of the Yorkshire College, believing that it would be a great help to pharmacy, if not to-day, certainly to-morrow.

Mr. **Yewdall** also acknowledged the compliment on behalf of the Mechanics' Institute.

Mr. **Atkins** moved—

> "That the heartiest thanks of the Conference be accorded to the President for the very able and courteous manner in which he has conducted the business of this meeting."

Mr. Umney was to his mind a typical President of such a Conference, being not only a man of science but a man of business, and a courteous gentleman, and possessing such qualifications, the Conference had been extremely fortunate in having him as President.

Mr. **Martindale** had much pleasure in seconding the motion. He had known Mr. Umney nearly thirty years, having been a fellow student with him and enjoyed his friendship ever since. He felt that he should have the greatest difficulty in following him in the presidential chair, but he should do his best, and hoped to see a very large gathering at Cardiff next year. It was a great advantage to the Conference to be a peregrinating body, as it enabled the members to see more of their native country than many of them would do otherwise.

The motion having been carried by acclamation,

The **President** said he very much appreciated the compliment paid him, not only by putting him in that exalted position, but in thanking him so warmly for the little he had been able to do. He was much indebted to his colleagues on the Committee for the time and thought they had always been ready to place at his disposal in carrying on the business. He would like also to add his personal thanks to the members of the local committee for the excellent arrangements they had made and for the beautiful building they had provided for the meetings. He had attended the Conference for twenty-five years and never remembered being in such a convenient building. He also desired to thank the lady visitors for their presence, which added much to the success of the meeting. It had been a great pleasure to him to meet so many old friends who had been attendants at the Conference all the time he had known it.

BOOKS RECEIVED.

Outlines of General Chemistry. By Wilhelm Ostwald, Professor of Chemistry in the University of Leipzig. Translated by James Walker, D.Sc., Ph.D. London: Macmillan and Co. Pp. 391.

The Treatment of Syphilis of the Nervous System. By Julius Althaus, M.D., M.R.C.P. Lond. London: Longmans, Green and Co. Pp. 35.

Vierteljahresschrift der Chemie der Nahrungs-und Genussmittel. Erstes Heft, 1890. Berlin: Julius Springer. Pp. 127.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmacy Act Amendment Bill.

Sir,—I would just like to say a few words on this subject, and will be as brief as possible. The Bill as far as it goes is a good one—for apprentices, and as a Curriculum Bill,—but it does not go far enough; and although Mr. Carteighe gave us such an excellent address a few days ago, I fail to see why a "company" clause should not be inserted,—even if it be somewhat illogical. The argument for logic will not do in these days. Some may ask, why did I not speak out at the meeting? Well, I may say, I am rather diffident at speech making; much more so than Mr. Taylor said he was. I admire him for his outspokenness; there is much truth in what he said, though Mr. Carteighe did think it deficient in logic. This Bill, I take it, will do little real good for the trade if passed, though I agree with it from an educational point of view. As the first Bill was a Poisons Bill, so this is a Curriculum Bill. The Pharmaceutical Council, as a body, has all along neglected the trade as a means of livelihood of the chemist and druggist, and no wonder so many are outside its ranks. The trade is accused of being apathetic, but has not the Pharmaceutical Council been equally so? Yes, and more so with respect to the interests of our trade! I agree with Mr. Kemp in wanting to put down bogus companies (I see another new one just announced), and would like with others to insist on a clause being inserted for such a purpose.

Why should it imperil the Bill? Take out the widows' clause if necessary, or limit it to time. I do not think so many would object. There is no doubt in my mind that if a good sound Bill, which studied our trade interests and the welfare of the public generally, were presented to Parliament with the approval and support of nearly the whole body of chemists, it would be far more likely to pass than one having the support of only a section of about one-third of the trade. I say let the Council go in for as much as it possibly can, even if it should not get all that is wanted. "Nothing venture, nothing win." There is no doubt the future of British pharmacy depends on vigorous and united action now. Then let us be up and doing, all of us, and by one great effort get a Bill passed that will be a credit and a satisfaction to every chemist on the register. I would make one to interview the M.P.'s for my district, and I venture to think if all others would do the same, and not be apathetic, but vigilant and determined, a happy result would follow, and a better future await us.

Manchester. G. W. Pratt.

Sir,—As far as I can see there is no need for such a Bill. In Clause 5 the same dilemma (if such there is) that exists now will exist afterwards, if the Bill comes into force. If an apprentice has not sufficient tact to discover that he is not an apprentice or student of the Society unless he pays his fee, even the title of "Student Associate" will not help him to discover the fact, and I can hardly agree with the President when he says "the great mass of apprentices registered under the statute were confused in that respect." I know I was not, nor did I know anyone that was confused on the subject, and what is the advantage of putting a clause into a Bill which will be of no benefit?

After reading Clause 6 one asks himself, if this Bill becomes law, what is the good of passing the Major exam.? He will have no more privileges than a Minor man except in title, and the next thing we shall hear of will be a Bill to enable Minor men to call themselves pharmaceutical chemists and to enable them to elect not only Minor men but apprentices for the Council, their argument being, if you have Major men to represent pharmacists and Minor men to represent chemists and druggists, why not have apprentices to represent the junior part of the trade? If Minor men want so badly to be on the Council, because they are so clever, how is it they are not clever enough to pass the Major exam.? I think, sir, it is an honour to be on the Council, and as such we should elect the best men from our ranks, men who take interest in and study pharmaceutical science as well as men of business who understand the profession from a tradesman's point of view. There are some who have the idea that Major men are not men of business, but if a man has sufficient pluck in himself to call himself a man of business, why does not he use part of that pluck to pass the Major? The idea they seem to have is that a pharmacist cannot be a man of business, and a man of business cannot be a pharmacist; it is what one would call an incompatible mixture, but it is not, and we have proofs of it on the Council now. Some say the reason they do not pass the Major exam. is on account of the expense; be it so, but we must not blind ourselves to the fact that there are others who have the chance and means, but are too lazy to take advantage of these, but who by their own help and that of their friends are successful in business and would fain seek the privilege of becoming a pharmaceutical councillor. And if the present Council succeed in giving ten seats to Minor men, these latter will not rest until they have the whole of them, and when that time comes we may expect a Council of the Board of Guardians type, plenty of wrangling, but no business done except in the stomach line.

I daresay the great reason for drawing up this Bill was for the purpose of making clauses 2 and 3 law, and the remaining clauses were thrown in for the purpose of making a show. Can one look behind our counters and in warehouses without being struck with the pale wan faces, short-sightedness and the short stature of the modern English youth? Whenever were there (especially in London) so many children seen wearing spectacles? And how many chemists a few years ago thought of adding these articles to his stock? And what is the cause of this degenerating physique? I think no truer answer can be given than competition and education, and when this Home Rule Pharmacy Bill is put into operation, what will be its effect upon future apprentices? Every one will admit a great advantage would be obtained if apprentices were obliged to pass the Preliminary before starting their apprenticeship; but this is not compulsory, nor would this Bill make it compulsory. And why should it not, if it is to do anything? Most apprentices' hours in the shop are from 8 a.m. to 8 p.m., and this Bill will make it compulsory to attend evening lectures perhaps two nights in the week, and the remaining three nights he must study hard at home, and this he must do continually for four or six years after passing the Preliminary. Now, Mr. Editor, is it to be expected that a youth after working twelve hours in a shop is going to do two hours more study every night? I do not think so; it is not reasonable. When is a fellow to have his recreation, not only outdoors for his bodily health, but indoors for a change from the monotony of the shop? I daresay in some cases where parents can do it, and the master is willing, some of these students will go to a London college three months previous to each examination, and if they pass how would this system improve upon the present one? The pharmaceutical colleges will reap all the benefit from such a Bill. And this Bill is proposed in order to prevent what the President calls the "outcasts of pharmacy." But let one take away the percentage of the men who will not trouble about the examinations, then those who attempt them unsuccessfully, and you may depend upon it that there will be a greater percentage of these outcasts of pharmacy and pirates of the calling they desired to enter, and the end will be the remedy is worse than the disease, because with this curriculum the expenses will be greater in studying for the examinations, and the fees for them must necessarily be increased, as well as being more difficult to pass.

I think, sir, the only reformation that is needed in the Council is that seven members should go out of office every year in rotation. The Major and Minor examinations are plenty stiff enough (what is the good of making one's own rope to hang himself with?). If it were made compulsory for an apprentice to pass his Preliminary before entering a shop, and after that having it put into his indenture that his master should allow him time for lectures and study during the day and not be allowed to keep him after 8 p.m., and then the master to register the name of his apprentice with the Society's registrar, the latter seeing that the master does justice as far as the indentures are concerned, I think if something of this kind could be done, we should be striking at the root of the evil. For then a young fellow would have a fair chance, and if he could not possibly attend lectures his master (if he knows anything) could direct him in his studies. It is not because a young fellow has not the inclination, but because he has not a fair chance. And why should a pupil in our profession (for such we term it) be obliged to work and study any longer than those of other professions. Pardon my long letter, Mr. Editor; it is more on behalf of the young than on behalf of the older ones that I write this. You may consider me rather dogmatical, but even dogmatism must be a good thing at times, else it would not exist in human nature.

Nottingham. QUISCUS.

DRAFT PHARMACY BILL.

Sir,—I am astonished at the arguments put forth by Mr. Robt. McAdam on behalf of "middle aged men" who have neglected or failed to pass a qualifying examination to enable them to sell and dispense poisons. If these men be "middle aged" now, they must have been young in 1868, and surely had enough "go" in them to pass the "modified," presuming they were twenty-one years of age and had been dispensing for three years. All I can say is if they could not do that, "mercy on them," for I knew an "old" man from Bristol who pluckily presented himself and passed with credit. I was disqualified for the modified by one month, but buckled to and spent time and money (all my savings), and passed the Minor, and was proud of it. No Member of Parliament will be troubled with such a request as suggested, for "ample provision" was made for "all" conditions of pill makers in passing 1868 Act, and any who came after, whether of fifteen years or more standing, entered with their eyes open or should have done so. It is quite annoying enough to find assistants utterly indifferent to their future prospects and unwilling to put themselves to inconvenience; and now to find them showing dismay at the accomplishments of the march of time, and demanding consideration for their predicament, would open a way for a decided protest from those who have gone through the mill.

Rather should chemists be looked up "on the same lines" as the Glasgow Dr. and all be treated alike. It will then be infinitely better for the qualified assistants and their position gain public recognition, which is what is so much wanted. Surely Mr. McAdam cannot complain if mice will persist in playing whilst the cat is asleep, and when she awakes to punish them for their daring; this is how the Society has acted, yet he says "it is not their fault." Have they never seen the long list three or four times a year of those who have passed the Preliminary—the struggles of those who have tried again and again for the Minor and have at last succeeded? Are they earning the reward for their struggles? Not yet, but the time is looming in the distance, if we can only get the Society to be still more awake and cope with the "Bogus Companies" also, when I believe the whole of the trade will be at its back. But we hear of the "widows' clause" being an impediment. Then sweep that away, and let there be no mistake about this Draft Pharmacy Act being of genuine benefit to all who qualify. LOCUST.

Sir,—As regards the addition of a clause to restrain company trading, chemists should be content with "what they can get and not what they would like." Such a clause would affect the great as well as the small, and what result but utter defeat would befall a Bill containing such a clause as your contemporary, the *Chemist and Druggist*, is clamouring for, did, say, the Army and Navy Stores alone send out (as doubtless they would) a whip to each of their shareholders, who number many thousands, asking their influence with their Parliamentary friends to preserve their vested interests. Why, the shareholders themselves are members of Parliament, army and navy men, doctors, parsons and men of influence from all over the country. I cannot help but think that had there been the remotest chance for such a measure passing, it would have been included in the Draft Bill.

I most heartily agree with the remarks of your correspondent, Mr. Robert McAdam, whose letter in your issue of November 8, I trust all chemists will carefully read. When the last Bill but one (the last was withdrawn) was brought forward, the late Lord Milltown added the "Branch Shop Clause," which provoked the opposition that killed the Bill. Much the same proposals as those suggested by Mr. McAdam were then made to the Society and to the President on behalf of the *bonâ fide* branch shop managers—men who are qualified by long practical experience and are thoroughly competent to conduct their business, and although part of the Council was in favour of granting these men an exemption clause, and several of the Council pleaded for them, a false idea of duty blinded the majority and the Bill went to the Commons. But the branch managers throughout the country laid their case before their several M. P.'s, and the result was the promise "that after the Bill had passed the second reading and was in committee the interests of the *bonâ fide* managers would be considered." But this did not quite meet the case or the views of the members who had promised to watch on behalf of the managers whose living was threatened, and so the Bill was blocked and never passed. "Live and let live" is a good old adage, and commends itself specially to us in this matter. These men ask for no official recognition, they only desire to be permitted to follow the business they have toiled at for years without feeling they may at any moment be in "the grip of the law." I plead most particularly for the branch shop managers, as a rule careful, skilful and competent men, and would suggest that all of, say fifteen years actual service as *bona fide* managers, should pay their subscription to the Society and receive exemption from the working of the Bill under that servitude. Give them so long grace to pass the Minor, and in certain cases without insisting on the Preliminary, the real stumbling block to men who have passed their first manhood. How much better to end all opposition by this simple concession once for all than risk the possibility of a defeated Bill again.

SALOL.

MILK OF SULPHUR PROSECUTIONS.

Sir,—Perhaps I may be allowed to supplement the very sensible letter of Mr. Symons in your last by the record of my own experience in the attempted sale of sulphur precipitatum in lieu of the commercial milk of sulphur, which experience I venture to say is precisely similar to that of hundreds of our brethren in the trade. Some fifteen years ago, if I remember rightly, there arose no small stir among officious analysts anent the assumed impurity of this substance, so resolving to introduce the pure article, I had a 7lb. parcel of it sent me. In every case in which I supplied it to my customers it was brought back with the remark that "I had made a mistake," or some message of a more uncomplimentary kind, no amount of explanation being sufficient to effect a sale of the pure article in a single case, my customers generally clinching their requests for its exchange with such remarks as "Well, it's no matter what this is, we wanted the old sort." The last occasion on which I sent out sulph. præcip. B.P. it was returned to me with the polite inquiry as to "What sort of muck this was?" After this "unsolicited testimonial" I gave up the attempt, and the parcel has since lain untouched on the warehouse shelf; but as some protection I had milk of sulphur labels printed with the addendum "not sulph. præcipitatum B.P." These have long since been used up and discontinued, as the subject appeared to be dead and buried, having, as I thought, received its quietus at the hands of Dr. Redwood and others in the Journal, as also in court about that time, and I am quite of Mr. Symons' opinion that if the articles and reports of cases which then appeared in it had been put in as evidence in the recent cases we might in all probability have witnessed a very different result. As it is I know not whether a precedent has not been created. If the crusade is to be recommenced, I suppose something after the style of my former label must be reverted to, though I am doubtful whether even this precaution would be sufficient in the presence of a cantankerous analyst and badly informed magistrate.

Mexboro'. R. J. SHIELDS.

Sir,—I beg to differ from Mr. Symons on the subject of milk of sulphur. For the last ten years I have retailed sulph. præcip. when asked for milk of sulphur, and venture to predict that is what the great majority of chemists do. I never get a complaint of not having supplied what any customer desired. In the next edition of the B.P. lac sulphuris would, I think, be welcomed as a synonym of sulph. præcip. and so settle the point. J. CLOWER.

Northampton.

HYOSCYAMUS.

Sir,—I notice that in your last issue Mr. Gerrard speaks of having had difficulty in obtaining annual henbane leaf from commercial channels. It may interest him and help to throw more light on the matter if the following note is placed on record.

During the month of June this year I picked a number of seed vessels from a parcel of foreign henbane; their contents were sown in open ground with a southern exposure, a few of the seeds being covered with a bell-jar. Of all that were sown one only germinated and that under the glass. The plant had at first every appearance of the first year's plant of the biennial variety; much to my surprise, however, it came into flower in September. The flowers had the yellow corolla with purple lines, generally recognized as characteristic of the flowers of biennial henbane. The plant is still alive and has several seed vessels; it is very improbable, however, that the seed will ripen, the seeds having been sown too late to allow the requisite time between the flowering time and the return of cold weather.

The lesson to be derived from this seems to me to be that foreign henbane is at least sometimes the leaves and tops of the annual plant, and that the purple striation of the corolla is not by any means—as is generally supposed—characteristic of the flowers of the biennial variety. The plant in question was very small when compared with a healthy second year's plant, and would not, judging from its appearance, yield more than an eighth of the weight of leaves that the latter would.

While this question is under discussion it would be interesting to have the experience of growers as to the difficulty of germinating henbane seed and any reasons there may be for it. I sowed in May this year a quantity of seed taken by a friend from wild second year's plants the autumn before last; not one of the seeds has germinated, although the situation was the most sheltered and sunny that could be found.

Sheffield. G. A. GRIERSON.

A LINGERING SUPERSTITION.

Sir,—We sometimes hear of "lingering superstitions in the country," but the following incident came under my notice the other day here within the metropolitan area.

Two respectably dressed females entered the shop and asked for some "quicksilver," one of them remarking as I weighed it out, "I suppose you do not know what we want it for, Sir." On my assuring them of my ignorance I was informed it was to cure rheumatism, the manner of use being to hermetically seal the bottle, securely encase it in leather and carry it in the pocket, when it would act as an infallible cure for and prophylactic against rheumatism. I have no doubt this is by no means a solitary experience, and it assists in explaining why Sequah and such like people flourish.

West Brighton. CHARLES H. TURVER.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Walker, Humphrey, Wall, Jones, Learoyd, Hooper, Southwell, Thompson, Clower, Rowell, Lawes, Morison, Waller, Riley, Arnot, Alston.

AN INVESTIGATION OF THE CONSTITUENTS OF THE ARTIFICIAL SALICYLIC ACID OF COMMERCE.*

BY PROFESSOR W. R. DUNSTAN AND MR. O. F. C. BLOCH.

[*From the Research Laboratory of the Pharmaceutical Society of Great Britain.*]

I. Historical.
II. Identification of Two Acids isolated by Williams.
III. Melting point of Pure Salicylic Acid.
IV. Re-investigation of the Constituents of the Artificial Salicylic Acid of Commerce.
V. Separation of Pure Salicylic Acid from the Impure Artificial Acid.

I.—Historical.

It has long been known that the salicylic acid prepared by Kolbe's reaction from commercial phenol (carbolic acid) contains a variable quantity of impurity or impurities. Among these impurities there are sometimes found a red colouring matter, unaltered phenol, and apparently other substances which had been associated with phenol in the crude carbolic acid. These substances it has been proposed to remove by dialysing the acid, on the assumption that unlike salicylic acid they are uncrystalline and therefore incapable of dialysis. Therapeutic observation has, however, disclosed the fact that both the commercial salicylic acid and that purified by dialysis produce effects when administered to the human subject which are not observed to result from the administration of the pure salicylic acid, prepared from the methyl salicylate contained in the natural oil of wintergreen.

In proposing dialysis as a means of purification no account had been taken of the possibility that, owing to secondary reactions occurring in the process of manufacture, other acids might be produced, notably the isomeride of salicylic acid, parahydroxybenzoic acid, and also the hydroxyisophthalic acid, which might result from a further action of carbon dioxide on the disodium salicylate first formed. Moreover, if the phenol employed were not pure, other acids might be formed from the cresols and xylenols contained in it, viz., those three varieties of the ten hydroxytoluic acids which are most conveniently designated cresotic acids and the hydroxyxylenic acids.

Professor P. W. Latham, of Cambridge, was one of the first to direct attention to the circumstance that the administration of large doses of artificial salicylic acid might be attended with serious if not with fatal consequences, and for this reason he advises, in his small work on the 'Treatment of Gout and Rheumatism,' as well as in his Croonian lectures, the exclusive employment in therapeutics of the so-called "natural" salicylic acid, derived from oil of wintergreen.

The existence of foreign acids in the artificial salicylic acid of commerce was first demonstrated by a former President of this Society, the late Mr. John Williams, in a paper published in 1878 (*Pharm. Journ.*, [3], viii., 786). In this paper it is shown that there is contained, even in the better qualities of artificial salicylic acid prepared from phenol, a foreign acid which may be isolated by taking advantage of the greater solubility of its calcium salt, as compared with calcium salt of salicylic acid. The plan recommended was the following. The salicylic acid is dissolved in boiling water and chalk is added until neutralization is complete. As the liquid cools impure calcium salicylate is deposited in distinct crystals if the original acid was not largely contaminated, but otherwise in indistinctly crystalline masses. This salt is then several times recrystallized from boiling water, until well formed and almost colourless crystals are obtained. These are decomposed in aqueous solution by hydrochloric acid, and the pure salicylic acid thus procured is crystallized from weak alcohol. By further concentrating the liquid containing the remainder of the calcium salt, more impure calcium salicylate is obtained, whilst the concentrated mother liquid from which no more crystals can be produced yields on decomposition by hydrochloric acid, a foreign acid which after purification and crystallization from alcohol, occurs in scales differing entirely from the crystals of pure salicylic acid. Mr. Williams did not proceed to examine or identify this acid, which he found to exist to the extent of from 15 to 20 per cent. in the artificial acid of commerce, but he remarks "as it is probably derived from cresylic acid, we might name it cresylsalicylic acid." Its physiological action was not ascertained. Eight years afterwards Mr. Williams informed one of us (D) that he had obtained a second foreign acid from commercial salicylic acid, which appeared to differ from the first, at any rate in its crystalline form, and he was anxious that its chemical nature should be ascertained. Accordingly a specimen of this acid, supplied by Mr. Williams, was examined and proved to be ortho-cresotic acid. Allusion will subsequently be made to the mode in which it was examined. Specimens of both these acids were presented by Mr. Williams to the Museum of this Society, and we are indebted to the curator, Mr. Holmes, for having allowed us to use a portion of the specimen of the first acid for chemical investigation. In a private communication to one of us Mr. Williams subsequently stated that in consequence of a correspondence he had with Professor Kolbe, the quality of the commercial salicylic acid had much improved, and in 1884 the amount of foreign acid contained in the best qualities had fallen to about 5 per cent.

No substantial advance was made in the elucidation of this matter until much later. In 1888 Ewell and Prescott (*Pharm. Journ.*, [3] xix., 328) proposed to estimate the quantity of foreign acids whose existence in artificial salicylic acid had been revealed by Mr. Williams, from a determination of the neutralizing power of the specimen. They point out that the foreign acids are probably hydroxytoluic and hydroxyxylenic acids, derived from the cresols and xylenols contained in the crude phenol from which the salicylic acid has been prepared, and since the formula-weights of these acids are greater, and consequently their neutralizing power less, than that of salicylic acid, it will be possible to estimate their quantity (assuming other substances to be absent) without actually isolating them, by determining the neutralizing power of a given weight of the specimen. One gram of orthohydroxybenzoic acid (salicylic acid) when pure will require for neutralization 726·3 c.c. of a centinormal soda solution, whilst 1 gram of a hydroxytoluic acid will need only 659·4 c.c. for neutralization, and the same quantity of hydroxyxylenic acid 603·8 c.c.

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, November 12.

Upon these differences in neutralizing power Ewell and Prescott founded a method of estimating the impurity in salicylic acid by titrating it with standard alkali. A commercial specimen examined in this manner was found to contain from 15 to 20 per cent. of "foreign acid," calculated as hydroxytoluic acid, it being assumed that hydroxyxylenic acids would only occur in small quantity. If isomerides of salicylic acid are present they will behave as salicylic acid itself. These observers also arrive at an approximate estimation of the amount of foreign acid present by distilling the commercial acid with lime and submitting the distillate (phenol and cresols) to the rough test of purity which is well known to those who have to examine crude phenol, depending on the greater readiness with which phenol reacts with alkali.

Messrs. Ewell and Prescott also ascertained whether the method by means of which Williams first isolated the foreign acid from salicylic acid could be rendered quantitative. The operation recommended by Williams (see above) was conducted three times in succession. By this means a certain quantity of pure salicylic acid was obtained, but a considerable amount remained with the foreign acid, which when titrated was found still to consist of 61 per cent. of salicylic acid, and in another experiment, where the process of purification was carried much further, more than 50 per cent. of salicylic acid remained attached to the foreign acid. From these results it was concluded that the method of separation based on the different solubilities of the calcium salts is not adapted for quantitative use.

B. C. Hesse (*Pharm. Journ.*, [3], xx., 174) experimented with the titration method proposed by Ewell and Prescott, and found in commercial specimens of salicylic acid from 30 to 40 per cent. of foreign acids.

In 1889 Bernhard Fischer (*Pharm. Zeit.*, xxxiv., 42, p. 327) published the results of an investigation of the methods of detecting and estimating the impurities present in commercial salicylic acid. Fischer remarks that the principal impurities in the artificial acid are probably parahydroxybenzoic acid, the isomeride of salicylic acid, the homologous hydroxytoluic or cresotic acids and hydroxyisophthalic acid. For the estimation of the cresotic acids Fischer made use of a modification of the titration method suggested by Ewell and Prescott. He observes that in carrying out the operation, these workers recommend the employment of 0·2 gram of the specimen which is titrated with centinormal soda solution. An error in weighing of ·001 will make a difference of 5·5 per cent. in the amount of cresotic acid found, while a difference of 0·3 c.c. in the volume of the soda solution used corresponds to a difference of 2·5 in the percentage of cresotic acid found. Fischer therefore proposes to reduce these errors to a minimum by employing for the titration a standard baryta solution instead of the soda solution suggested by Ewell and Prescott; the formula weight of baryta being greater than that of soda small errors in operating will not cause such large differences in the percentages of acid found; thus an error of ·001 in weighing will now produce a difference of only 0·8 in the percentage of cresotic acid. Working with this solution and observing certain precautions Fischer found that the results were trustworthy, assuming that other substances than cresotic acid are absent. The largest amount of foreign acid, calculated as cresotic acid, found in a number of commercial specimens was 6·5 per cent., whilst many specimens contained considerably less. Similar results were obtained when the titration was conducted on the impure acids (containing about 50 per cent. of foreign acids) produced by the conversion of the original specimen into calcium salt and separating the greater part of the less soluble salt in the manner suggested by Williams.

Attention is called by Fischer to the circumstance that the melting point of salicylic acid is considerably lowered by the presence of these foreign acids and that the mixture of acids melts irregularly, some portions softening and melting before others, so that the only definite point to be observed is that of complete liquefaction. The bath is heated to 150°C. before the tube is introduced and the temperature at which the substance is entirely liquid is noted. Fischer states that perfectly pure salicylic acid melts at 156·8° C., whilst commercial specimens of the artificial acid melt at 153·5°–156° C. No allusion, however, is made to the fact that various melting points of salicylic acid have been recorded, the best authorities stating that pure acid melts at 155°–156°. For the qualitative detection of the cresotic acid reliance is placed on the observation that salicylic acid containing 14 per cent. of other acids becomes pasty when heated with water to its boiling point; when 20 per cent. is present the mixture completely melts; whilst in presence of 40 per cent. the mixture is fluid at a still lower temperature. Hydroxyisophthalic acid was not found to be an invariable constituent of salicylic acid, but in one specimen from 0·5–1 per cent. was detected. Fischer does not seem to have attempted to isolate the cresotic acids in a pure state, so that they might be identified, and he remarks that their physiological action is unknown.

The only contribution to this part of the subject which remains to be noticed is a short paper by G. C. Henderson (*Journ. Soc. Chem. Ind.*, ix., 591), in which Williams's method of separating the foreign acids from slightly impure artificial salicylic acid is recommended as a means of preparing pure salicylic acid. Dr. Henderson worked in conjunction with Dr. Charteris, who will make further reference in his paper to the results they obtained. On the medical side, however, Dr. Charteris, of Glasgow, advanced the investigation a stage further by showing that the artificial acid purified by Williams's method is identical with the so-called natural acid in its physiological action and possesses no poisonous properties. The impurity in the commercial artificial acid apparently not obtained pure, was found to possess the toxic properties observed in the artificial acid before purification (*Trans. Roy. Med. Chirurg. Society*, 1890).

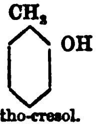
It will be seen from the foregoing brief summary of the most important work which has already been done on this subject that the toxic action of the artificial salicylic acid of commerce has been definitely traced to an impurity which seems likely to be the same as that isolated by Williams twelve years ago, and that since then no important advance has been made on the purely chemical side of the subject, the exact nature of this impurity still remaining very largely a matter of conjecture. We therefore decided to complete the chemical inquiry by isolating the foreign acid or acids in a pure state, identifying them, and, with the co-operation of Dr. Charteris, ascertaining whether they possess toxic properties. This having been done, we should then be in a position to work out a satisfactory method of separating chemically pure salicylic acid from the mixture which constitutes the artificial acid of commerce.

II.—IDENTIFICATION OF THE ACIDS ISOLATED BY WILLIAMS.

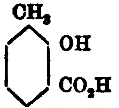
We have mentioned that in 1884 one of us, at the request of Mr. Williams, examined an acid which he had isolated from the artificial salicylic acid but had not further examined. The acid is not the same as that described in his published paper, and it does not appear that Mr. Williams ever published an account of the extraction of this second foreign acid. We are not aware of the method by which this acid was isolated, neither do we know whether it was yielded by the same specimen of artificial acid as that from which the other foreign acid was obtained.

This acid was in fine needle-shaped crystals and was apparently quite pure. It closely resembled salicylic acid, not only in appearance but also in certain of its chemical and physical properties. In cold water it was slightly soluble, but more soluble in hot water, very soluble in alcohol, and less so in ether and chloroform. It volatilized with steam, and its aqueous solution afforded a deep violet colour when mixed with ferric chloride. The crystals melted at 163°* and were thus distinguished from salicylic acid. The silver and lead salts of the acid were prepared and analysed. The silver salt, like that of salicylic acid itself, is very slightly soluble in cold water, and is obtained as a precipitate when the sodium salt is mixed with silver nitrate in aqueous solution; this precipitate was well washed, dried, and analysed. Weight of salt taken 0593 gram, weight of silver obtained ·0248 gram. = 41·83 per cent. Calculated for $AgC_8H_7O_3$ = 41·71 per cent.; for $AgC_7H_5O_3$ (silver salicylate) 44·05 per cent. The lead salt was prepared by adding a solution of lead acetate to an alcoholic solution of the acid. The salt, which is more soluble in water than lead salicylate, afforded the following results on analysis. Weight of lead salt taken ·3026 gram., weight of lead oxide obtained, ·1329 gram. = 43·91 per cent. Calculated for $Pb(C_8H_7O_3)_2$ 43·72 per cent.

These results prove that the acid is that variety of hydroxytoluic acid or cresotic acid, which on account of its great similarity to salicylic acid has been called orthohomosalicylic acid. It is otherwise known as β-cresotic acid. It stands in the same relation to orthocresol (C_7H_7OH) that salicylic acid stands to phenol (C_6H_5OH) and may therefore be conveniently called ortho-cresotic acid.



Ortho-cresol.



Ortho-cresotic acid.

The existence of this acid in artificial salicylic acid is easily accounted for, since ortho-cresol is a constituent of crude phenol, from which the salicylic acid is prepared, and it is known that ortho-cresotic acid can be produced from ortho-cresol by the same reaction which forms salicylic acid from phenol. The presence of a very small quantity of this acid in salicylic acid causes a remarkable lowering of the melting point, the mixture of acids melting at a lower temperature than either of its constituents. A mixture containing 50 per cent. of salicylic acid (m.p. 156·75° C.) and 50 per cent. of ortho-cresotic acid (m.p. 163° C.) after crystallization from alcohol melted at 126° C.

A specimen of this acid was sent to Dr. Charteris, so that its physiological action might be determined, and it will be seen from his experiments recorded in the following paper that the substance exerts a powerful toxic action.

We have also fully examined the other acid isolated by Mr. Williams and described in his paper above referred to. It consisted of almost colourless, scaly crystals which melted at 170·2° C. In order to determine whether it was a pure substance some of the specimen was fractionally crystallized from alcohol and the melting point of each fraction determined. The following results were obtained:—

Fraction I.	m. p. 174·25°
Fraction II.	m. p. 173·0°
Fraction III.	m. p. 172·1°
Fraction IV.	m. p. 170·1°

The substance was evidently not pure, and it was therefore converted into its lead salt by the addition of lead acetate to the alcoholic solution of the acid. Four fractions of lead salt were successively obtained from the liquid, and each fraction was decomposed with the necessary quantity of dilute sulphuric acid. From the mass of lead sulphate and acid, after it had been well washed, the acid was dissolved with hot alcohol. From the four alcoholic solutions crystals were obtained, having the following melting points.

Fraction I.	m. p. 174·5°
Fraction II.	m. p. 174·5°
Fraction III.	m. p. 174·3°
Fraction IV.	m. p. 161·1°

The acid from Fraction I. melting at 74·5°, was now crystallized from alcohol, so that four new fractions were produced. The melting point of each fraction was determined with the following results:—

Fraction I.	m. p. 174·5°
Fraction II.	m. p. 174·5°
Fraction III.	m. p. 174·5°
Fraction IV.	m. p. 174°

There was therefore no doubt that the acid melting at 174·5° was a pure substance. The silver salt of the acid was next prepared, and in its preparation advantage was taken of the opportunity of obtaining confirmatory evidence of the purity of the acid. The sodium salt was fractionally precipitated with silver nitrate and the acid was recovered from each fraction, of which there were three, and was found to melt at exactly the same temperature, viz., 174·5°.* The analysis of the silver salt gave the following results. Weight of salt taken ·286 gram; weight of silver obtained ·1191 gram = 41·64 per cent. Calculated for $AgC_8H_7O_3$ 41·71 per cent. The lead salt was next prepared and analysed. It was observed not to be so soluble in water as the lead ortho-cresotate, but more soluble than lead salicylate. The analysis yielded the following results: Weight of lead salt taken ·2163 gram, weight of lead oxide obtained ·0908 gram = 41·97 per cent. Calculated for $Pb(C_8H_7O_3)_2,H_2O$ 42·2 per cent.

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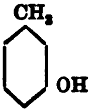
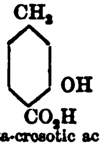
* All the melting-points recorded in this paper have been determined by means of a standardized thermometer. The finely powdered substance was contained in a small glass tube attached to the thermometer and immersed in the bath, so that the entire mercurial thread was heated. The necessity for the usual correction was thus avoided.

* Various melting points have been ascribed to meta-cresotic acid, ranging from 168° to 178° C. The present determination most nearly corresponds with that of Biedermann and Pike (*Ber.*, vi., 828), who found 174°.

This acid corresponds in all its properties with that variety of hydroxytoluic acid which from its resemblance to salicylic acid has been called meta-homo-salicylic acid. It has also been termed γ-cresotic acid, but it is more convenient to assign the name meta-cresotic acid to it, which recalls its derivation, by Kolbe's reaction, from the meta-cresol, from which indeed it has doubtless originated in this instance, the meta-cresol being one of the constituents of crude phenol from which the salicylic acid has been prepared. Its close resemblance to salicylic acid is seen in the following properties. When slowly crystallized from dilute alcohol it forms prismatic crystals not unlike those of salicylic acid, but when quickly deposited from a strong solution crystalline scales are obtained. In cold water it is only slightly soluble, but it is more soluble in hot water. Alcohol readily dissolves it, ether and chloroform less readily. It volatilizes with steam and its aqueous solution gives a violet blue coloration with ferric chloride. The relation of this acid to meta-cresol is shown by the formula



Meta-cresol.
($C_6H_4CH_3OH$).



Meta-cresotic acid.
($C_6H_3CO_2H{\cdot}CH_3{\cdot}OH$).

A specimen of meta-cresotic acid was sent to Dr. Charteris, who reports that it is devoid of toxic action.

It thus appears that the two foreign acids isolated by Mr. Williams from artificial salicylic acid are ortho- and meta-cresotic acids, which have originated with the ortho- and meta-cresols contained in the crude phenol from which the salicylic acid had been manufactured.

III. The Melting Point of Pure Salicylic Acid.

As is the case with most organic compounds, salicylic acid has been stated to melt at various temperatures. These temperatures range between 155° and 159° C. The principal chemical treatises accept as most correct the determinations of Hübner (*Annalen*, 162, 74) and Kohler (*Ber.*, xii., 246), who stated the melting-point to be between 155°-156°. The best of those commercial specimens which occur in small crystals melt near these temperatures. The British Pharmacopœia states that salicylic acid should melt at "about 155° C.," whether it has been prepared from oil of winter-green or from phenol. B. Fischer has pointed out that the pure acid melts at 156·8°, but he did not sufficiently investigate the question to satisfactorily establish this as the correct melting point.

As it was of considerable importance in connection with the inquiry we were making to know for certain at what temperature pure salicylic acid melts, the following experiments were made. The melting point of some fine crystals of salicylic acid obtained from oil of wintergreen was 156·75°. The crystals were dissolved in alcohol, and the solution partly precipitated with water, when a mass of woolly crystals was obtained, these also melted at 156·75°. The acid was in the next place converted into its sodium salt, and the solution partly precipitated with silver nitrate. The precipitate was well washed, the acid recovered from it and crystallized from alcohol. The crystals melted at 156·75° C. The acid was also recovered from the salt which remained dissolved in the filtrate from the silver precipitate, and was crystallized from alcohol. This also melted at 156·75°. Further evidence that the acid melting at this temperature was pure salicylic acid, was gained from an analysis of its silver and lead salts. The very sparingly soluble silver salt afforded the following results. Weight of salt taken, ·1759 gram; weight of silver obtained, ·0774 gram = 44·0 per cent. Calculated for $AgC_7H_5O_3$ 44·05 per cent. The lead salt, which is slightly soluble in cold water, but more soluble in hot water, was produced by adding a solution of lead acetate to a warm alcoholic solution of the acid. The salt, which forms fine needles, was recrystallized from water. Weight of salt taken, ·4441 gram, weight of lead oxide obtained, ·1972 = 44·54 per cent. Calculated for $Pb(C_7H_5O_3)_2,H_2O$ 44·56 per cent. The melting point observed by us is confirmatory of that obtained by Fischer, viz., 156·8°. The crystalline appearance of pure salicylic acid varies considerably, being dependent on the manner in which crystallization has been effected. If precipitated by water from its alcoholic solution a mass of woolly crystals is obtained, almost indistinguishable from the crystals of the impure acid met with in commerce. When slowly crystallized from alcohol or quickly from hot aqueous solution, long, thin needles are obtained. By extremely slowly cooling a boiling aqueous solution, containing nearly three times as much water as is requisite to dissolve the acid (*i.e.* about a 1 per cent. solution) thick, large distinct prismatic crystals are obtained, and the same characteristic crystals may be obtained by gradually cooling a solution in very weak alcohol. From an acid containing about 5 per cent. of one of the cresotic acids, it is most difficult, if not impossible, to obtain these large separate crystals. It has already been mentioned that the presence of a small quantity of one of the cresotic acids also affects the melting point of salicylic acid, very considerably lowering it. The determination of the melting point furnishes the only trustworthy evidence of the purity of a specimen of salicylic acid.

IV.—Re-investigation of the Constituents of the Artificial Salicylic Acid of Commerce.

Twelve years have elapsed since Mr. Williams isolated the two foreign acids from commercial salicylic acid, and since then considerable modifications have been made in the mode of producing salicylic acid from phenol. We therefore thought it desirable to ascertain whether the artificial salicylic acid of commerce still contained the foreign acids which are now identified and if so to what extent. We commenced work on the lines indicated by Williams, the salicylic acid being converted into calcium salt and crystallized in several fractions. From the more soluble salt the foreign acid would be obtained, from the less soluble salt after repeated crystallization pure salicylic acid would be produced. The operation was so conducted that six fractions of calcium salt were obtained. A determination of the melting point of each fraction would enable us to judge how far the plan could be successfully and economically employed for the separation of pure salicylic acid. The commercial acid used for the experiment had been prepared from phenol and was labelled "pure powder." It melted at 154·5°. One hundred grams were mixed with 37 grams of precipitated chalk and the mixture boiled with water until the resulting calcium salt had completely dissolved. The liquid was then cooled, when about 60 per cent. of the total quantity of salt crystallized out and this constituted the first fraction, which was filtered, washed with cold water and dissolved in the smallest possible quantity of boiling water. Hydrochloric acid was then added and the precipitated salicylic acid collected and washed with cold water until free from chloride. The acid was then crystallized from alcohol and the melting point of the crystals determined. The filtrate from the first fraction of calcium salt was concentrated and a second fraction was obtained from it, this process being repeated until six fractions were obtained, from each of which crystals of acid were produced in the manner described and the melting points were then determined. The results obtained were:—

Fraction I.	m.p. 155·25°
Fraction II.	m.p. 155·4°
Fraction III.	m.p. 155·8°
Fraction IV.	m.p. 156·1°
Fraction V.	m.p. 156·2°
Fraction VI.	m.p. 153·4°

None of these fractions consisted of pure salicylic acid (m.p. 156·75°). Fractions I., II. and III., which melted at about the same temperature, were now mixed and reconverted into calcium salt, the three fractions of which were decomposed with hydrochloric acid and the resulting acid crystallized from alcohol. The following were the melting points of the several deposits of crystals:—

Fraction I.	
1st crystals from alcohol,	m.p. 156·6°
2nd " " "	m.p. 156·75°
3rd " " "	m.p. 156·6°
4th " " "	m.p. 156·4°
5th " " "	m.p. 156·75°
Fraction II.	
1st crystals from alcohol,	m.p. 156·4°
2nd " " "	m.p. 156·6°
3rd " " "	m.p. 156·4°
Fraction III. " " "	m.p. 156·25°

A repetition of this process on the acid (m.p. 155·25°-155·8°) obtained in the first operation had resulted in the production of some pure salicylic acid (m.p. 156·75°). Nearly the whole of the fractions I. and II. from the second operation was pure acid, small differences in melting points being disregarded.

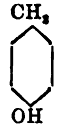
As far as the economical preparation of the pure acid is concerned the modified method used is very little, if at all, superior to the plan of several times recrystallizing the first fraction of salt before converting it into acid. In either case the separation of pure acid is a tedious and wasteful operation, and at its close a considerable quantity of the salicylic acid remains attached to the calcium salt of the foreign acid. This experience of the method confirms that of Ewell and Prescott. The plan is not capable of dealing with an impure acid which melts at 154°. With salicylic acid containing less impurity it may perhaps be more successful.

It now remained to isolate the foreign acid, the greater part of which was contained in the last fraction of the first operation. This melted at 153·4° and weighed about 2 grams. It was reconverted into calcium salt and this was recrystallized in fractions. The acid was regenerated from each and the melting points determined. The results were—

Fraction I.	m.p. 156·25°
Fraction II.	m.p. 153·75°
Fraction III.	m.p. 151·2°

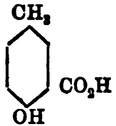
The third fraction when submitted again to the same treatment melted at 151°, at which point it remained constant. A pure acid had thus been obtained which was evidently different from either the ortho- or meta-cresotic acids. It closely resembled salicylic acid in its behaviour with solvents and was completely volatile with steam. Its aqueous solution was coloured deep violet by ferric chloride. When crystallized from hot water it formed fine needles, very like those of salicylic acid. It differed from salicylic acid in its melting point (151°), and in the greater solubility of certain of its salts in water. The silver salt, which is very slightly soluble in water, was prepared and analysed. Weight of salt taken ·1087 gram; weight of silver obtained, ·0457 gram=42 per cent. Calculated for $AgC_8H_7O_3$ 41·71 per cent., for $AgC_7H_5O_7$ (silver salicylate) 44 per cent. The lead salt was readily prepared in crystals, which were much more soluble in water than lead salicylate. Its analysis afforded the following results. Weight of salt taken, ·2964 gram; weight of lead oxide obtained, ·1303 gram=43·91 p. c.; calculated for $Pb(C_8H_7O_3)_2$, 43·72 p. c.

These results prove that the new acid is a third variety of hydroxytoluic acid, which has been called parahomosalicylic acid or α-cresotic acid, but which it is convenient to name para-cresotic acid, since it is derived from para-cresol by Kolbe's reaction.



Para-cresol.

($C_6H_4\cdot OH\cdot CH_3$).



Para-cresotic acid.

($C_6H_3CO_2H\cdot CH_3OH$).

This is the acid corresponding to the third cresol contained in crude phenol. A specimen of the substance was sent to Dr. Charteris, who reports that it exerts a marked toxic action when administered to animals.

We carefully searched the different fractions for ortho- and meta-cresotic acids, but not a trace of either acid could be found, and we shall have occasion later on to allude to the examination of another commercial specimen from which nothing but para-cresotic acid could be obtained. It would therefore appear that the impurity existing in the artificial salicylic acid of commerce is no longer the same that it was twelve years ago. Then it consisted of ortho- and meta-cresotic acids, now it consists of the para-cresotic acid alone.

V. The Separation of Pure Salicylic Acid from the Impure Artificial Salicylic Acid.

Having regard to the toxic properties of para-cresotic acid and to the circumstance that large doses of salicylic acid are now administered in the treatment of disease, it becomes a matter of importance to ascertain the best method of ridding the commercial substance of this impurity. We have already drawn attention to the fact that the separation by means of the different solubilities of the calcium salts is not sufficiently sharp to constitute an entirely satisfactory method unless the acid worked on is very nearly pure. It must be remembered that Mr. Williams had employed this process for the separation of the ortho- and possibly of meta-cresotic acid, whereas we now have to deal with the para-cresotic acid. Although calcium para-cresotate is considerably more soluble in water than calcium salicylate, yet when much of the salicylate is present considerable quantities of the para-cresotate remain obstinately attached to it and *vice versâ*. Moreover the method possesses the disadvantage that during the boiling of the solution of calcium salt some decomposition occurs leading to the formation of a red colouring matter.

We have made a series of experiments in the hope of discovering some more satisfactory method of purifying the artificial acid of commerce, of which we will now give some account.

The first experiments were made with silver salts. It was found that by fractionally precipitating with aqueous silver nitrate a solution of an impure sodium salt, prepared from artificial acid melting at 154°, an excellent separation could be effected, the first six fractions, representing more than 50 per cent. of the original substance, affording pure salicylic acid, whilst the acid from the later fractions, after being again fractionally precipitated with silver nitrate, yielded pure para-cresotic acid. Owing, however, to the expense attending the employment of silver salts, the investigation of this method of purification was not pursued.

Experiments were next made with the lead salts, it having been observed that lead para-cresotate was considerably more soluble in dilute alcohol and in water than lead salicylate.

Twenty grams of salicylic acid (m. p. 153·75) were converted into the sodium salt and the warm liquid was fractionally precipitated with lead acetate, added in successive small quantities. The acid recovered from the seven fractions had the following melting points:—

Fraction	I. m. p. 156·1	5 per cent.
„	II. m. p. 156·75° . . .	55 „
„	III. m. p. 155·75° . . .	5 „
„	IV. m. p. 153·9°	5 „
„	V. m. p. 150·7°	5 „
„	VI. m. p. 154·°	20 „
„	VII. m. p. 154·6°	5 „

The numbers printed after the melting-points show what percentage of the whole each fraction was. The second and third fractions constituted about 60 per cent. of the acid taken, and were very nearly but not quite pure salicylic acid. Thus far the method promised well; but a difficulty was encountered in the formation of a basic lead salicylate at different stages of the operation, the salt appearing as a nearly insoluble precipitate. This accounts in some measure for the irregularities which are apparent in the melting-points recorded above, some of the fractions being composed of normal salt, others of basic salt. Nevertheless, the process was not unsuccessful, since on mixing together the lower fractions and repeating the process of fractionation pure para-cresotic acid was obtained, in addition to more pure salicylic acid. Before proceeding further, we fully examined the properties of lead salicylate $(C_6H{\cdot}_4OH{\cdot}COO)_2Pb,H_2O$. It was found to be scarcely attacked by strong acetic acid, or by dilute nitric acid, but it was readily decomposed by dilute sulphuric acid and by hydrochloric acid. Strong nitric acid formed nitro-salicylic acid. Boiled for some time in water it formed a basic salt $(PbC_7H_4O_3)$, especially if a trace of alkali were present. This basic salt is almost insoluble in boiling water.

The effect of fractional precipitation as a basic salt was now tried, small quantities of solution of basic lead acetate being successively added to a solution of the impure sodium salicylate. Each precipitate was filtered off and the acid recovered from it. Four grams of commercial salicylic acid (153·75) were precipitated in this manner, and the following numbers represent the melting-points of the acids obtained from the several fractions:—

Fraction I.	m. p. 150·7°.
Fraction II.	m. p. 151·5°.
Fraction III.	m. p. 151·85°.
Fraction IV.	m. p. 152·75°.
Fraction V.	m. p. 153·25°.

The first two fractions yielded almost pure para-cresotic acid, while the later fractions also contained this substance, so that a repetition of the process on them would be necessary in order to obtain pure salicylic acid. We decided to more fully investigate the capabilities of the plan in the event of no better method being found. As we had noticed normal lead salicylate to be stable in presence of even strong solutions of acetic acid, experiments were made by precipitating salicylic acid itself with solution of lead acetate, lead salicylate being formed and acetic acid liberated. The salicylic acid was dissolved in diluted alcohol, the quantity of water alone required to dissolve the acid being so large as to render its employment impracticable.

One hundred grams of the acid (m.p. 153·75) were dissolved in 380 c.c. of strong alcohol and mixed with 138 grams of lead acetate dissolved in 500 c.c. of alcohol, after which half a litre more of alcohol was added. The solutions were mixed while warm. On cooling, a mass of crystals of lead salt was deposited, which was filtered and thoroughly washed with very dilute alcohol; this constituted the first fraction. Three-fourths of the alcohol in the filtrate was then distilled away and the remaining liquid as it cooled deposited a second large fraction of lead salt which was collected and washed. The filtrate was again concentrated by distillation until about 370 c.c. more of alcohol and water had distilled. The remaining liquid when cooled afforded the third fraction of lead salt. The filtrate, after evaporation, constituted the fourth and last fraction.

The acid was recovered from the washed lead salts by decomposition with about the calculated (for lead salicylate) quantity of 20 per cent. aqueous sulphuric acid. The semi-solid mass of lead sulphate and acid was washed with water and the salicylic or para-cresotic acid extracted from it with hot alcohol. The acids were caused to crystallize from alcohol in several fractions (indicated below by small numerals), the melting point of each fraction being taken. The following were the numbers obtained:—

Fraction I.

1. m.p. 156·75°. 61 per cent.
2. m.p. 155·4° . 2 per cent.
3. m.p. 154·1° . 5 per cent.

Fraction II.

1. m.p. 156·75°. 15 per cent.
2. m.p. 154·75°
3. m.p. 154·1° } 10 per cent.
4. m.p. 153·2°

Fraction III.

1. m.p. 150·7°
2. m.p. 150·3° } 6·5 per cent.
3. m.p. 149·85°
4. m.p. 139·6° . 3 per cent.

Fraction IV.

m.p. . 149·3 . 0·3 per cent.

It will be seen from these results that the whole of the first fraction of lead salt had afforded pure salicylic acid, amounting to 69 per cent. of the acid taken for purification, whilst the first three portions of the second fraction required a repetition of the treatment to yield about 12 per cent. more. From the later fractions somewhat less than 10 grams of para-cresotic acid had been obtained.

As this process answered so well on a comparatively small scale it was repeated with a larger quantity of acid. Half a kilogram of the same specimen of salicylic acid was converted into lead salt in the manner above described. The first fraction of salt represented about 75 per cent. of the acid originally taken. After having been drained and thoroughly washed it was decomposed and the recovered acid crystallized from alcohol. The acid thus obtained was pure salicylic acid. The later fractions yielded para-cresotic acid, while the intermediate fractions required to be further resolved by a repetition of the process. The following are the melting points of the acids yielded by the fractions of lead salt:—

Fraction I. . . . . 157·75° = 69 per cent.

Fraction II.

1 . . m. p. 156·4
2 . . m. p. 155·6
3 . . m. p. 155·0
4 . . m. p. 133·15 } 21 p. c.
5 . . m. p. 151·3
6 . . m. p. 150·8

Fraction III.

1 . . m. p. 150·8
2 . . m. p. 150·5
3 . . m. p. 155·1 } 6 p. c.
4 . . m. p. 148·3
5 . . m. p. 140·2

Fraction IV.

1 . . m. p. 153·7 } 2 p. c.
2 . . m. p. 147·5

Fraction V.

1 . . m. p. 149·7 } 1 p. c.
2 . . m. p. 148·4

The only difficulty that was experienced in the use of the process on the large scale arose from the accumulation of acetic acid in the concentrated liquid. The acetic acid and salicylic acids by reaction with the alcohol formed a small quantity of ethyl salicylate and acetate, which separated as an oil towards the end of the process. The acid was recovered from these esters after saponification with potash, the concentrated potash solution being decomposed with hydrochloric acid in the usual manner.

We have since attempted still further to improve the method by employing lead carbonate instead of the acetate.

Five grams of the same commercial specimen of salicylic acid which had been successfully purified by means of lead acetate were boiled with 300 c.c. of water and an equal weight of precipitated lead carbonate until all chemical action had ceased. The turbid liquid was filtered while hot, when some of the basic lead salt, together with a little unaltered lead carbonate were removed. The filtrate crystallized as it cooled, yielding a large first fraction of lead salt, and by repeated evaporations of the filtrate three other fractions were obtained. Each fraction was well washed with cold water and the acid recovered and crystallized from alcohol. The following numbers are the melting points of the acid obtained from the various fractions of lead salt:—

Fraction I.:—
1st crystals from alcohol. . . m. p. 155·75°.
2nd " " " . . . m. p. 155·6°.
Fraction II. . . . . . . m. p. 154°.
Fraction III. . . . . . . m. p. 152·75°.
Fraction IV. . . . . . . m. p. 152·6°

The plan had therefore proved no more successful than that in which the calcium salts had been similarly employed, the separation not being at all sharp. The next experiments were made with alcohol instead of water, but it was observed that the reaction between lead carbonate and salicylic acid is very sluggish in the presence of little water. It was therefore decided to form the lead salts with water as before and then to add alcohol before crystallization commenced.

One hundred grams of salicylic acid were mixed with 97 grams of lead carbonate and 700 c.c. of water. The mixture was heated in a water bath for about half-an-hour, during which time it was constantly stirred. All action being over 800 c.c. of alcohol (methylated spirit) were added. The liquid was then boiled and filtered from the basic salt which had separated. The filtrate crystallized as it cooled, and afforded a first fraction. This was filtered off and the liquid concentrated by distillation, when a second fraction was obtained, and by further concentration a third and fourth fraction. The melting points of the different specimens of acid were as follows:—

Acid from Basic Salt.
1st crystals from alcohol . . m.p. 156·75°.
2nd " " " . . . m.p. 156·
3rd " " " . . . m.p. 155·5°.

Fraction I.
1st crystals from alcohol . . m.p. 156·75°.
2nd " " " . . . m.p. 156·75°.

Fraction II.
1st crystals from alcohol . . m.p. 156·75°.
2nd " " " . . . m.p. 156·75°.
Fraction III. . . . . m.p. 154·1°.
Fraction IV. . . . . m.p. 151·3°.

The separation in this case was perfectly satisfactory. Seventy-six per cent. of the original substance had been recovered as pure salicylic acid in a single operation, the first two fractions of lead salt having yielded the pure acid. The fourth fraction, representing about 6 per cent. of the original substance, had yielded nearly pure para-cresotic acid. The fact that the second fraction, as well as the first, afforded pure salicylic acid shows that somewhat less alcohol might have been added to the original liquid, when the first fraction would have been larger; in actual practice the first fraction may safely represent rather more than 75 per cent. of the substance taken, but when much impurity is present it is better to recrystallize this large fraction from dilute alcohol (25 vols. meth. spirit, 75 vols. water) instead of washing it on the filter, in order to completely remove the adhering mother liquid. It is noteworthy that a considerable quantity of the basic salt is produced in this process. We find that this may be avoided, by adding to the hot aqueous liquid, as soon as the action between the lead carbonate and salicylic acid is over, from 3 to 4 grams of strong acetic acid for each 100 grams of salicylic acid employed, and then continuing the heating for a short time. By this means only a very small quantity of the basic lead salt is left insoluble

For the same reason, if it is necessary to recrystallize the first fraction of lead salt from dilute alcohol, acetic acid should be added to the liquid. By working in this manner we have obtained in a single operation 80 per cent. of pure salicylic acid from an impure specimen melting at 153·75°.

ADDENDUM.

Having regard to the fact that the British Pharmacopœia describes as one substance the pure "natural" acid and the impure artificial acid, assigning to both the same melting point of "about 155° C.," there is the possibility in practice of a confusion of the two substances, which in the light of Dr. Charteris' results may be serious or even dangerous. It seems distinctly desirable that advantage should be taken of the approaching publication of an "Addendum" to the British Pharmacopœia to include in it a description of "Purified" or "Pure Salicylic Acid," which alone should be employed for internal administration. This purified acid should be required to exist in separate, well defined prismatic crystals,* melting between 156·5° C. and 157° C. From this pure acid the sodium salicylate should be produced.

THE PHYSIOLOGICAL ACTION OF THE CONSTITUENTS OF THE ARTIFICIAL SALICYLIC ACID OF COMMERCE.†

BY M. CHARTERIS, M.D.

Professor of Therapeutics and Materia Medica, Glasgow University.

Dr. Latham, of Cambridge, in the Croonian lectures for 1886, thus formulated a rule for the administration of salicylic acid in the treatment of acute rheumatism:—"The true salicylic acid from the vegetable kingdom must alone be employed. If you have to give large doses avoid giving the artificial product from carbolic acid, however much it may have been dialysed and purified. An impure acid will very quickly produce symptoms closely resembling delirium tremens.".

From time to time, before and after Dr. Latham's statement, doubts as to the prudence of prescribing the artificial acid were expressed in professional circles, and occasional reports of bad symptoms having followed its use were published in the medical journals. From my clinical experience, when from giving it in the hospital patients became delirious, I could not fail to see that it was a remedy to be watched and not to be trusted, and I relied entirely for the last ten years on salicin and the natural salicylate of sodium in treating rheumatism.

But yet I felt I might have been mistaken, and I resolved, with the assistance of Dr. MacLennan, to enter upon an experimental research as to the physiological action of the two acids.

I may briefly summarize the first experiments which I carried on with Dr. MacLennan on natural and artificial salicylic acid and their salts of sodium, by stating that artificial salicylic acid in a 10 grain dose and artificial salicylate of sodium in an 18 grain dose were sufficient to cause the death of a rabbit weighing from 2½ to 3 lbs., while natural salicylic acid and its salt of sodium in proportionate doses caused no bad results.

The deductions from these experiments indicated that artificial salicylic acid and its salt of sodium were dangerous to animal life, while natural salicylic acid and its salt of sodium were not.

Further, it was shown that the difference was due to an impurity in the artificial acid, not a trace of which existed in the natural salicylic acid.

This impurity was observed by experiment to be of the nature of a slow but certain poison, and that its lethal dose was relatively much less than that of the salicylic acid from which it was obtained.

I therefore concluded from these experiments that artificial salicylic acid contained an impurity or impurities, and that until this or these could be extracted by the aid of chemistry, the internal administration of the acid or its salt should be discountenanced. Large and repeated doses of the sodium salt were necessary in the treatment of acute rheumatism, and hence the restlessness, the confusion and the delirium attendant at times on their use. The retarded convalescence also which occurred in some cases of acute rheumatism after the salicylate treatment was due in all probability to the great and protracted prostration to which the impurity or impurities gave rise. In connection with these symptoms it was noted that prescriptions for the salicylate of sodium were invariably made up, unless otherwise indicated, from the artificial and not the natural salt.

The conclusion of the paper, which was published in the *British Medical Journal* of Nov. 30, 1889, was "in a further communication we will state the physiological action of the acid from which the impurity has been removed."

An interval of some months elapsed before the artificial salicylic acid, purified by Dr. Henderson, of the Chemical Laboratory of Glasgow University, was submitted to the physiological test. The result was disappointing. We found that it caused death in a 10 gram dose, when administered to a full grown rabbit, and that the same thing happened when a sample of the acid of a Berlin firm, guaranteed pure, was tried under similar conditions.

In the paper read before the Royal Medico-Chirurgical Society on February 14, I entered into full details as to the time when an article by the late Mr. Williams was brought under my notice, in which one mode of purifying the artificial salicylic acid was given. Proceeding on the lines Mr. Williams laid down, and modifying in the final part his process by employing repeated slow crystallization from water instead of rectified spirit, a purified artificial salicylic acid was obtained identical in its chemical form, its solubility, its melting point and its physiological action with that of the natural acid. It was also shown that if the form, the solubility and the melting point varied in the artificial from that of the natural, no uniform physiological result could be obtained.

I did not venture to give a name to the impurity or impurities which could be extracted from commercial salicylic acid. I only said they were probably some form of cresotic acid, and left their investigation to chemists able and willing to make an exact analysis.

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* The occurrence of the salicylic acid in large separate crystals is not in itself satisfactory evidence of purity, since the presence of a small quantity of para-cresotic acid does not affect this property. We find that salicylic acid (m. p. 156·1°) containing 2 per cent. of para-cresotic acid can readily be obtained in these large distinct crystals, which are shown to be impure by their low melting point. Since, however, much of the artificial salicylic acid of commerce contains larger quantities of para-cresotic acid and cannot be obtained in fine crystals it might be well to require that the salicylic acid used for medicinal purposes shall melt at the proper temperature, and occur in large separate crystals.

† Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, November 12.

On the 4th of October I received with great pleasure a letter from Professor Dunstan, whose capabilities as a careful and competent chemist are well known in scientific circles, stating that he had made commercial salicylic acid a matter of investigation, and asking my co-operation in regard to the physiological action of the constituents which he had found in it. My assent was willingly given, and the results of these experiments will now be detailed.

On the 7th of October, 1890, I received from Professor Dunstan a sample of artificial salicylic acid and two samples of substances which had been removed from this acid and marked O-acid P-acid, and I subsequently received another substance marked M-acid. For convenience of description the characters of these samples will be given in their alphabetical order, although the details of their physiological action are recorded in the order of time in which they were examined.

M-acid (meta-cresotic acid).—Hard white crystals, melting-point 174·5 C.

O-acid (ortho-cresotic acid).—White silky crystals, very light, melting-point 163° C.

P-acid (para-cresotic acid).—Whitish powder, somewhat like coarse flour, melting-point 151° C.

Artificial salicylic acid.—Small crystals with slight interlacing needles, melting-point 157° C.

These samples were examined as to their physiological action in the following way.

O-acid. Oct. 18, 1890—10 a.m.—Two grains of this sample were dissolved in twenty minims of rectified spirit and injected into a rabbit, which weighed one and a half lbs. Within fifteen minutes the animal assumed a prone position, with its hind legs stretched out.* In the course of half an hour the breathing became laboured and there was also great prostration, as evidenced by the head resting between the fore-limbs and inability to move. In the evening the hind-limbs were completely paralysed, and in thirty hours from the time of the injection being given the animal died.

P-acid. On the same day and at the same time two grains of this sample similarly dissolved were injected into a rabbit also weighing one and a half lbs. In the course of thirty minutes slight symptoms of prostration were evinced, but it was found that these were not so severe as in the previous case, for when roused the animal could move about fairly well. Yet it was observed that the animal was under the influence of a poison by its refusing to take food and by the peaked expression of its face. On the morning of the 10th it was found dead, having lived twelve hours longer than the rabbit which had received the injection of ortho-cresotic acid.

Artificial Salicylic Acid.—This acid was slowly crystallized from solutions in boiling water, and as the result of this procedure the crystals became better defined. On October 28 ten grains dissolved in rectified spirit were injected into a rabbit weighing three pounds. Another specimen of the purified artificial acid from Professor Dunstan in larger crystals also afforded a satisfactory result.

M.-Acid.—November 1, 1890. Two grains of this sample dissolved in rectified spirit were injected into a rabbit weighing one and a half pounds. In this instance there was not the slightest evidence of any unhealthy action.

Summary.—The ortho- and para-cresotic acid by their physiological action show that they are slow but certain poisons, causing prostration and paralysis affecting first the hind limbs and gradually extending over the body. The lethal dose is about 1 grain for a pound rabbit. These facts, now corroborated, were mentioned in the article which appearedin the *British Medical Journal*, Nov. 30, 1889, as the result of trying the impurity obtained from salicylic acid, which Dr. Henderson had isolated by Mr. Williams's method but had not further examined. The meta-cresotic acid was innocuous.

The conclusion from all these experiments seems to be that a high melting-point is not the only or the best test for purity. Something more is required, and this is that the artificial crystals should be identical with those of the natural variety, for similarity of crystallization seems to be absolutely essential to secure a uniform and harmless physiological action. Pharmaceutical chemists may not have the apparatus or the time for applying the melting-point test, but they can all easily observe the difference between well-defined crystals, like those of strychnine, and others which present an appearance like quinine.

The well-defined crystalline form of the acid with a melting-point of almost 157° C., should be the official form of artificial salicylic acid, and from this alone should the salicylate of sodium be prepared.

I may add that if salicylic acid be prepared from synthetic carbolic acid, having a melting-point of 42° C., it then contains no impurity. Its melting-point is 157° C., and its physiological action is in every way satisfactory. This pure carbolic acid is about three times the price of the ordinary form, and until this can be reduced the more economical plan will be to produce salicylic acid from ordinary carbolic acid and subsequently to purify it.

I would recommend as additions to the forthcoming Addendum of the British Pharmacopœia—

ACIDUM SALICYLICUM PURIFICATUM.

Characters.—White, separate, large, prismatic crystals, inodorous, taste at first sweetish, then acid. Soluble in about 500 parts of cold water and 15 of boiling water; readily soluble in hot chloroform; soluble in alcohol and ether. Melting point about 157° C. Dose, 10 to 30 grains.

SODII SALICYLAS PURIFICATA.

Obtained by the action of purified salicylic acid on carbonate of sodium.

Characters.—Well defined white odourless crystalline scales, having a sweetish saline taste; soluble in nine-tenth part of its weight in water, or in 6 parts of rectified spirit. Dose, 10 to 30 grains.

Professor Dunstan agrees with me as to the importance of making these additions to the Addendum, and in this way avoiding the great delay which would be involved in waiting for a new edition or reprint of the Pharmacopœia itself.

[*The discussion on this and the preceding paper will be found on page* 442.]

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* The mode of injection in this and the following experiments may be stated. An assistant held the rabbit on its back. A piece of skin was picked up from the abdominal wall—the hypodermic needle was then inserted and the contents of the syringe slowly pressed out.

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following list of persons whose names will be erased from the Registers unless they communicate with him on or before December 30 next.

Those marked (*) are Pharmaceutical Chemists.

Abbott, Joseph Ortzen	18, Lamcote Grove, Lamcote Street, Nottingham.
Acton, Samuel Frederick	41, Barker Street, Lozells, Birmingham.
Adams, FrederickJoseph	26, New Charles Street, City Road, London, E.C.
Adcock, William	119, Hope Street, Birmingham.
Alexander, Hugh Dalrymple	46, Canongate, Edinburgh.
Allen, Ernest Edward	123, Lisson Grove, London, N.W.
Allen, Frederick	174, The Grove, Shepherd's Bush, London, W.
Allshorn, Adolphus Hahnemann	90, Dalston Lane, London, N.E.
Allwood, William Henry	15, Powis Gardens, Notting Hill, London, W.
Alvey, William Smith	156, Packington Street, Islington, London, N.
Anderson, George Harwell.	25, Marchmont Road, Edinburgh.
Appleby, Henry	40, Conder Street, Limehouse Fields, London, E.
Ashwin, Richard Charles	Beaulieu Villa, Green Lanes, Finsbury Park, London, N.
Atkins, Joshua William	18, Holly Terrace, Millfield, Sunderland.
Baigent, Thomas George	Market Place, Darlington.
Bake, Alfred Benjamin	Norwood Villa, Clifton Park, Birkenhead.
Baker, William	High Street, New Hampton, Middlesex.
Balderston, David	51, Naburn Street, Glasgow.
Balfré, Juan Morday	30. St. George's Place, Hyde Park, London, W.
Ball, Thomas	Auckland, New Zealand.
Ballard, William	1, Lansdowne Villas, Lillie Road, W. Brompton, London, S.W.
Barker, Charles Dexter	Herbert Villa, Cromwell Road, Bristol.
Barrett, Thomas Guppy	Ilchester, Somerset.
Bartlett, Frederick	Harleston, Norfolk.
Beaven, Alfred George	21, Paddington Street, London, W.
Beckett, Harry Rumbold	7, Atherton Road, Ilford Road, Stratford, London, E.
Bell, William	37, Wakefield Road, Bradford, Yorks.
Bell, William	Queen Square, Wolverhampton.
Bellars, John Osborn	30, Ferdinand Street, Chalk Farm Road, London, N.W.
Bennett, Henry	112, Upper George's Street, Kingstown, Dublin.
Billing, Charles	Wallasey, Liscard, Cheshire.
Birchall, Thomas Barrow	5, Bushell Place, Preston, Lancs.
Black, George	8, Maitland Street, Newhaven, Midlothian.
Blandford, John F.	2, Belgrave Villas, Lee, Kent.
Bookless, John	45, King Street, Maryport, Cumberland.
Boor, Jonathan	22, High Street, West Norwood, London, S.E.
Booth, George Boyer	Mossley, Lancs.
Bowie, George	49, Powis Place, Aberdeen.
*Bown, John Quinton	13, Lower Talbot Street, Nottingham.
Bradbury, Samuel William	Russell Road, Rock Ferry, Cheshire.
Bradley, John	12, Wilson's Buildings, South Street, Hull.
Briggs, James Spencer	23, Fleming's Square, Blackburn, Lancs.
Briggs, John	23, Fleming's Square, Blackburn, Lancs.
Broadhead, Richard	Aliwal North, Cape Colony.
Brockett, Richard Hodgson	41, Northumberland Street, Newcastle-on-Tyne.
Brookes, Philip	60, Uttoxeter New Road, Derby.
Brown, George	217, Edgware Road, London, W.
*Brown, George German	6, Windsor Villas, Blackheath Vale, London, S.E.
Brown, Thomas	10, Dock Street, Hull.
Brown, William	38, Blackstone Street, Liverpool.
Burbidge, Edwin	Stoneleigh Terrace, Kenilworth.
Burgoyne, James	Alperton near Ealing, London W.
Burke, Freeland	8A, Old Church Street, Paddington, London, W.
Burnett, George Thorne	Stogumber, Somerset.
Burnham, Charles John	458 Mile End Road, London, E.
Burnham, Charles John, jun.	458, Mile End Road, London, E.
Burton, Shadrach	30, Catherine Street, Leicester.
Butler, Christie Havelock	7, Defoe Road, Tooting, London, S.W.
Butt, John	8, High Street, Lincoln.
Capper, John	Royal Arsenal, Woolwich.
Cargill, Richard	82, Marine Parade, Brighton.
Carlton, Thomas Wokes	Thames Street, Kingston-on-Thames.
*Carter, Arthur Joseph	6, Avenue d'Eylau, près l'arc de Triomphe, Paris.
Chamberlain, William	90, Needwood Street, Churnet Street, Rochdale Road, Manchester.
Chard, John Aloysius	Ireland's Mansion, Shrewsbury.
Charlwood, Thomas Gilbert	125, New John Street West, Birmingham.
Charlton, Henry	1, Stafford Street, Barrow-in-Furness.
Childs, Charles John	65, Old Christchurch Road, Bournemouth.
Clark, George	19, Barker Street, Harpurhey, Manchester.
*Cleave, Samuel Whiteway	11, Aldersgate Street, London, E.C.
Clegg, Edmund	82, Church Street, Eccles, Lancs.
Clough, Thomas	52, Nuttall Street, Wavertree Road, Liverpool.
Coatsworth, Thomas	6, High Northgate, Darlington.
Cole, John	Whitchurch, Hants.
Collins, Henry	7, Lewins Mead, Bristol.
Comyns, Joseph Robert	Netherton, Maryport, Cumberland.
Cooke, Charles	2, James Street, Oxford Street, London, W.
Cooke, John	58, Kay Road, Clapham Road, London, S.W.
Cooke, Stephen	58, Kay Road, Clapham Road, London, S.W.
Cooper, Wightman	84, Elthorne Road, Holloway, London, N.
Cottman, Henry	4, Wellington Terrace, High Street, Upper Sydenham, London, S.E.
Courtenay, Alexander	Water Street, Demerara.
Cox-Davies, Charles	3, Saville Row, Great Malvern.
Crawford, Thomas	6, Wellington Place, Leith.
Crichton, Mary	Creetown, Kirkcudbrightshire.
Crosby, John Bernard	22, Fowler Street, South Shields.
Cull, Edwin	84, High Street, Cheltenham.
Currie, Alexander	Diamond Fields, Kimberley, S. Africa.
Cussons, Edward Coward	6, Brunel Terrace, Scotswood Road, Newcastle-on-Tyne.
Cutforth, John Dixon	9, Brushfield Street, Bishopsgate Street, London, E.C.
*Daintree, Ernest	Hillside, King's Langley.
*David, John	75, Oxford Street, Swansea.
Davies, Edward Henry	Maes-y-cwmwr, near Pontllanfraith, Mon.
Davies, John Albert	Grammar School, Llanidloes.
Dawney, Charles	242, King's Road, Chelsea, London, S.W.
Dawson, George Alan	105, St. James' Street, Burnley, Lancs.
Dawson, William Powell	H.M. Convict Prison, The Grove, Portland, Dorset.
Dearden, Verdon George Steade	Heeley, Sheffield.
Denny, Henry William	314, Rotherhithe Street, Rotherhithe, London, S.E.
Denton, Charles Hughes	Halifax, Yorks.
Dewar, James	2, Morrison Place, Piershill, Edinburgh.
Dibley, Alfred	21, Walnut Tree Place, Lambeth London, S.E.
Dick, James	Kilbarchan, Renfrewshire.
Dingle, Richard Hawke	Fore Street, Callington, Cornwall.
Dinwoodie, James Herbert	8, Roxburgh Terrace, Edinburgh.
Dixon, James	North Kelsey, Lincolnshire.
Dodds, Nicholas	35, Bread Street, Edinburgh.
Dodwell, John, junr.	178, Camberwell New Road, London, S.E.
Doran, Robert	338, Argyle Street, Glasgow.
Dores, James	10, Back St., James's Street, Newcastle-on-Tyne.
Duckett, George	2, Bairstow Street, Preston.
Elgar, Edwin Henry	Morden Road, Merton, Surrey.
Elvey, Thomas	8, Halkin Street West, London, S.W.
Evans, Henry	18, Victoria Grove, Nelson Street South, Birmingham.
Fairbrother, Joseph	Ash Cottage, Bent Lanes, Davyhulme, Manchester.
*Fazan, Charles Herbert	216, Goldhawk Road, Shepherd's Bush, London, W.
Fitter, Charles Joseph	Wolverhampton.
*Fletcher, Redfern	100, Richmond Road, West Brompton, London, S.W.
Follows, William	New Hampton Road, Wolverhampton.
Foster, Edwin	Beast Fair, Pontefract, Yorks.
Fothergill, Simon	30, Mount Vernon Road, Liverpool.
Francis, James	95, Fore Street, Exeter.

ranklin, Henry	61, Stockwell Green, London, S.W.
raser, Donald Halliday	1, High Street, Gt. Horton, Bradford, Yorks.
rayne, William Richard	Green Lanes, Wilnecote, near Tamworth.
ryer, Charles Hart	18, High Street, Kidderminster.
andy, William Seymour	169, Stamford Street, Ashton-under-Lyne.
Gardiner, William Eustace	193, Loughborough Road, Brixton, London, S.W.
Garlike, Thomas	Ripley, Surrey.
Garnett, James	8, Moss Terrace, Upper Moss Lane, Manchester.
Gasson, William	Crawley, Sussex.
*Gerard, Philip Augustus	60, St. George's Road, London, S W.
*Gilbert, William John	The Cottage, Ventnor, Isle of Wight,
Goodworth, Thomas Moore	81, Willoughby Street, New Lenton, Notts.
Goulstone, Cornelius Edward	18, Commercial Street, Mountain Ash, Glamorganshire.
Graham, David	32, Polmadie Road, Glasgow.
Graham, Robert	St. Merrin Street, Paisley.
Greaves, Eccles	49, High Street, Mexborough, Yorks.
Greaves, George Statham	49, High Street, New Mexborough, Yorks.
Griffith, Martin Luther	17, Dorchester Place, Blandford Square, London, N.W.
Grimes, Benjamin	2, Infirmary Square, Leicester.
Haffenden, James	Virginia Cottage, St. John's Road, Margate.
Hall, Abel	Edonfield, Lancs.
*Hall, Alfred Richard	9, Stanrarer Place, Maida Vale, London, W.
Hamilton, Charles	29a, Munster Street, Regent's Park, London, N.W.
Hargreaves, Joseph	50, Sankey Street, Warrington, Lancs.
Harrison, Stephen Wright	83, Barnsdale Road, St. Peter's Park, London, W.
Hartley, Thomas	10, Regent Street, Haslingden, Lancs.
Hartshorn, Thomas	84, Kirkstall Road, Leeds.
Hateley, John Henry	128, West Street, Oldham.
Hatrick, John B.	Millerstan Place, Dunoon, N.B.
Havell, Charles John	Beulah House, Nelson's Place, Ryde, Isle of Wight.
Hay, Edmund John	14, Bond Street, Leeds.
Haycock, Henry	135, City Road, London, E.C.
Heape, Thomas	11, Fishergate Hill, Preston, Lancs.
Henry, James	129, Grange Road, Bermondsey, London, S.E.
Herring, Thomas	Thorner, near Leeds.
Heywood, Thomas	Chesterfield, Derbyshire.
Highmoor, George Samuel	46, Waterworks Street, Hull.
Hill, Elizabeth	6, Gladstone Terrace, West Hill, Hastings.
Hill, Martha	Oak Hill, Stoke-on-Trent.
Hindson, Joseph	Castle Street, Carlisle.
*Hitchcock, Arthur William	5, Bathurst Street, Hyde Park Gardens, London, W.
Hoad, Frank	Guildford Street, Chertsey.
Holland, William	Carlton, Notts.
Hollis, Richard Montague	14, Royal Hill, Greenwich, London, S.E.
Holme, Paul	11, Thirwall Road, Heeley, near Sheffield.
Holmes, Charles Joseph	10, Keppel Street, Russell Square, London, W.C.
Holmes, Charles Newman	Lambourne End, near Romford, Essex.
Holmes, John	Oxford House, Colwyn, North Wales.
Hornby, Robert William	33, Market Street, Over Darwen.
Huggett, Sydney	Criterion Buildings, Upper Holloway, London, N.
Hughes, Thomas Llewellyn	23, Bayswater Terrace, London, W.
Hunt, William	48, Cross Green Lanes, Knostrop, Leeds.
Hunter, Andrew	10, Glengyle Terrace, Edinburgh.
Hunter, Robert	492, Springburn Road, Glasgow.
Hurley, Edward William	137, Lewisham High Road, London, S.E.
Hutton, Thomas	Klift Drift Diamond Fields, South Africa.
James, James Thomas	376, Edgware Road, London, W.
James, John	Opposite Greig Chapel, Ogmore Vale, Bridgend, Glamorganshire.
James, John	Crickhowell, Brecknockshire.
Jeffries, Gilbart	61, Trinity Square, London, S.E.
Jenkins, David Morris	Bute Street, Treherbert, Glamorganshire.
Jenkins, John	8, Neeld Terrace, Harrow Road, London, W.
*Johnson, Edward Eli	4, Colquitt Street, Liverpool.
Johnson, Frances	Hutton Cranswick, Yorks.
Johnson, John Walters	2, Bromfield Pavement, Uxbridge Road, London, W.
Johnson, Mark	7, Barnes Street, Oakenshaw, Clayton le-moors, near Accrington, Lancs.
Johnstone, Henry	"Birchgrove," Erdington, near Birmingham.
Jones, Ebenezer	Abergiynolwyn, Merionethshire.
Jones, George Henry	Pagett Villa, Lea Bridge Road, Leyton, London, E.
Jones, Henry Stevens	Royal Naval Hospital, Haslar, Hants.
Jones, John	Taliesin, Cardiganshire.
Jones, Llewellyn Phillips	Victoria Road, Ebbw Vale, Mon.
Jones, Margaret	Llandinorwic, Carnarvonshire.
*Jones, Thomas	6, Wolsey Villas, Barnes Green, London, S.W.
Jones, Walter Robert	Moat Lane, Smithfield, Birmingham.
Jones, William Henry	29, Reedworth Street, Kennington, London, S.E.
Joseph, Arthur Iorwerth	14, Grand Parade, St. Leonards-on-Sea.
Kay, John	119, West Derby Road, Liverpool.
Keen, Walter Henry	21, Wellington Road, St. John's Wood, London, N.W.
King, Abraham	1, High Street, Dunstable, Beds.
Kirk, James	18, Brougham Place, Edinburgh.
Kirtley, John George	62, Gibson Street, Newcastle-on-Tyne.
Knight, Charles	88, Market Place, Penzance.
Knight, John Edward	Hampton, Middlesex.
*Knight, Thomas	Myrtle Villa, Braithwaite Road, Birmingham.
Laird, Joseph	16, Cross Street, Blaenavon, Monmouthshire.
Lamb, William Davis	14, St. Alban's Villas, Highgate Rise, London, N.
Lancashire, John	53, Arbour Street, Southport, Lancs.
*Lance, Henry	6, St. George's Road, London, N.
Lane, George William	15, Wellington Street, Camden Town, London, N.W.
Langford, Charles	87, Fore Street, Hertford.
Langton, William Crowder	Milner Lodge, Napier Terrace, Islington, London, N.
*Laurens, Frederick Lemprière	32, Gough Street, Poplar, London, E.
Lea, Harry	209, Dunstall Road, Wolverhampton.
Leach, Peter	Wish Court Villa, Cullompton, Devon.
Lee, John	18, Woodhead Street, Newpellon, near Halifax.
Leicester, Frederick	Castle Street, Northwich, Cheshire.
Leslie, James	29, Bankside, Southwark, London, S.E.
Lewin, John Harrie Stockwell	38, Robertson Street, Hastings.
Lewis, David William	Aberdovey, Merionethshire.
Lewis, John Workman	19, Evesham Street, Redditch, Worcestershire.
Lewis, Rebecca	Green Hill Cottage, Crickhowell.
Linay, Thomas William	383, Lodge Road, Birmingham.
Lister, Charles	Queen Street, Derby.
Litchfield, John	143, Campbell Road, Stoke-on-Trent.
*Little, Arthur Nicholas	5, Versailles Road, Anerley, London, S.E.
Lockhart, Charles	56, Main Street, Renton, Dumbartonshire.
Lockwood, William	262, Ribbleton Lane, Preston, Lancs.
Lodge, Arthur William	281, Hackney Road, London, E.
Loeffler, George Berthold	8, Mathien Street, Berlin.
Logan, Francis	High Street, Nantwich.
Lupton, Slater	367, South Terrace, Oldham Road, Rochdale.
McCallum, Alexander Inglis	59, Cumberland Street, Edinburgh.
MacCreath, David	25, Frederick Street, Edinburgh.
Macdonald, Robert	150, Trongate Street, Glasgow.
Macfarlane, Hugh	170, Cathcart Road, Govanhill, Glasgow.
McGruer, John	27A, West Muir Street, Parkhead, Glasgow.
McInnes, Archibald Sinclair	7, Bank Hall Street, Govanhill, Glasgow.
Mackay, William	260, Union Street, Aberdeen.
Mackie, George	21, Duke Street, Edinburgh.
MacNay, Susan	Millfield, Sunderland.
McNeil, James Norton	77, Victoria Street, Crewe.
Mangnall, Thomas	202, Bradford Road, Manchester.
Marshall, Richard	8, Barker Street, Lozells, Birmingham.
Massa, William	385, New Shoreham Street, Sheffield.
Mauchlen, Robert	14, Albion Terrace, South Shields.
*Mayfield, John Thomas	High Street, Nottingham.
Meakins, Thomas Hopkins	Adelaide Place, St. George's, Bristol.
Meluish, John	10, Church Lane, Hendon, Middlesex.
Melhuish, Thomas Boucher	10, Church Lane, Hendon, Middlesex.
Meredith, James	Holborn Hill, Millom, Cumberland.
Michell, Frederick J. Curlett	20, Arwenack Street, Falmouth.
Milne, Andrew	11, Langton Street, Chelsea, London, S.W.
Mitchell, William	15, High Street, Ashford, Kent.
Mitchell, William Kirkpatrick	35, Bread Street, Edinburgh.

Moody, Alfred	High Street, Wimborne Minster.
Moore, Sarah	155, Kirkdale Road, Liverpool.
Morgan, Charles	19, Oxford Street, New Clee, Grimsby.
Morris, George John	2½, Cherry Street, Temple Row, Birmingham.
Moyle, Joseph	27, Broadway, Hammersmith, London, W.
*Munro, John Morrison	1, Salisbury Square, Edinburgh.
Newman, Joshua Booth	13, Great Hampton Street, Birmingham.
Newton, Arthur	36, Oxford Street, Liverpool.
Newton, John Titus	Ossory Villa, Ossory Road, London, S.E.
Nielson, Walter	58, Rumford Street, Manchester.
Nolen, James	8, Coleshill Street, Birmingham.
Oakes, Henry	80, Gloucester Road, South Kensington, London, S.W.
Oakey, Joseph	2, Denison Place, Rusholme, Manchester.
Oates, Charles	Longroyd Bridge, Huddersfield.
Ocock, Mary Grace	Dulverton, Somerset.
Owen, James	120, Great King Street, Birmingham.
Owen, Richard	Llanfachreth, Anglesea.
Owen, Rowland	Min-y-don Llanfair, Anglesea.
Palmer, George Smith	16, Robertson Street, Hastings.
*Parker, John Samuel	20, Broadgate, Lincoln.
Pasco, John	149, Chapel Street, Salford.
*Pasmore, Frederic Rich	82, King's-Road, London, S.W.
Passmore, Charles Frederick	96, Westborough, Scarborough.
Paul, Andrew	712, Gallowgate Street, Glasgow.
Paul, Henry Stanley	106, Ledsam Street, Birmingham.
Payne, Jacob Hugh	138, Newington Butts, London, S.E.
Payne, William Henry	Prospect House, Horwich, near Bolton.
Pearson, Charles Frederick	Park Road, Liverpool.
Pearson, Laura	25, Aigburth Road, Grassendale, Liverpool.
Penfold, Oliver	4, Blackmoor Street, Drury Lane, London, W.C.
Pheasant, William	8, Airedale Mount, Bradford, Yorks.
Philp, Joseph	Station Road, Horley, Surrey.
Pickburn, George Henry	10, King Street, Newcastle-under-Lyme, Staffs.
Pirie, James Crichton	22, Kemp Place, Edinburgh.
Plummer, Arthur	32, Robertson Street, Hastings.
Powell, Ernest George Barrup	Colonial Hospital, Suava, Fiji.
Powell, John	8, Springfield Terrace, Bowes Park, London, N.
Poyser, Robert	Morden Road, Merton, Surrey.
Preston, Alfred Prince	13, Church Street, Middlesborough.
Prettejohn, Robert Froude	10, High Street, Camden Town, London, N.W.
Quicke, Pitman Richard	376, Edgware Road, London, W.
Raffan, Robert	10, Union Street, Leith.
Ransome, Thomas	6, Bond Street, Manchester.
Reynolds, James John	3, Chapel Place, Cavendish Square, London, W.
Rich, Thomas	233, New Cross Road, London, S.E.
Richardson, John	13, Savile Street, Hull
Richford, Edwin Miller	51, Stoke Newington Road, London, N.
Robinson, Henry	1A, Canning Street, Liverpool.
Robinson, Henry Chetham	253. Malpas Road, Brockley, London, S.E.
Robinson, John	69, Constitution Hill, Birmingham.
*Robinson, John	184, Devoe Street, Williamsburgh, U S.A.
Robinson, John Edward	Huttoft, near Alford, Lincolnshire.
Robinson, John Francis	59, Gilkes Street, Middlesborough-on-Tees.
Robinson, William	69, Constitution Hill, Birmingham.
Roe, Ann	Tranquil Vale, Blackheath, London, S.E.
Rogers, George Edward	8, Rolle Street, Exmouth.
Rutter, Clement Thomas	14, Hotspur Street, London, S.E.
Salt, Thomas G.	63, Downs Park Road, Hackney, London, N.E.
Sampson, Henry	10, London Street, Southport, Lancs.
Sampson, Nicholas Mackey	1, Charles Street, St. John's Wood, London, N.W.
Sanders, Edgar Arthur	146, Hockley Hill, Birmingham.
Saxton, Henry	3, Beaumont Villas, North Finchley, London, N.
Seaman, Newcome	550, Dairy Coates, Hull.
Searby, Wright	99, Grey Street, Newcastle-on-Tyne.
Shadford, Major	19, Milton Street, Nottingham.
Shakespeare, Alfred William	27, St. Mark's Crescent, Regent's Park, London, N.W.
Shaw, George Benjamin	124, Bridge Road West, Battersea, London, S.W.
*Shephard, William Arthur.	Market Place, Ripley, Derbyshire.
Short, William	King Street, Wimborne, Dorset.
Skyrme, Henry Edward	12, Richmond Terrace, Park Place, Cardiff.
Smith, Alfred	46, Clumber Street, Nottingham.
Smith, John	The Lodge, 9, Dingle Lane, Toxteth Park, Liverpool.
Smyth, Thomas Spring	234, Marylebone Road, London, N.W.
Spencer, Edward Fowler	14, St. Aldate's Street, Oxford.
Spencer, Robert	193, High Street, West Bromwich.
Spragg, Elizabeth Ann	Dunkinfield, Cheshire.
Squire, Frederick John Cripps	Dispensary, Queen's Road, Brighton.
Steel, Richard	Castle Bytham, Lincolnshire.
Steele, William	North Quay, Maryport, Cumberland.
Stevens, Edmund Matthew	30, Terminus Road, Eastbourne.
Stevens, James	Staincliffe Hall, Dewsbury.
Stevens, Stephen Nobbs	3, St. Peter's Road, Great Yarmouth.
Stone, Samuel	Grappenhall, near Warrington.
Stovell, Edwin	4, Market Place, Walthamstow, Essex.
Strawson, Henry	3, Cobden Place, Leeds.
Stubbs, Edwin	Spring Bank, Hull.
Sturdy, Thomas Metcalfe	80, Gloucester Road, London, S.W.
Summers, Thomas Daniel	25, Silver Street, Durham.
Surman, Thomas William	5, Ogle Terrace, South Shields.
Sutcliff, John	8, Victoria Buildings Parade, Sutton Coldfield.
Sutton, John Dexter	217, Jamaica Road, Bermondsey, London, S.E.
Symons, Williams Henry	95, Fore Street, Exeter.
Taggart, Robert	Harrold's Cross Road, Dublin.
Tait, Robert	Penicuik near Edinburgh.
Taylor, George Haddah	19, Beatrice Road, Bermondsey, London, S.E.
Taylor, Robert Allan	35, High Street, Perth.
Thomas, Samuel Charles	Yaxley, Hunts.
Thompson, Frederick	155, Fitzalan Street, Sheffield.
Thompson, Leonard	Market Place, Thirsk, Yorks.
Thomson, James Hood	Argyle Street, Dunoon, Argyleshire.
Thornley, Samuel	Bickinhill, Worcestershire.
Tocher, George	236, Paisley Road, Glasgow.
Todd, Edwin Hodgson	98, St. George's Road, Southwark, London, S E.
Todd, Levi	154, Moss Lane East, Manchester.
Trevaskis, George Marrack	50, Union Street, Plymouth.
Tucker, William Tyler	2, Bathurst Street, Sussex Square, London, W.
Turner, Thomas	Glenarm House, Clapton Park, London, N.E.
Turton, Randolph Culwick.	17. Dalzell Road, Stockwell, London, S.W.
*Upjohn, Henry C.	118, High Street, Oxford.
Upton, John	61, Culford Road, London, N.
Uttley, Thomas	225, Ridgway Street, Oldham Road, Manchester.
Vick, John	30, Southgate Street, Gloucester.
*Vincent, John Beckley	22, High Street, Kensington, London, W.
Wakelin, Herbert Warters.	35, Chestnut Terrace, Forest Gate, London, E.
Walford, Ryland James	East Grige, Wantage, Berks.
Walker, John	21, Duke Street, Edinburgh.
*Walker, John Sydenham	60, St. George's Road, London, S.W.
Walton, John	Dudley Road, West Bromwich.
Ward, Josiah	High Street, Steyning.
Ward, Thomas Rowland	78, Derby Road, Salford, Manchester.
Webster, James	Derwentwater Road, Gateshead-on-Tyne.
Welsh, Thomas	14, West Newington Terrace, Edinburgh.
Whewell, Herbert	101, Alston Street, Ladywood, Birmingham.
White, Thomas	107, St. Patrick Street, Cork.
White, William Henry Hyde	2, Exchange Buildings, E. Dulwich Road, London, S.E.
Wickes, Gerald Noel	5, Paradise Place, Tything, Worcester.
*Wilkinson, Robert	The Willows, Kirkham, Lancs.
Wilkinson, William Henry	2, Exchange Buildings, E. Dulwich Road, Peckham Rye, London, S.E.
Williams, George Seath	19, Edgcumbe Street, Stonehouse, Devon.
Williams, Thomas	Knowle Road, Bristol.
Williams, William Jones	8, Park Terrace, Sutton, Surrey.
Williams, Wm. Roderick	Raglan Place, Pentre Pontypridd.
Willison, Alfred Augustus	New Market Place, Beccles.
Wilson, Joseph Gilpin	40, Aldermanbury, London, E.C.
Woodcock, Francis Thompson	Crindau, Newport, Mon.
*Worthington, William	12, Grafton Street, Preston.
Wyatt, William	Sun Street, Hitchin.
Young, Robert John	Banwell, Somerset

The Pharmaceutical Journal,

SATURDAY, NOVEMBER 22, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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PROFESSOR KOCH'S REMEDY FOR TUBERCULOSIS.

OF the various diseases to which mankind is liable, tuberculosis is the one to which the adjective ubiquitous is most appropriately applied. It has held, at all times and among all civilized peoples, a foremost place among the national diseases, and it extends over every part of the habitable globe. It was formerly the custom to assume that all diseases accompanied by the formation of tiny nodules or tubercles in the tissues, especially in the lungs, were examples of tuberculosis. This caused many diseases to be regarded as tubercle, which with our present knowledge would be excluded from the class. Thus the term tuberculosis possessed until very recent times merely a generic significance. The first attempt to give the term a specific value was the discovery of the giant-cell among the cellular constituents of the nodules. Careful histological research soon showed that giant-cells were present in formations which, even by the most elastic use of the term, could not be regarded as tubercle, whereas many apparently typical nodules did not possess this particular cell. It became gradually clear that the giant-cell could not be regarded as the criterion of tubercle. The question assumed a new aspect when Dr. R. KOCH announced to the Berlin Physiological Society, March 24, 1882, that he had discovered a micro-organism peculiar to tubercular formations. This, the now famous tubercle bacillus, is a rod-like body, its length being a third of the diameter of a red blood corpuscle and its breadth is one-fifth of its length. These bacilli are most abundant in fresh tubercles, but occur sparingly in older ones. Their presence can only be manifested after the preparations have been stained by appropriate reagents, and are only visible under high powers of the microscope. The ingenuity of histologists soon devised simpler methods for demonstrating these minute organisms than those introduced by KOCH, and the bacillus described by him soon became recognized as the criterion of tubercle. KOCH, however, did more than demonstrate the connection between the bacilli and tubercular lesions; he cultivated them outside the body and found that they flourished best at a temperature between 30° C. and 41° C. He also introduced the cultivations into animals susceptible to tuberculosis and produced the disease, thus demonstrating unmistakably that tuberculosis was the direct result of the introduction into a living body of these minute organisms. This fact settled, it naturally followed that attempts should be made to cure at least pulmonary consumption by administering drugs, either by the mouth or in the form of inhalations, which were poisonous to the bacilli. To this end carbolic acid and other agents used in antiseptic surgery were requisitioned, but with unsatisfactory results. At the recent meeting of the International Congress at Berlin, KOCH again startled the medical world by stating that he had discovered a cure for tubercle; at least, that he had a remedy which conferred on animals an immunity against tuberculosis. Investigations have now been carried out on human patients. The precise nature of the preparation used by KOCH is yet a secret, but we know it to be a brownish transparent liquid which does not require especial care to prevent decomposition. Judging from the meagre accounts as yet available, it is reasonable to regard this fluid as containing some substance (ptomaine) produced by the bacteria, and that the method is on the same lines as those utilized by PASTEUR for hydrophobia. The manner of using the remedy is also that employed by PASTEUR, viz., subcutaneous injections. The accounts which have already come to hand are extremely gratifying, and the administration of the remedy has this great advantage, that when injected into healthy individuals it does not produce the disease against which its use is directed. When injected into healthy persons it produces some very pronounced symptoms, which usually pass off in a few hours. The statements which have been published regarding the effects of the remedy on lupus are almost incredible, and serve to astonish those who are acquainted with the histological details of the healing of wounds and sores. The accounts which have found their way into print during the last few days have been more temperate and reasonable. It is now claimed for the remedy that in tuberculosis of glands, bones, joints and in lupus, mild and recent cases are speedily cured and slow improvement ensures in severe cases.

The method is now being submitted to an extensive and critical trial in Berlin; the generous facilities offered by KOCH for supplying the lymph will enable it to be carried out simultaneously in other cities, and it is to be hoped that the remedy will fulfil the sanguine expectations of its discoverer. Even if his hopes are realized only in part he will deserve and receive the most hearty thanks of the whole civilized world, and be justly regarded as one of the greatest benefactors to suffering humanity, for we may with reason regard this discovery as the commencement of a series of similar remedies for a long list of diseases of which tuberculosis is a type.

We have been requested by the Registrar to call attention to the list printed on pp. 438-440 of persons whose names will be erased from the Register of Chemists and Druggists unless they communicate with him on or before the last day of the present year. The names are those of persons to whom two registered letters, directed to their registered addresses, have been sent at an interval of six months, inquiring as to their present address, without any reply having been received. According to section 10 of the Pharmacy Act, which provides for the keeping of the Register, after the lapse of three months from the sending of the second letter without response, the Registrar is authorized to erase the name of the defaulter from the Register, and he now notifies that in exercise of the power vested in him he will erase the names of all persons included in the published list who do not communicate with him on or before the 31st of December. The assistance of Local Secretaries and others is requested in bringing the official notification to the knowledge of any of the persons concerned with whom they may be acquainted.

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The length of the reports of the meetings held to discuss the provisions of the Draft Pharmacy Bill at Liverpool and Birmingham necessitates the postponement of the report of the Evening Meeting in Edinburgh and other matter, notwithstanding that the present Journal consists of double the usual number of pages.

* * *

We are pleased to be able to state that Mr. Alderman Goss, pharmaceutical chemist of Barnstaple, Local Secretary to the Pharmaceutical Society, has been placed on the Commission of Justices of the Peace for the Borough.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday, the 27th inst., at 9 p.m., at 103, Great Russell Street, when a paper will be read on "Electro-Chemistry," by T. A. Ellwood, F.C.S., A.I.C.

* * *

Mr. Munday, the Local Secretary for Cardiff, informs us that the President of the Society has accepted an invitation to attend a meeting to be held in that town on December 4th next, and that further particulars as to the time and place of meeting will be given in the next issue.

* * *

The meeting held in South Kensington last Thursday gave evidence of careful consideration of the Draft Pharmacy Bill by those who took part in the discussion. We regret that the pressure of matter which claims precedence in publication prevents our giving a report of the proceedings this week, but we may state that though there was no lack of criticism it was of a practical and constructive nature rather than merely sentimental. A resolution was unanimously carried approving of the Bill and giving a pledge to support the Council in the endeavour to pass it through Parliament.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, November 12.

The second ordinary meeting of the session was held on Wednesday, November 12. The chair was taken by Mr. Bottle, Vice-President, at 8 o'clock, in the temporary absence of the President, who, however, shortly afterwards came in and took the chair.

The first paper, of which only a summary was given, was on—

THE CONSTITUENTS OF THE CARBOLIC ACID OF COMMERCE.

BY PROFESSOR W. R. DUNSTAN.

The paper is printed at p. 429.

Professor CHARTERIS (Glasgow) then gave an abstract of the following paper on—

THE PHYSIOLOGICAL ACTION OF SALICYLIC ACID AND ITS IMPURITIES.

This paper is printed on p. 436.

The two papers gave rise to the following discussion—

Dr. LATHAM (Cambridge) said he felt very intense satisfaction that this question as to the difference in the action between the artificial and the true salicylic acid should at last be put on such a satisfactory basis, by the experiments of Dr. Charteris and the investigations of his old friend Professor Dunstan. He had never in his life prescribed artificial salicylic acid. Early in 1877 he commenced the treatment of rheumatic fever by means of salicylic acid, and considering that it was an experiment to be made on human beings, he deemed it advisable to use only what he thought might probably be the least harmful remedy of the two. They knew how often remedies were put forward as perfect cures for certain diseases, whose claims were not always justified; and in this case, seeing that the artificial salicylic acid was prepared from carbolic acid, he concluded at once that there was a possibility of harm being done by it. The only acid, therefore, used in the hospital at Cambridge was the true salicylic acid; and though the doses were gradually and rapidly increased, no bad effects followed. So it went on until 1881, when there was a good deal of discussion in London on the subject; and on December 10, 1881, he published a note in the *British Medical Journal* calling attention to the fact that artificial salicylic acid was not trustworthy. Some little correspondence followed, and early in January he made a further statement that the effects of true and artificial salicylic acid were not identical, and that when alarming symptoms, such as great gastric or intestinal irritation followed the administration of a dose sufficiently large to give relief, those results were due to the artificial acid only. During that time he had seen in consultation with other practitioners cases where very serious results followed the administration of the artificial acid, the symptoms closely resembling those of delirium tremens, with an abnormally high temperature and certain typhoid symptoms. The fact that so frequently salicylate of soda produced vomiting in patients in London hospitals confirmed his adverse opinion of the artificial acid. In 1885 he again published some statements with regard to it, pointing out the danger of employing this substance. If time permitted he could say a great deal more, but the practical point was this, that when statements were made by a physician—even a provincial one—as to the action of a drug, those statements should be investigated in order to prove whether the drug was reliable or whether the physician had made a mistake. He hoped the Research Laboratory of the Society would be made use of in that way, and that it would be encouraged to the greatest possible extent. When clinical physicians reported that there were differences in the action of particular drugs on human beings—independently of what physiologists said took place in the case of other animals—those drugs should be investigated, so that the physician might know why they acted differently in different cases, and be able to judge whether they should be employed or not.

Dr. **Lauder Brunton** said if anyone were asked to name the two greatest scourges of mankind he would probably say they were phthisis and rheumatism. The whole civilized world was awaiting anxiously the result of Dr. Koch's experiments to learn the means of curing or preventing phthisis; but if any physician almost were asked whether phthisis or rheumatism occasioned the greater amount of misery, he would probably say rheumatism, inasmuch as it not only led to perhaps almost as many deaths as phthisis, directly or indirectly, but it caused an immense amount of loss of time and power, and intense pain. The rheumatic tendency showed itself in a great many other disorders, such as indigestion, headaches, and so on. Of late years this had been more and more recognized, and physicians had begun to administer a remedy for rheumatism in its various forms more and more freely, viz., salicylate of soda, or salicylic acid, principally the former. Rheumatism not only caused pains in the joints, but inflammation of the serous membranes, and led to inflammation both round and inside the heart; it led to the formation of clots or fibrous masses in the heart, which becoming detached might be carried to the brain, cause the patient to become paralysed. It was therefore of the utmost importance that rheumatism should be cut short both to prevent these serious consequences and to relieve the severe pain under which the patient suffered. But it was a serious thing to cut the patient's pain short at the expense of serious damage to him; and many physicians had been afraid to give that relief to their patients which they otherwise might have done, lest by pushing the remedy to the extent they would desire they might possibly kill their patient by weakening the heart so far that it would cease to act. From the experiments of Dr. Charteris it would seem that this fear owed its origin to the employment of an impure acid, and that if a pure acid could be obtained commercially its administration might be pushed to the full extent without risk. The papers read were therefore of the very utmost importance, and though at first sight they might not seem to be anything like so important as the discovery by Dr. Koch, yet ultimately they might prove to be nearly, if not quite, as important. Humanity owed a great debt to the Society and to the Research Laboratory for an investigation which showed the cause of the danger that physicians ran in prescribing large doses of salicylate of soda, and the way in which it could be avoided. The Society might well congratulate itself on this great achievement, and mankind at large had great cause to be grateful.

Professor **Attfield** said he had been much charmed by what he had heard. He was quite sure that no one present took more interest in the subject, not only from his early acquaintance with Kolbe in 1862, in Marburg, the discoverer of this artificial salicylic acid, but as one of the leaders in the great salicylic acid fight between Von Heyden and Neustadt some ten years ago, as well as from his position in connection with the Addendum to the Pharmacopœia, to which allusion had just been made. He had been endeavouring to fractionate what he had heard and to preserve all the many interesting portions, but would only speak on two of the points which had been mentioned as having most importance to those at anyrate who regarded the matter from a pharmaceutical point of view. It was suggested that the acid should be crystalline, and in connection with that he would point out that the characters given in the Pharmacopœia included only those of a crystalline acid, and that the pulverulent form, the alcoholic solution of which also left a coloured residue, was not recognized. It was also to be remembered in connection with the melting point that the figure mentioned in the Pharmacopœia was about 155° C., which followed the generally accepted melting point at that time, namely, between 155° and 156°, and in his judgment it was right to then mention the lower number. If the acid had those characters and such a melting point, it would contain very little cresotic acid. Even a little, however, was undesirable, and he need not say that the compilers of the Pharmacopœia or the Medical Council who were responsible for it, would be only too glad to receive any further contributions to existing knowledge, such as had in his judgment been supplied that evening, which should have the effect of a purer article being supplied to the medical profession and to the public. Whether this end was more likely to be attained by any variation of the official account, or by the action of the four chief manufacturers, who had for some time been producing what they termed "physiologically pure" salicylic acid, and whose attention would be further drawn to the matter by the publication of these papers, was a question. He did not himself think the official recognition of a separate salicylic acid was called for. He thought the object aimed at could be better secured in other ways. A Pharmacopœia could not be kept up to date and published very often, not more frequently, certainly, than once in ten years, probably in fifteen, and an Addendum no doubt afforded an opportunity for introducing new remedies, without much inconvenience to the medical profession, say once in five years; but he doubted whether any mention of this subject would properly come within the scope of the forthcoming Addendum, because, as he believed, the recognition of a second salicylic acid in the British Pharmacopœia was most undesirable, indeed, altogether unnecessary. There should be an increase of the melting point, which could be done when another (fifth) reprint of the Pharmacopœia was required, treating the present melting point as though it were an original error, raising the 155° C. by 1½ or 1 to 2 degrees, or whatever amount might be shown to be practicable. On the general question it was satisfactory to find that the whole world had not been swallowing a poisonous, or even a very seriously deleterious salicylic acid every time that body had been administered. Clearly the amount of other substances in salicylic acid during a period of about fifteen years had been liable to great variations. Why there should in some cases have been so large a proportion of other acid was not easily understood, though no doubt obvious hypotheses might be formed. There could be no question whatever that the result of these investigations would be to give to the medical profession a purer acid in future.

Mr. **Martindale** thought the publication of the Addendum would be a good opportunity for inserting, if not a pure salicylic acid, at any rate a pure salicylate of soda. Salicylic acid was very largely used in surgical processes, and for that purpose it was not necessary that it should be absolutely pure, but it was very desirable that a pure salicylate of soda should be available for internal administration. He thought the melting point rather than the form of large crystals should be regarded as the test of purity.

Mr. **Hodgkin** said this subject had a peculiar interest for him, being connected in some way with the late John Williams. Since seeing the announcement of these papers he had looked carefully through the authorities with regard to the question of the melting-point, to see what might be taken to be the average melting-point. He constantly found Hübner's 155° to 156° repeated, but most modern writers seemed to be in favour of a higher melting-point. In the new edition of Fehling two authorities were quoted—Fischer, who gave 158, and Kolbe, who gave 159. In Watts 'Dictionary' Cabours, who worked a great deal on salicylic acid, was said to give the melting point at 158, and Professor Armstrong at 157. The balance of authority therefore was in favour of a higher melting-point than Hübner's. It had been shown, especially by Bernard Fischer's experiments, that salicylic acids with low melting-points contained a large or perceptible quantity of cresotic acid, and it was therefore very desirable that there should be a definite melting-point fixed in the Pharmacopœia, and that it should no longer be left to "about," which word had been settled by the London Chamber of Commerce to mean within 5 per cent., which would allow of a difference of 1½ per cent. Two or three years ago Professor Hartley examined spectroscopically some pure natural and pure artificial acid obtained from the late Mr. Williams; they were both in long crystals, and on photographing the absorption spectra they proved to be identical in every respect. The pure artificial acid was obtained by Mr. Williams's process, which showed that a definite acid could be obtained in that way, and he did not think there were many recrystallizations. There were five or six or more different makers of commercial salicylic acid, and it was well known that they differed very much, some being much better than others, and he should like to know whether Professor Dunstan had experimented with various makes. It was rather extraordinary that only the para acid should be found now, whereas the other acids were found previously. From one or two experiments with a lime salt he had found it perfectly possible to produce an artificial acid with a melting point slightly higher than that of the natural acid, the probable explanation he thought being that it was impossible to separate from the latter the whole of the terpene.

Mr. HELBING thought it important to insist not only on the high melting point, but also on the large crystals. The recent German Pharmacopœia fixed the melting point at 157°, but unfortunately it admitted either large crystals or a crystalline powder. He should like to ask if there were any easily applied test for the purity of salicylate of soda, which was used in much larger quantities than the salicylic acid itself. Great efforts had recently been made in Germany to render the artificial acid physiologically pure, and he had put on the table a specimen which certainly possessed the character of very large crystals. Recently Professor Domme, of Berne, had recommended the use of para-cresotic acid in medicine as an antipyretic, which seemed very strange after what they had heard as to its poisonous qualities.

Mr. PETER MACEWAN said the Professor referred to examined three cresotic acids physiologically, and found that one was not lethal, as Dr. Charteris also had found; and it was possible that the Professor had got mixed in his prefixes.

Mr. MASON said the importance of this question was not confined to the medical aspect of it. It had been said that the soda salt was much more used than the acid; but he believed the output of acid would be found immensely larger, because it was not only used in medicine, but for the preservation of food substances. If the statements now made were correct, and commercial salicylic acid was poisonous, this was a matter which should receive attention even from the medical world. As far as he could ascertain the larger part of these preparations sold in England were made in Germany, and four manufacturers practically controlled the whole business. They practically admitted that the acid they were selling was impure, because they sold a crystalline acid at 6*d*. a pound more, and what they called pure acid at 3*s*. a pound more. It naturally followed that the ordinary article, which was very largely used for food preservation, was contaminated with this para-cresotic acid.

Mr. ARNOLD asked if Professor Dunstan had experimented with crystal acid, which seemed to be recognized as distinct from the ordinary commercial article. He had reason to believe that German manufacturers were now sending out a commercial acid with a melting point of 156·6° and a crystal acid melting at 157°, and he should like to know whether this was so.

Dr. PASSMORE remarked that ortho- meta- and para-cresotic acids had been mentioned, but he found there were ten isomerides theoretically possible, four from ortho-, four from meta- and two from para-cresol; it would be well, therefore, to know more exactly which were the compounds referred to.

Professor DUNSTAN in reply said it was to be regretted if Professor Attfield attempted to defend the present statement in the Pharmacopœia, which would pass as pure a specimen containing between 5 and 7 per cent. of para-cresotic acid.

Professor ATTFIELD: Not if you raise the melting point, as he had suggested.

Professor DUNSTAN agreed that the statement in the Pharmacopœia as to the melting point represented the state of knowledge at the time of its publication, but on account of present knowledge mention should be made of pure acid as a separate substance in the Addendum, since it now might very well be laid down by authority that for internal administration, pure acid alone should be employed, especially after what had been demonstrated with respect to the poisonous action of the impurities in the commercial substances recognized by the Pharmacopœia. The question had been raised whether the melting point alone, without reference to crystalline form might not be taken as the standard of purity, and there was a good deal to be said for that. It was quite possible to have pure acid in small crystals. For surgical purposes it might not be necessary to have the acid perfectly pure. Possibly in a future Pharmacopœia there might be two acids, one for internal and the other for external use. It would be practically impossible to prepare pure salicylate of soda without having first pure salicylic acid, and for this reason the acid and not the salt should be defined. Mr. Hodgkin spoke from experience as a manufacturer, and he could support what he had said about the purity of the acid produced by Mr. John Williams's method, although, as they had shown, that method was not altogether satisfactory. In reference to the melting point, the lower number (155°–156°) was given in many standard treatises, as, for example, in Roscoe and Schorlemmer's 'Treatise,' which was probably largely referred to in this country. Higher numbers had been recorded, even as high as 159, but this number was certainly too high. He could not agree that the so-called natural acid would melt at a lower temperature on account of traces of terpene still adhering to it. To get the acid from the oil of wintergreen it was necessary to saponify by boiling with alkali, which must remove a volatile terpene, and the later treatment would certainly remove any trace of oil. Besides this they had observed that the repeated crystallization or conversion into silver salt, which would remove a terpene, did not affect the melting point. He was familiar with Hartley's results, which were based on the fact that on getting artificial acid presumably pure, and comparing its absorption spectrum with that of salicylic acid from oil of wintergreen, no difference could be detected. That, of course, was an interesting fact, but it is doubtful whether anyone really believed that apart from impurity there was any difference between the natural and artificial acid. They had examined several commercial specimens of salicylic acid. Those examined were for the most part more or less impure. The most impure contained less than 10 per cent. of the para-cresotic acid, and the purer specimens about 2 to 5 per cent. or even less. There was a marked difference between the appearance of the specimens of different purity. All might be called crystalline, but some were fluffy crystalline powders. Others were also in powder, but more distinctly crystalline. In reply to Mr. Helbing as to how the purity of sodium salicylate might be ascertained. Here again the crystalline form went for something, and the purity could be confirmed by recovering the acid from the sodium salt, and determining the melting point; if recovered in fractions, each fraction should have the same melting point. With regard to Mr. Helbing's other question, about the para-cresotic acid, he was not familiar with the research to which he had referred. Possibly the nomenclature used in the paper referred to was not the same as they had employed. Mr. Mason had mentioned an important point which was also touched on in the paper. They knew that the use of salicylic acid in food stuffs had been prohibited by more than one Government on the ground that it was poisonous. Mr. Mason was probably correct in suggesting that this was owing to the use of the impure artificial acid, and it therefore raised a very important question. It had been remarked that the supposed intoxication which might be produced by drinking large quantities of German beer, was due, not to the small quantity of alcohol it contained, but to a considerable quantity of impure salicylic acid. Mr. Arnold had alluded to the melting points of the different varieties of acid, and to the fact that it is possible to obtain in commerce an acid melting at 156·6. That acid contained a small proportion of para-cresotic acid, and Dr. Charteris would be able to say that it was not satisfactory in its action, but it would be quite easy to purify such an acid. The point referred to by Dr. Passmore was alluded to in the paper. Starting with the three cresols in crude carbolic acid, by the action of soda and carbon dioxide on them, only three cresotic acids could be produced, and those three were most conveniently called the ortho-, meta-, and para-acids respectively.

The President then moved a vote of thanks to Professor Dunstan and Dr. Charteris for their valuable papers, and to Mr. Bloch, for his aid in the investigation. It was extremely gratifying to him personally to find that a really good piece of original work by the late John Williams had been elaborated and carried out in so satisfactory a manner. He was sure that if Mr. Williams had been spared he would have been the first to congratulate Professor Dunstan and Dr. Charteris on the result of their investigation.

Donations to the Museum.

Mr. Holmes then drew attention to some of the additions to the Museum which had been placed on the table. Mr. H. Helbing had contributed some of the newest of the chemical remedies. One of these, euphorin or phenyl-urethan, had recently been put forward as an antipyretic and antirheumatic; another, piperazidine hydrochlorate, identical in composition with ethylenimine, or double ethylenimine of Ladenburg, is believed to be the active principle of spermine. The base piperazidine is able to dissolve large quantities of uric acid, and it is thought likely on this account to play a prominent part in medical treatment of gout and other diseases. Other specimens presented by Mr. Helbing were orexin, used as a stomachic; benzoyl-guaiacol, employed in phthisis; and physiologically pure salicylic acid prepared in Germany; fruits of *Balanites Roxburghii*, offered in London as colocynth, and an ingenious adulteration of benzoin, the white tears in which are formed of white talc, imbedded in a mass of valueless resin and sand. Another donation of some interest was the rhizome of *Podophyllum Emodi*, from Messrs. Bertie Smith and Co., and of podophyllin prepared from it by Messrs. Morson and Co. This rhizome has been shown to yield more podophyllin than *P. peltatum*, but it was not generally known that the podophyllin obtained from *P. Emodi* would not answer the Pharmacopœia tests as to solubility and that it was almost free from the characteristic odour of podophyllin. About the activity of the preparation there could be no doubt, for, he had been assured by a competent judge, in doses of a quarter of a grain it was perfectly efficacious. At that late hour of the evening he would, with the permission of the Chairman, only direct attention to two other donations, leaving the consideration of the rest to the next evening meeting, when they could be again placed on the table. The two specimens in question were some beautifully dried belladonna leaves, presented by Mr. C. Umney, in which the leaf had retained perfectly its green colour, its odour and its form; such a specimen showed that it was possible to advance in the field of pharmacy as well as in that of chemistry. The other donation was one of essential oils of plants grown at Mitcham, by Mr. Jakson, consisting of the oils of white and black peppermint, of rosemary, and chamomile. The oil of white peppermint was well known to have a flavour superior to that of black peppermint, but owing to the small yield of oil and the consequently higher price, it was not so much cultivated as the black. An approach in quality to the white had, however, been made by rectifying the oil of black peppermint, by which it was claimed that it was made to resemble that of white peppermint. The oil of chamomile possessed a beautiful blue colour, due to trichamomillol, a substance which occurred also in the oils of *Matricaria Chamomilla* and wormwood, etc. The blue colour was stated by Mr. Jakson to fade in a few weeks when the oil is exposed to the light. The specimens had been presented as perfectly pure and typical specimens of these oils. In concluding, Mr. Holmes directed the attention of those present interested in botany to some living specimens of two varieties of the cubeb plant, exhibited by Mr. T. Christy, and congratulated him on being able to procure such healthy specimens of the plants, seeds suitable for purposes of cultivation being exceedingly difficult to obtain, a few which he (the Curator) had been able to obtain having been gladly accepted at Kew. There were also on the table a number of dried specimens of rare British plants and some exotic medicinal plants, which had lately been added to the Herbarium of the Society.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of this Association held at 103, Great Russell Street, on Thursday, Oct. 30, Mr. A. Campbell Stark, President, in the chair, a paper was read, from which the following extracts are taken.

Fungi.

BY JOHN WOODLAND, F.L.S.

Fungi are unique amongst the members of the vegetable kingdom, as they may be regarded as constituting a link between the animal and vegetable kingdoms. Like other plants they are mostly fixed to their media; like animals they inhale oxygen and exhale carbonic acid gas; unlike other plants they contain no true green colouring matter, and feed entirely upon *débris* that is of organic origin, and unlike animals they are fixed. Having no epidermis or true skin, and hence no stomata, inhalation and exhalation of gases in the fungi take place by means of the uppermost intercellular spaces. This fact was proved by the following experiment: A large flat portion of a thallus torn from the stump of an exogenous tree was placed immediately into soft water, and a continuous gentle stream of oxygen passed into the liquid. The oxygen gas did not escape plentifully at the surface, but seemed to be absorbed, and after stopping the admission of oxygen, bubbles appeared on the surface of the thallus which gradually dissolved in the water. A subsequent examination of this water proved the dissolved gas to be carbonic anhydride, and a microscopical examination of the thallus showed that the intercellular cavities were dilated to the extent of what appeared to be $\frac{1}{100}$ of an inch.

Fungi are cellular plants, being entirely composed of soft or parenchymatous cells which are nearly if not quite alike in their conformation. In consistence they are hard, fibrous, or gelatinous, fleshy or leathery, or, as we more commonly see them, soft and extremely brittle. They form no distinct woody fibre like flowering plants, and are regarded as being aggregations of homogeneous and simple cells. Although usually soft, their expansive powers are great, as shown by some fungi, called agaries, being able by their growth to upheave heavy flagstones. Bulliard also relates the case of a phallus which being left in a glass vessel grew until it broke its prison.

In colour fungi may be almost said to approach flowers. They take various shades of red and yellow and red and blue; their colours are bright and not often variegated on the surface. A pure green tint is not seen, owing to the absence of chlorophyll in the order, but a colour approaching that of verdigris is occasionally seen. Owing to the absence of chlorophyll, fungi are unable of themselves to form active principles, hence the poisonous and other principles found in them are looked upon as bye products left from their parasitical feeding. The growing vegetative portion of a fungus is termed the thallus or mycelium, which is developed below the surface of its medium, and sends up a stalk (called the stipe), on the top of which is the pileus or cap. On the under surface of this cap can be seen a number of thin radiating plates, collectively called the hymenium, and on these plates the spores are fixed. The difference between a mushroom or toadstool and a puff ball is that in the former the spores are exposed to the air, or gymnosporous, whilst in puff balls they are enclosed from the air, or angiosporous. Some fungi remain almost indefinitely in the vegetative or thalloid form, without developing any fructification, such as can be seen in many rhizomorphas, and the flat growths which separate the barks from many exogenous trees. The mycelium takes generally one of four forms, being either membranous, filamentous, pulpy or tubercular. When of a filamentous nature the hair or thread-like cells composing it are called hyphæ. The reproductive organs or fructification which are developed in air bear spores which are borne by (1), sphorophores, which are filamentous processes; (2) basidia; (3) thecæ; (4) cystidia, and (5) asci. The lowest forms of fungi are not reproduced sexually. A spore is a one-celled independent reproductive body; it has two coats, each of which has an indefinite expansion. After the first growth of the coats has formed what is termed the prothallus, the mycelium is built up upon it, and this again in its turn sends up the fructification processes. This will not be the order of reproduction of all the fungi, but the most general one. In their duration of life fungi vary exceedingly, some springing up in the course of a single night and disappear in a shower of rain the next day. One is remarkable for disappearing when held in the hand and breathed upon (*Agaricus radiatus*). Most parasitic forms perish at the termination of the life of their host; others are destroyed by volatile oils. This is one reason why deal is useful for building purposes, and why it will to a great extent resist attacks by fungi; it contains small traces of turpentine. Most of our British fungi are autumnal, though many are in perfection in winter and spring. An interesting case was reported in the *Lancet* a few years back, in which the spores of a fungus attacked the hairs of a gentleman's moustache every autumn, turning these hairs quite grey. On the cause being discovered a germicide stopped any further annoyance. Other fungi assume perennial longevity, as, for instance, the *Polyporus lucidus*, which adds a fresh layer of mycelium or spawn which overlaps the pre-existing ones.

Fungi inhabit all parts of the world except the frigid regions, in which their carbonaceous food could not be elaborated for them, and exist chiefly, if not solely, on decaying material both of animal and vegetable origin; in tropical woods they are rarely seen, their place as consumers of decaying matter being taken by insects. In moist temperate climates they are chiefly found and can be studied to the best advantage. The number of British species is generally reckoned to be about 800. The sizes and shapes of members of this order vary extremely, as does also the rate of growth.

The chemical composition of fungi is remarkable by the richness they exhibit in phosphates, nitrogen, and water. The large amount of nitrogenous matter causes a great affinity with animal tissue, and on the decay of a fungus, the odour evolved reminds one strongly of animal decay, owing to the preponderance of this element. The mycelium yields a large quantity of a substance termed fungine, which is regarded as a mixture of cellulose and fatty matter; also fungic acid, sugar, and several nitrogenous substances. The poisonous properties of different fungi are ascribed to an alkaloid called amanitine, but reports upon it vary so much that the accuracy of the statement is doubtful. Several fungi devoid of alkaloids possess an acrid volatile substance.

As regards the medicinal action of fungi, only one is in common use, namely, ergot, the mycelium of which is remarkable for its hardness and compactness. Some of the puff-balls have been mentioned as being anæsthetics, owing to their spores having the property of stupefying bees. Those which are used for food are well known, as, for instance, the different kinds of mushrooms and truffles, the latter growing entirely underground.

Diseases, both of plants and animals, are largely caused by these chlorophylless plants. Blight, mildew, rust, smut, dry rot, and numerous other unhealthy excrescences are due to them. In the cellars of the London Docks a species of *Racodium* is found in positions where moisture is retained by the wooden posts and rafters. Human beings, caterpillars, wasps, flies, and even birds are attacked by these voracious parasites. The species of *Uredo* produce largely the diseases of corn and other cultivated plants which we call blights, rusts, etc. The potato disease now reported to be so prevalent in Ireland is due to *Botrytis infestans*, and apparently it cannot be easily stamped out, although the sprinkling of coal ashes on the soil when seed potatoes are planted is stated to be an excellent preventive against this tuber robber, which penetrates the leaves, stems, and tubers of its host. *Agaricus muscarius* is one of the most poisonous of fungi, and yet by the natives of Kamtschatka it is used as an intoxicant. The poisonous properties of fungi seem to be modified by climate, soil, and season of the year; hence the virulence with which human beings may be attacked at a certain time of the year or at certain geographical positions. Some of this family appear to be nearly always in a state of irritant activity, as for instance the bacteria, which are seen to found their growth on septic wounds or contusions, or even on healthy mucous surfaces.

The President said the Association was indebted to Mr. Woodland for an instructive and interesting paper. The fungi were exceedingly interesting organisms, and had become more so lately on account of their close connection with those wonderful beings, the bacteria. Although these could hardly be classed entirely with the fungi, yet the resemblance was very close. Both increased with enormous rapidity, suffered death from the same causes, and some cases of certain diseases had been traced to a form of aspergillus. The formation of definite alkaloids by the bacteria, however, seems to constitute a point of difference, and he should be glad to hear from Mr. Woodland something more about the elaboration of active principles by fungi. One of the most remarkable features of some of the fungi was their, to borrow an old term, catalytic power, and they would all remember the remarkable instance of this, quoted by Mr. Blunt at the last meeting, the fact of penicillium converting an optically inactive body into a lævorotatory one.

Mr. W. Lloyd Williams referred to the intimate relationship existing between the biological and chemical processes, and instanced the recent communications on the "Germination of the Graminaceæ" and on "Invertase," published in the Chemical Society's Journal, as demonstrating the side-lights which the investigation of one department of science may shed upon another. Regarding the effect of varied climatic conditions upon fungi, Mr. Williams observed that it was remarkable that in cold countries such as Russia, species of fungi were edible, which when grown in warmer districts were endowed with poisonous properties. Much of the uncertainty prevailing as to the suitability of many fungi for food was due to the difficulty of making the necessary experiments.

Mr. J. C. Umney asked how the absence of oxalate of calcium from all fungi could be accounted for.

Mr. McDiarmid said he had had occasion to make a large quantity of glyco-gelatine in which a rather dilute solution of hydrargyri perchloridum was used. This was placed in a jar, which was covered over with parchment and kept in a cool cellar. In a short time this solution was covered with a fungoid growth. It was well known that all glyco-gelatines were liable to be thus attacked, but he could not understand it in the presence of so powerful an antiseptic as hydrarg. perchlor.

Mr. Strother said he would like to know some simple mechanical test for distinguishing the poisonous from the non-poisonous mushroom.

Mr. Woodland in replying to the President's first request, namely, hints as to the formation or elaboration of active principles by fungi which were definite, mentioned the fact that fungi could in their parisitical life only absorb portions of their host, and no doubt the residues being left in a more or less nascent state formed compounds peculiar to the substance on which the fungus had fed; and hence, though the fungus looked out for No. 1, and took all the nutriment it required itself, and in constitution remained the same, it left a compound or active principle of varied composition. With regard to edible fungi, Mr. Woodland would like to have brought many facts before the meeting, but ephemeral organisms like fungi seemed hardly to allow of permanent laws being applied to them. The absence of calcium oxalate was accounted for by the fact that fungi not possessing formative powers as regards elaboration, oxalic acid was not formed in their tissues, nor was it a product of their vegetable digestion; and hence, as calcium oxalate could not be formed in their tissues, and they could not absorb it from any of their various hosts, in this salt they were deficient. In answer to Mr. McDiarmid, perchloride of mercury acted more as a preventive than a cure; hence if germs were already contained in any gelatine preparations their mycelia might grow, but if the gelatinous medium were free from germs to start with, the perchloride would act as a protector. Lastly, as a simple mechanical test to tell poisonous from non-poisonous fungi, the lecturer referred to the fact of poisonous fungi changing colour shortly after being cut.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION AND THE PHARMACY ACT AMENDMENT BILL.

VISIT OF MR. CARTEIGHE.—IMPORTANT DISCUSSION.

A special general meeting of the Liverpool Chemists' Association was held at the Royal Institution, Colquitt Street, on Thursday, 13th inst., to consider the Draft Pharmacy Act Amendment Bill, as approved by the Council of the Pharmaceutical Society. Mr. Carteighe, the President of the Pharmaceutical Society, had kindly accepted the invitation of the Council of the Liverpool Association to attend and address the meeting, which accordingly assumed the form of a Conference, to which all the chemists of the district were invited. There was a large attendance, all the leading representatives of the trade being present. Mr. Chas. Symes, President of the Liverpool Chemists' Association, occupied the chair, and amongst those present, in addition to Mr. Carteighe, were Messrs. A. C. Abraham, Richd. Parkinson (Hon. Treasurer), John Bain (Hon. Sec.), M. Conroy, T. F. Abraham, J. S. Ward, J. Shepheard, B. Dickins, W. Wellings, Harold Wyatt, J. Clarke, J. Hugill, J. Cragg James, J. Hocken, H. Peet, J. Smith, J. J. Smith, J. Turner, F. Barton, W. Wright, etc.

The Chairman in introducing the proceedings said they had met to consider matters affecting the interests of pharmacy. He should perhaps say, to commence with, that they had reporters present. It was desirable to get the most free discussion of the subjects which they could get, but gentlemen need not fear that what they said would go into the public press. They were not afraid of what they said coming before the public, but sometimes things were said which were misunderstood, and gentlemen were sometimes afraid on that account of expressing their opinions, lest what they said might appear to their own interests and against those of the public. Therefore he would say that the reporters present were those representing journals connected with the trade, and the proceedings would not go into the public press. Each present had had a circular stating the object of the meeting and he need not ask Mr. Bain, the Secretary, to read it out. They would therefore take it as read. They were aware that Mr. Carteighe, the President of the Pharmaceutical Society, had consented to come that day in the first place to give them a short exposition of the Pharmacy Act as it affected their interests and other matters which he might think desirable to bring before them. He would first give a short address, and then invite the meeting to criticize what he had said or ask any questions, which he would answer so long as they kept fairly to the point. Mr. Carteighe had a good deal of faith in himself in being able to answer anything, and that was an essential to a gentleman in his position. Many of them, perhaps, had not previously seen Mr. Carteighe in the flesh but many of them would have heard of his Alpine expedition, which was known all over the world. They knew him as the—he was about to say the perpetual President of the Society—but still in the nine years of his presidency he might be called such, and to give any further introduction would be quite superfluous. He hoped they would give his remarks every attention, so that when they came to criticize what he had said they would not say "I thought he said so and so." Mr. Carteighe liked criticism—he absolutely desired criticism by each of the meetings he attended before the Bill was introduced into the Houses of Parliament, so that when once they went with the Bill they would do it unitedly, having settled all their differences before going thither.

Mr. Carteighe, who was very warmly received, thanked the Council of the Liverpool Association for having afforded him the opportunity of addressing some of its members. He felt it a great compliment to be allowed to appear before them in the character of an expositor. He would not detain them very long in the first instance, but would just give them such a slight sketch of the Bill as to make it clear what it was they were going for and they would have the criticisms afterwards. He did not propose in the first place to bring forward any elaborate arguments, but simply to explain to them what there was in the Bill. He hoped they would pardon him in using the word "explain," because although Bills were drafted in what was supposed to be plain English, there were very many of their brethren who did not quite realize the intention of certain clauses, the effect of which depended not upon their immediately becoming law but upon the passing of certain bye-laws and under certain conditions. Mr. Jacob Bell, one of the founders of the Society, went into Parliament at his own cost, after having been all over the country to confer with chemists and druggists as to the state of the drug trade, and spent many thousands of pounds in getting there, with the intention of passing a Pharmacy Bill, and his intention and that of those who supported him was to pass what he (Mr. Carteighe) ventured to call a true Pharmacy Bill—a Bill which covered very much wider ground than anything they had ever had presented to them in late years, and better than anything they would get in the future. Well, he was supported very faithfully by one branch of the medical profession, and more or less opposed by the others, and unfortunately he did not receive any substantial support from the trade at large, and he absolutely failed to get anything of a compulsory character affecting pharmacy. In that year (1852) such was the strength of the terrible—what should he call it?—difficulty, free trade, when applied to educated people, that even he (Jacob Bell) with all his ability was unable to obtain more than a Permissive Bill. He was now speaking of that Bill which afterwards became an Act, which so far as it affected the trade it made no difference whatever as between pharmaceutical chemists and chemists and druggists. For eighteen years the Society went on, the Council working up for an opportunity of getting further legislation. Many conferences were held and Bills were drafted with the object of getting compulsory powers. He would not refer at present to the difficulties which were encountered, excepting just to say—and he might have to emphasize it later on—that in his judgment and the judgment of those who were as disinterested as himself on all these matters (he had no purpose to serve in addressing them, but simply to do his duty loyally to his trade), the chemists and druggists who did not belong to the Pharmaceutical Society—who had been invited to join, but who did not join, and who opposed sundry of the Bills propounded by the Pharmaceutical Society in 1865, 1866, and 1867, did themselves very great harm. The effect of the opposition of the trade was that in 1868 the Bill which they now called the Pharmacy Act and the Poisons Act was passed, and it gave protection to the title of chemist and druggist so as to make it penal for anyone to assume the title who was not entitled to do so. Unless he were qualified the Bill rendered it penal for any person, whether he called himself a chemist and druggist or not, or whatever he called himself, to sell or dispense poisons, so that the Act passed in 1868 was one which did affect the trade in the direction he had mentioned. They would observe that that Act did not deal with the dispensing of prescriptions, nor in any other way than in regard to the dispensing of poisons, and if it did not he had to say that the onus of the failure rested not with the Council of the Pharmaceutical Society and not with the Government of that day, but with the trade at large. Unfortunately they thought proper to oppose a very comprehensive measure because it did not allow them to become pharmaceutical chemists and have all the privileges of those who had been enrolled in the Society after having passed their examinations. He did not, however, want to cry over spilt milk, he only mentioned it as a matter of history. Well, here they were in 1890, upwards of twenty years having elapsed without their being satisfied, and very naturally so. They had been endeavouring for some time to obtain a remedy and they now placed before the meeting for their consideration a Bill which they thought went as far as it was advisable to go at present. Now the first proposition in the Bill dealt with the general subject of education. He knew it would be said by many of them that they were getting too much education and examination. He might be disposed to agree with them in regard to the latter, for they certainly had too many failures, and after all he was sorry to say that they had not got very much education. There was all the difference in the world between a merely examined man and an educated man, and they had found in practice that the examinations, from which they could not seriously depart, however well they were adapted to the wants of the trade, might be improved upon. They were anxious that the men who came up for examination in the future should be able not only to pass the examination with credit and in much larger numbers than hitherto, but that they should in the period of their apprenticeship obtain a certain amount of knowledge and be able to pass a certain part of the examination. If the Bill passed into law, certain bye-laws would have to be prepared by the Council of the Pharmaceutical Society. In the first place they would have to be considered at three meetings of the Council, then at a special general meeting of the Society, and afterwards they would have to be approved by the Privy Council as representing the public before becoming law. It was intended to interpose a period of three or four years between the Preliminary examination and the Minor examination, which would be divided into two parts. They intended to allow a young man to pass a portion of his qualifying examination in his own neighbourhood while going on working, and he would afterwards appear in London or Edinburgh, as the case might be, to go through the remainder, which would be the practical examination for qualifying him. In that way they placed before every parent and guardian a proper exposition of what was required before anyone entering their trade could expect to get a living. It was positively pitiable for him as President and as a former examiner for a number of years to see the number of young men who came to that examination, and who were rejected, and who told him with tears in their eyes that they never had any opportunities during their apprenticeship, and that they positively did not know the requirements of their trade till they were twenty years of age. It was not uncommon for young men of twenty and twenty-one and older to come up to the Preliminary examination, instead of having done that during their apprenticeship and being ready to pass their qualifying examination. He maintained that it was to their benefit as a trade, as well as to that of the individual apprentice, that he should have fully placed before him at the threshold what he had to do, and it was to their interest to have nothing to do with pupils who were unable to pass the Preliminary examination. He who took a lad as an apprentice, knowing he wanted the assistance of an errand boy, might think for the moment that he was supplying a want and doing a clever thing; but his experience in the examinations and all over the country showed him that one of that sort, who had not had the necessary education, and who never could pass the Minor examination until after numberless attempts, was not likely to pass the Major examination. Many of them never passed at all, and what were they to do to gain a living? Many of these went back to the places they came from, and assisted in the irregular if not illegal proceedings, perhaps in the immediate neighbourhood of his former master, of which so much was heard, and in this way he became a kind of pirate. Not only would this clause be a benefit to individual pupils in the future, but he submitted that as a matter of trade business it was good for them, because they must remember that the Pharmaceutical Society had powers vested in it to restrict the number of those who entered into the trade. Surely they had got plenty in it; they might say too many. If that was so, surely it was desirable that there should be a separation at an early stage of those who it was evident would not pass; that they should be got rid of early instead of getting a partial knowledge of the business, which would enable them to act to some extent as legitimate men hereafter. Section 4 proposed to repeal certain clauses in order that clauses 5 and 6 might be enacted. It was a clause for the consolidation, as they called it, of the Pharmaceutical Society. Speaking for the Society and its Council, he said they were anxious that no man engaged in pharmacy should have any just cause or complaint against them. Now it had been said that when a man passed a qualifying examination and went into business, he ought surely to become a member of the Society, and not to be merely an associate, as at present; and he ought also to have the power of going into the Council equally with the pharmaceutical members, as his right. Inasmuch as the Legislature thought fit to make a Minor qualification, which in the early days was only regarded as an assistant's qualification, and not a qualification for keeping open shop—as the Legislature thought fit to take that as the standard of capacity for keeping open shop, it was right that such a man should have the full membership of the Pharmaceutical Society. If therefore there were Major men in the room he hoped they would be as ready as the Council were to forego any claim to exclusive rights in the Society, so that all persons engaged in business as chemists and druggists should associate together with one common title, and manifest a desire to associate together for the benefit of the craft. By the 1868 Act they were precluded from admitting as members any but men who had passed the Major or who were in business before the passing of that Act. They could not admit a Minor man as a member—they could only admit him as an associate, and therefore they were by this Bill asking Parliament to untie their hands in this respect, so that they might give every chemist and druggist the same position in the future as a pharmaceutical chemist. Coming to clause 6, there was a question of the representation of the chemists and druggists and various other matters of what might be called political importance, which were here dealt with. It was proposed that the Council of the future should consist, roughly speaking, of equal numbers of the chemists and druggists and pharmaceutical chemist members. The word ten was used in the clause because they could not well divide twenty-one and say on the principle of the *seniores priores* which should have the preference, so that they had kept one over the chemists and druggists. He submitted that if it should ever happen, which was very doubtful, that the interests of the other class represented should be opposed to the chemists and druggists, he felt certain that if there were ten chemist and druggist members the other eleven would be powerless to do anything the chemists and druggists did not agree with. For all practical purposes, therefore, this was as fair an arrangement as they could have. Clause 7 stood, he was sorry to say, as the only one asking for direct control of educational matters affecting their craft. He could see some of them smile at the President when he talked of education, but he (Mr. Carteighe) thought there was a good deal of good in it. He had been preaching a long time about it, without making much headway, but wherever he had an opportunity of talking about it, as by their kindness he was enabled to do to-day, the proposals he made had been received with unanimity, and not only so, but in most cases with acclamation. He could not compel any of them to join the Society, nor did he wish to go to Parliament to compel anyone who entered the trade to join the Pharmaceutical Society, which must ever remain a voluntary Society. Everybody must, of course, go to his examination and be registered, but neither the present nor any Government would ever make it imperative for men who had qualified for a trade or calling to also be compelled to pay a guinea a year or any specified sum to become a member of any society. He quite agreed that it was desirable to make the examination fee and the admission to the Society, as it were, one sum, so that a student would become a full-fledged member when he passed, and have nothing more to pay. The arrangement, however, must remain a voluntary one, and in this respect they were on all-fours with the Incorporated Law Society, which, as many of them knew, was to solicitors what the Pharmaceutical Society was to chemists and druggists. Its membership was small relatively to the whole number of admitted solicitors, but it had imposed upon it by statute the duty of examining all persons who wanted to become solicitors. After having been admitted each could join or not, as he thought proper, the Incorporated Law Society. The Incorporated Law Society had also educational schools, and did everything it could to advance legal knowledge among the profession. The powers they were seeking for the Pharmaceutical Society exactly coincided with those of the Incorporated Law Society. The Incorporated Law Society had one duty cast upon it which he thought might even be useful if it were possessed by the Pharmaceutical Society, though he was almost afraid to suggest it. When a solicitor was guilty of misconduct his name was struck off the rolls. They had not such power with their body, but he could wish they had it. He was almost afraid to raise that question at present, though perhaps they might encourage him later on. Clause 7 was a clause restricting the compounding of medical prescriptions to registered persons. Some of them might say, "What is the good of it?" Well, he thought there was good in it. The words "medical prescription" meant a good deal more than some of them thought. He read a medical prescription to mean a piece of paper upon which any medical compound was written for the purpose of being dispensed. He read a medical prescription in that Bill to mean not merely the prescription of a doctor, pure and simple, but any form of prescription or recipe for medicine presented for compounding. They were in the habit of regarding a medical prescription as being necessarily the prescription of a medical man, but he begged to observe that the prescription referred to in the clause was a prescription of medicine, and he did not care who wrote the prescription. Of course he was not a lawyer to say that the clause had been properly drawn, but that was what he meant. He submitted to them that if the registered man had placed within his reach the privilege, the restrictive privilege of doing this that he might be able to add something to the very small limit of poisons in his hand. Some of them would say that those who did their own dispensing would have to obey this law, and that they would not be able to keep open shop without either dispensing with their own hands or superintending or leaving a qualified chemist and druggist in their place when they went away from home. He (Mr. Carteighe) submitted that this would not be a disadvantage to them in their trade. They knew a great many medical men who left uneducated people in charge of their shops. He named an instance that had occurred in Glasgow, and said that he could name hundreds where this occurred, and that he had seen during the last ten years in different towns. In London particularly this kind of thing occurred, and broken down doctors having a qualification had perhaps half a dozen shops which they called medical halls or dispensaries, and which were left in charge of a boy or girl during the absence of the principal, while he was looking for work elsewhere. By this clause their powers as to legitimate dispensing would be increased, and what were undoubtedly their rights with regard to outsiders, doctors and others, would also be increased. Some had objected that this clause was bad because it was not restrictive in regard to a medical man dispensing in his own dispensary. They must remember, however, that the medical man charged so much for his medicine and attendance together, and in some cases it was quite common in London to leave out the medicine altogether in his bill and enter it as attendance, thereby giving the impression that he was throwing in the medicine for nothing. Well, now, they must remember that if that question were raised, they immediately attacked one branch of their community—the medical profession, which was as heavily handicapped as they were themselves. It was not because the medical man and the general practitioner liked dispensing their own medicines that they did so. It was because of the ignorance of the public, who regarded the cure to be due to the medicine and not to the skill of the medical man. He believed if they and the medical men were thoroughly united they could obtain such an arrangement as would be mutually beneficial. The medical man who supplied attendance and medicine for 5*s.* wanted and deserved 5*s.* for his attendance, but in the present state of public opinion he had not the courage to ask for it. Well, if they could help him to get his 5*s.*—if they could get him to consider it from the standpoint that there were men capable of dispensing his prescriptions with the greatest safety for the public, he thought they ought to achieve a great deal, and he thought this arrangement to be perfectly practicable and possible. But to do this they must show that they had educated men to dispense their prescriptions, and that they were not mere hucksters, otherwise the doctors would regard them as mere tradesmen. In outlying districts, if the chemist and druggist allowed himself to be dragged down to the level of the very huckster of whom he complained in regard to the sale of poisons, whom had he to blame but himself for going down? The point he wanted to emphasize was, that whereas the medical profession were almost completely united in England and very largely in Scotland, chemists and druggists were not. The British Medical Association was not a qualifying body at all; it was purely one for mutual benefit and protection. It contained nearly all the medical practitioners in general practice, and he believed that if the chemists and druggists in large towns were to put their shoulder to the wheel and support union in the trade, as they called it, and deal with the Pharmaceutical Society fairly and honourably, they were powerful enough to be able in a few years to dissuade the whole medical profession from dispensing. He had no doubt many of them would like to ask questions. He had promised the Chairman not in the first place to refer to anything except what was in the Bill, but, with his permission, he hoped to be able to answer questions regarding this and anything that might be urged against the Bill.

The Chairman: Before we proceed to the discussion of this important subject I would ask our Secretary, Mr. Bain, to read a few letters of apology he had received, at least, he will not take up time by reading them, but will merely intimate whom they are from.

Mr. Bain said the letters were from Mr. Alfred Hy. Mason, of London; Mr. Geo. Baxter, Local Secretary, Chester; and Mr. John Day, of Liverpool.

The Chairman then said they had listened very diligently to the remarks of Mr. Carteighe, and he must be gratified at the attention they had shown. It was his (the Chairman's) intention originally to speak on the subject immediately after Mr. Carteighe, and to put before the meeting some ideas he had, some of which ran no doubt concurrently with Mr. Carteighe's own, and some of which he might have something to say about; but he had been accused—it might be intended as a compliment, and if so he would take it as such—of leading Liverpool opinion too much in matters of pharmacy, and so as to prevent that being repeated that day he would defer his remarks till the close of the general discussion. He should therefore be glad to hear any remarks that gentlemen had to make. He knew there were a number of gentlemen present who he was quite sure wanted to speak on the subject, and who were only waiting for somebody to begin.

Mr. H. Peet said there was just one point about which he was not very clear, as to the Pharmaceutical Society having the power to restrict the number of gentlemen they would admit as apprentices.

Mr. Carteighe: Only the powers conferred by the Act as to education.

Mr. Peet: No further restrictive powers?

Mr. Carteighe: No.

Mr. A. C. Abraham (who was received with applause) said he would like to point out that they should consider not only this Bill, but all matters of pharmacy which it might be well to discuss. At the same time it would be desirable, he thought, to seek as much as they could in the Bill. As it was, there was already in the Bill before them plenty of food for observation and consideration, and unless other matters were of great importance it might perhaps be better to leave them to be dealt with at some future time. Before going further he would like to say that the President of the Pharmaceutical Society, whom they were glad to welcome among them that day, was a gentleman who had given an amount of time and thought to pharmaceutical legislation and to the interests of pharmacy in general, of which few of them had any idea; and certainly few of them, if any, would be able or willing to give the time he had given to the subject. The Council of the Pharmaceutical Society was introducing, or was proposing to introduce this Bill merely with the idea that half a loaf was better than no bread. A great many of them would like to see introduced into it other things, but they felt they had asked for all they were likely to get in the Bill, and that was the only reason they had not asked for what they were not likely to get. That, he maintained, was quite a sufficient reason for the omission of what had been left out of the Bill. He might point out that practically the Bill was unopposed on the Council of the Society. It was true there were several members, of whom he was one himself, who would have liked to have seen other things in the Bill, and who believed it was possible to obtain more than the Bill asked for; but, at the same time, he wished to point out that the President of the Pharmaceutical Society had given so much time and attention to the subject—and a large majority of the Council were distinctly with him—that both the President and the majority of the Council were of opinion that that was all they had a right to ask for, or that they were likely to get, and therefore they had thought it inadvisable to go for more; and he thought that their great experience should be taken into serious consideration in suggesting alterations. He did not make these remarks with any object of checking discussion upon the Bill at all, because he thought it was extremely desirable that the fullest possible discussion should take place that day, and then the President of the Pharmaceutical Society would be able to answer any difficulties that might arise, and he thought when the President came to answer them, he would be able to show that they were founded more upon a misunderstanding than anything else as to what it was possible to obtain. He would like to remark, in passing, that it was in that same building that Jacob Bell, when endeavouring to obtain the Act to which Mr. Carteighe referred, met a number of the chemists of that city, and although all were unanimously in favour of supporting him, yet, as Mr. Carteighe had told them, gentlemen in the House of Commons did not take that view. Neither did the country take that view, and it was owing to the lack of support throughout the country generally that that Bill was not obtained. He should like to say one word also in regard to the President's remarks about the dispensing of medicines by doctors. His own firm conviction was that the chemists should gradually and as much as possible give up prescribing, and in that way remove a great cause of friction which certainly exists at present between medical men and chemists in many quarters. It would also very much facilitate the giving up of dispensing medicines by doctors. There were many doctors who, to his own personal knowledge, merely dispensed their own medicines because they said that the chemists in their neighbourhood prescribed, and they would not allow their prescriptions to go out to such chemists. However, they did not assemble together that afternoon to listen to him, and he would not detain the meeting further. Probably Mr. Carteighe would have a good deal to refer to in his reply, because he hoped there would be a very free discussion of that important subject.

Mr. G. R. Sleggs said it was twenty years since the President of the Pharmaceutical Society had taken him by the hand after having passed his "Major," when he took the opportunity to tell the President, after having passed the examination, that he was rather disappointed in one or two of the subjects through which he had passed. But having been in business since that time he must say he had been disappointed with the Pharmaceutical Society in its endeavours to protect the trade. He thought, when he went to that meeting, that they had assembled together to discuss trade interests more than those of the Pharmaceutical Society. They had been considering the Pharmaceutical Society now for a number of years, and he should like the President to explain how it was that business in Liverpool had deteriorated very considerably within the last twenty years since he first commenced business. When he commenced business in Everton he was doing twenty or thirty prescriptions a day. Well, his shop, where he was doing a large business, had gone, and he was opposed right and left by good shops, which had also all disappeared, and he should like to know what was really the cause of good businesses disappearing in the suburbs of Liverpool in that way since 1868. Then there were also certain persons in clause 7 of the Bill entitled to dispense according to certain exemptions, which he did not understand.

Mr. Carteighe explained that the exemption was in regard to doctors and others simply to allow them to do as chemists did, and that was to dispense or keep open shop.

Mr. Sleggs: Putting in "other persons" would not exempt any company from keeping open shop.

Mr. Carteighe: Are you thinking of companies?

Mr. Sleggs: Yes.

Mr. Carteighe: These are the exemptions of the previous Act. They refer to veterinary surgeons when dispensing for animals under their care. And in regard to widows, about which I daresay I may have something to say, I mean there is nothing in this Bill different from the previous Act.

Mr. Sleggs considered that the exemptions should be more thoroughly understood. He had been told of a man during the last two days—he was referring to a case under the title-bearing company's label—a man whose name was on the labels, and who appeared in the directory as a chemist and druggist, but he had been told that man was not legally a chemist and druggist himself.

Mr. Carteighe: Is he a company?

Mr. Sleggs: Yes.

Mr. J. Turner (whose remarks were scarcely audible at the reporters' table, owing to the echo of the room) said he was about the oldest pharmaceutical chemist in Liverpool, and he came to that meeting to learn something that would be for the good of the trade. He was much pleased to see Mr. Carteighe amongst them. He had heard and read that he was a very plucky man, and he expected to find, from what he had heard and read of Mr. Carteighe, that clause 7 of the Bill would have been a far more go-ahead thing than it appeared to be. Having said that, he might say further that he rose, perhaps, to drop upon the President. He was very lawyer-like in saying that he was not a lawyer, and he said that "medical prescription" in the clause was according to his interpretation. Yes; doctors differed, and legal men differed, and he begged to differ from the President. The medical prescription would just bring them all over the country to where Liverpool was brought. He maintained that a medical prescription would not be a justification for him, when a lady asked for an ounce of laudanum, in giving her that quantity. To a great extent they were bringing down the magistrates upon them. Why, he had even one of these adulteration men, or whatever they were called, challenging him, but he was too old to be caught in that way. The man came to his shop and asked for a prescription to be made up, and when he read it, he said to the man, "Look here, I am not going to give you this; if you like I will give you so-and-so." "But," said the man, "there is such-and-such a quantity named there." "Never mind that," I said, "if you do not take what I give you, you can go somewhere else with your prescription." They would see how he escaped on that occasion. But the crux of the whole question was that about doctors making up their medicines. He had been forty-two years in Liverpool, and they were amongst a more seedy lot of medical men now than when he started in business. How was that? Just because now-a-days the doctor wanted to get his 5*s.* a visit and to keep it, and he wanted to be fully informed that he, as a druggist, did not prescribe for a headache. But that, he could assure the medical men, would never cease as long as the world lasts, and the chemist would go on prescribing for such simple things. He meant to say that people kept away from the doctors because they charged them 5*s.* when it ought only to be 2*s.* 6*d.* He had often told doctors the plain truth of the matter. He maintained that if a doctor who made up his own prescriptions fell short of something that ought to be in the bottle he put something else in, and nobody was any the wiser. He maintained that medical men—although he admitted he could not prove it—put things in they did not intend to put in, simply because they had not got the right thing. Referring to the President's remarks about the educational status of their apprentices, he quite agreed that it was foolish to take any man in unless he had passed the Preliminary examination, because he would only be a perfect drag upon them. He had never intended giving his advice, but he said again—and said it most emphatically—that they must have these prescriptions. That was the crux of the whole thing. They wanted the medical men to have more confidence in them, and he was sure they would get a *quid pro quo*. If the doctors sent him a customer he would do his best to send them a patient. There were a great number of chemists and druggists who were not members of the Pharmaceutical Society, and he hoped all who were not members would make themselves members, for unity was power. He believed the Society had in the past done him very little good, still, he wished well to the Bill. But, nevertheless, he again said that clause 7 was a paltry affair, and they were checkmated by all those licences which are given to unqualified men.

Mr. W. Wright took exception to a remark made by Mr. Carteighe as to chemists and druggists in the outskirts descending to the level of hucksters.

Mr. Carteighe said he must apologize if he had not made himself clearly understood. What he meant to say was that if an educated man allowed himself to drift and drift down to the level of a huckster, he had himself to blame. The truth was bad enough without his attempting to exaggerate it. He thought the meeting would endorse his intention in not meaning anything offensive.

Mr. Wright apologized for having misunderstood what had been said. To show what chemists in the outskirts had to put up with he spoke about medicines being made up in stores, and sold at a rate far below what a respectable chemist would charge, and he asked if it was right that such men should be admitted on the register of the Pharmaceutical Society. He thought it was outrageous. He said it without fear of contradiction, that half the prescriptions written in his neighbourhood were sent down to certain establishments in town. If it were otherwise the chemists and druggists in the outskirts would be in a very different position. Referring to apprentices he expressed the belief that if they had the compulsory clause, not one-half the apprentices would be able to pass their examination. In large establishments where they kept four or five assistants they had no time to study. They merely passed their Minor examination.

Mr. J. J. Smith said that Mr. Turner and Mr. Wright seemed to think that No. 7 was a paltry, mean clause. Well, Mr. Carteighe had told them that nothing was put into the Bill except what they thought they should possibly obtain. It seemed to him (Mr. Smith) that No. 7 was the clause which would be most fought over. He did not know if most of them understood that the clause not only prevented unqualified persons with certain exemptions from dispensing medicines, but it also prevented anyone dispensing medicines in their shops, if they happened to be out of the way. Most of them there, he supposed, had assistants; and he did not know but even under the present Act they were not breaking the law by being at the meeting. If they were going not only for poisons but also for prescriptions, they should inconvenience the public, it seemed to him, and there would then be opposition to such a proposition. He could quite imagine the case of what would happen if medicines were wanted urgently. It seemed to him, therefore, that there would be opposition to that clause; but he was very glad they had got it in the Bill.

Mr. John Smith said he would like to move a resolution on the subject, which was as follows:—"That in the opinion of this meeting, no Bill to amend the Pharmacy Act is satisfying unless it proposes to enact that no person or persons shall sell poisons or dispense medicines, or keep open shop for selling poisons or dispensing medicines, unless he be a pharmaceutical chemist, or chemist and druggist." He did not think there was much serious opposition to the Bill as it stood. There had been some remarks made in reference to the 7th clause, but he thought they ought to submit to such a reasonable clause as that No. 7 clause was, and he did not think there were many of them present who would like it to be made known to the medical men in their neighbourhood, or to the people among whom they were living, that they claimed the right to dispense their medicines or poisons by unqualified persons. If they wanted anything to be of service to them, as chemists and druggists, they could not expect to get all and give nothing in return. They certainly must submit to some reasonable restrictions, and he maintained that what was proposed was reasonable. But the point where the difficulty arose was just the point where the Bill ended. Now he did not oppose or disagree with a single thing in the Bill itself, except that where he differed from it was at the point where it ended. He thought they ought to say—and he hoped the meeting would say—that no Bill deserved support which did not take the dealing in pharmacy by unqualified persons in hand. As far as he had been able to gather, the arguments used against introducing that clause into a Bill to amend the Pharmacy Act were, in effect, they must look to higher education for the success of pharmacy in the future. But that had to be brought about by means of the curriculum, and therefore it was said the chances of the Bill would be risked, or, as some said, ruined, by the introduction of contentious matter. It was also said that a clause of the kind was opposed to free trade measures, and that a Bill with such a clause would not pass, and it would be risky to open up such a question and push such a Bill in Parliament. Well, he did not oppose the curriculum; for his own part, he thought the majority of chemists and druggists would welcome it, and he believed in the future it would be of some service to them. They thought the qualified dealers' clause would be of service to them in the present, and of the two they considered the qualified dealers' clause would be of far more importance than a curriculum clause, because the one was not of pressing urgency, while the other was a matter of present requirement. Mr. Carteighe had hinted about this being all they could get in the Bill at present; and it was no use for them to expect Parliament to amend the Pharmacy Act every few years. It had too much on hand already, and would not give very much time to the grievances of chemists. Therefore he thought that when they did propose to amend the Pharmacy Act they should seek to amend it for a number of years wherever it was defective. If it was difficult to obtain its amendment now on the lines of the resolution he was proposing, it would be ten times more difficult ten years hence, and for that reason he thought they ought to put the qualified dealers' clause first and the curriculum clause second. Instead of having to talk about adding a qualified dealers' clause to a Curriculum Bill, he thought they ought to have had a qualified dealers' Bill with a curriculum clause added to it if necessary. It had been said this clause was opposed to free trade principles. Well, Parliament had declared that there should be no free trade in poisons. The only way in which there could be that was by abolishing the Pharmacy Act, and they must not forget that they were taxed with interfering with free trade principles. But while they were not seeking to do anything of the kind, they did think they had a perfect right to claim that unqualified persons should not be allowed to appropriate the prestige attaching to the selling of medicines when they had not qualified for it. Then, again, some said the Bill would not pass. Well, on what authority were they told that? After all, it was simply a matter of opinion, and it would be time enough for them to make up their minds that the Bill would not pass when the majority of the House of Commons told them so. He did not consider that was an argument which they should accept. Supposing the leaders of political movements in the past had allowed themselves to be guided by those who told them that their Bills would not have passed, where would they have been? If they wished to pass this Pharmacy Act Amendment Bill, it would not be by such chicken-hearted expressions as that. Well, then, it was further said it was risky to open up the question at present. That meant that by going to Parliament and opening up the question, they did not know how it would be settled, that it might be settled in a way they did not like. But personally he did not think that at all probable. He thought it was scarcely possible that Parliament, having once enacted in the public interest that no person shall sell or keep open shop for the selling of poisons unless he be qualified, should now say that any person can keep open a shop for such a purpose when not qualified. That would be a retrograde movement, which they had no cause to fear in a business which had advanced so rapidly as theirs had done. But supposing the worst should happen. Supposing that came to be the way in which the matter were settled, would they be any worse off than now? At present, if any unqualified individual wishes to commence the business of a chemist and employs a qualified person to take charge of the business, where was the difference? It was the easiest thing in the world for an unqualified man with the aid of a few relatives and friends to register himself as a limited company, and thereby commence business. He could do that now without running any risk. He maintained that the risk such a man had to run was only slight, but what he had to gain was great. He could admit that in proposing such a Bill as that to Parliament, they would have to say it was in the public interest that such a Bill should be enacted. They knew that in a business such as theirs, in dispensing medicines particularly, about which the public know nothing, a great deal was left to the *bonâ fides* of the persons engaged in that employment, and they ought to maintain, and they ought to take up a position uncompromisingly in this, that not only should the person who conducts the transaction—the person who uses a little of one bottle and a little of another—not only should that person be a qualified person, but they should maintain that the person who owns the stock and whose influence controls the business, and who influences the buying and making of goods and preparations—the person who derives the profit from the business—that he should be a qualified man also. He should be qualified so that he shall be able to prove to the customers that he is competent, not only to judge of the value and correctness of the stock on his shelves, but also capable of judging of the carefulness and expertness of the person to whom he entrusts that important work of dispensing prescriptions. A gentleman need not wish to mix the medicines himself, but he should have the skill and be capable of supervising the work of the employé. The employé had not the direct interest of the owner. If the employé makes a mistake, either of omission or commission, and it should be found out, he can pack up his traps and seek a situation elsewhere. By a clause such as his motion pointed to, they would throw more responsibility upon a proprietor, and the public would be benefited by it. A point which ought to be of some interest to the medical profession, and, he thought, one which ought to have their support, was this: The medical profession were now represented by several Members of Parliament, and if they could only get their goodwill in Parliament it would be of great service to them. Last week Mr. Carteighe was at Manchester, and he (Mr. Smith) was sure many of those who thought as he did would have derived a great amount of encouragement from many of the remarks he had made there. He said, in effect, "Relinquish the widows' clause, and we will at once proceed to deal with companies." Mr. Carteighe might or might not be correct in what he says, that the presence of the widows' clause in the Pharmacy Act put them out of court. For himself, he thought that the question had been sprung upon them rather suddenly for them to decide the question at present, and it would probably be discussed at another meeting. But for his part he must say that he did not think the widows' clause was of very much value. It was not such an addition as was supposed; and he must say that chemists' wives were different now to what they were ten or twenty years ago. It was not so common now to see a chemist's wife behind the counter as then. Business was also different to what it was ten or twenty years ago. He did not believe there was one chemist's wife in a hundred who was familiar with the details of a business, and who knew so much about a business as to be able to conduct it profitably. That was hardly the time on which to enter upon the arguments of that question, but he thought chemists were making up their minds on it. He thought it was coming before them as a crucial question, and he thought before long they should have to decide whether to retain the widows' clause, or drop it, and, fortified by the invaluable assistance of the President of the Pharmaceutical Society, go for a qualified owners' clause without any limitations. He had not written down his motion, but would make it something to the following effect:—"That this meeting is of opinion that no Bill to amend the Pharmacy Act deserves support which does not propose to make it illegal for any person or persons to sell poisons or dispense prescriptions, or to keep open shop for selling poisons or dispensing prescriptions, unless he be registered as a pharmaceutical chemist, or chemist and druggist." He would move that, although he was prepared to go with the majority of chemists. If they thought they ought to have that widows' clause, good and well. Yet, really, he thought they would be very ill-advised to retain it. No doubt there was a number, no matter how it was argued, who thought it would press hardly upon chemists' widows to give up the widows' clause. The principle was there. They accepted the principle that an unqualified person could own a business. He could not say that he differed from Mr. Carteighe very much, and so long as they had that principle embodied in the Bill they certainly had—he did not say they ought not to try for it—a poor chance of getting what they wished for. He hoped his motion would receive the support of the meeting.

Mr. J. S. Ward: I would like to ask Mr. Smith if he intends that it should include companies. It has been decided in law that a company is not a person or persons.

Mr. Carteighe: Why not put it in. No Bill will be satisfactory which does not prevent a company or corporation from carrying on business.

Mr. Ward said he would like to see that in the Bill. He had much pleasure in seconding the motion. He had an opinion that the thing was utterly and entirely a mistake, and if they would bear with him for a few minutes he would try to show the grounds he had for believing so, because he maintained that assertion was not argument, and much less proof. Now, he unfortunately—because perhaps he stood pretty much alone—believed that thing to be altogether a huge mistake, for the simple reason that the foundation was not good. That Bill was brought forward, he maintained, simply and entirely upon a hypothesis, upon a mere conjecture, which was that they qualified, produced, and brought about a highly educated chemist, and the British public would—voluntarily, mind—recognize the man and voluntarily pay him for his services. Now, he maintained that they had no ground for supposing that to be the case, and he meant to argue that it was very unwise—very impolitic, if they liked—for anybody to take upon himself a burden even upon the mere chance of a future reward; and if he could show to them—as he believed he could, and as he meant to try to do—that they had not even that chance of a future reward under that Bill. He meant to say that it was foolish, and something more than foolish. They might say to him, "Well, why have we not good ground for believing in a future reward?" He answered in the nature of things, as they saw in everyday life; and he would ask them whether they could tell him of any person in this world who was paid for extra knowledge, for abstract ability or worth, and not for services absolutely rendered; and further, that these services were universally appraised and valued by the inevitable law of supply and demand. If they took the professions, a doctor engages an assistant, but he does not pay that assistant for his abstract ability, but merely for the services he can render to him. The same with the merchant and his clerk. If a merchant advertises for a clerk and gets a number of applications for the position, he meant to say, provided they were up to a certain standard, that he would pay a certain wage and no more. He might say to the clerk, "Your knowledge is grand, undoubtedly, but I only want certain work from you, and the market value for it is such and such a price, and such a price will I only pay you." Coming nearer home, they all themselves acted on the same principle. A man wants an assistant and he has a number of applications. Now, he meant to say that the rate of wage that man offered that assistant was invariably—he thought he might say in that respect certainly so—the rate of wage there was usually governed by that law of supply and demand, so that even if they had an assistant who had a universal training in all the high sciences, they would only pay that man the wages of a competent man; that was, they would not pay him, they would not be generous enough to pay him, for extra time and study, because he could not turn that extra time and study into money for the benefit of his employer. Well, if they had found that it was governed by an inevitable law, what reason had they for supposing that there should be in the future some glorious exception for the highly educated chemist? Those present at that meeting might be divided upon whether that Bill would do them good or harm; but there was no room for division of opinion upon one point, and that was that the Bill would very seriously affect, either for good or evil, the chemist of the future and also of to-day. He had looked into these questions somewhat closely, and would venture to put before them how it would affect both in his opinion—how he thought it would affect the people of to-day and the people of to-morrow. He would speak of to-day first, because they were more naturally interested in that. How will the Bill affect, if it becomes law, the people of to-day and to-morrow? Well, they could put them into four classes, which were—the British public, the chemist of to-day, the chemist of to-morrow, and the Pharmaceutical Society, as presiding over both parties. Now, if he was not too tedious he would just discuss its action on these four individuals, if they might call them individuals. He would not waste time over the British public. John Bull was a man who could look after himself. He was not addressing them as a meeting of philanthropists, but as a number of business men—men, if they pleased, who were willing to do good to the public, but who had every right to expect something in return for their money and their services. The chemist of to-day he would have to further subdivide to make himself understood. He would take first that division of them who had businesses and sons. In the natural order of things their business was intended as their son's heritage, and he was sorry to say that in a great many cases it was about the only heritage he would get. Well, how would this Act affect it? He was sorry to say that in many cases it must be allowed that it would cost that man very much more money to qualify his boy for his heritage than at present, because the curriculum meant extra time and study, and extra time and study was an expensive luxury. Well, it must of necessity cost very much more money to fit that boy for his heritage. That being so they had no right to impose such a burden on that boy unless they could show him that they correspondingly improved his heritage, and this he would show them it would not do. It must be well known to them that in country places the bulk of the business was worked by apprentices, and that the bulk of such businesses, or call them what they liked, was done in articles which did not require any special training or skilled labour. There would be a larger opening for assistants and fewer to take their places, and as a necessary consequence it would follow that those who worked their businesses largely through apprentices would be taxed at from £100 to £250 a year in the payment of assistants to do the same work which had previously been done for very little. In this they could not show that they were going to increase the quality or quantity of a chemist and druggist's returns. Coming to the third class—the city chemists—he remarked that they must necessarily work their businesses principally with assistants. If he had shown them that the effect of the Bill would be to cut off the supply of assistants, it was equally clear that they would be under the necessity of paying their assistants more money. This would be taxing the city chemist also, and therefore he held that the whole trade would be burdened by the passing of the proposed curriculum. What would then be the position of the chemist of the future? For one thing, chemists would be fewer in number—that was a dead certainty; but would they have the drug trade? Was there anything in the Bill that had any tendency towards conferring improved conditions on the druggist of the future? He maintained that the natural effect of the Bill was simply to throw open the market to unqualified dealers. They had in Liverpool hundreds of enterprising men, with plenty of capital, who would be ready to open bogus drug stores to-morrow, if they thought they would pay, and the only thing that kept these men from it was not this Bill, but the knowledge that it would not pay as a commercial speculation. For the chemists of the future to have to compete with these people would be a thousand times worse than the present competition amongst themselves. Coming to the Pharmaceutical Society, Mr. Carteighe had told them it was a purely voluntary Society, but as a Society it must have funds, for they knew very well that a Society like that could not run on very long without money. He believed that at present their Society was pretty well off in regard to income, and he would ask them to consider carefully the sources of its income. To commence with, did the Journal pay the Society much, and did the School pay much or did the Almanac?

The Chairman here interposed to request that Mr. Ward would confine his remarks to the Bill.

Mr. Ward, continuing, named the fees for examination, and the annual subscriptions of members as the two principal sources of income. Consequently, if they cut off the number of candidates coming up for examination, it followed that they must reduce the amount of fees, and therefore restrict one of the principal sources of revenue. If they cut off the number of candidates for examination, it was absolutely certain that they would cut off the number of chemists and druggists on the register, and also sensibly affect the amount of annual subscriptions for members and associates. He thought he had shown pretty clearly that the passing of that Bill must necessarily cut off the two principal sources of revenue to the Society, and therefore affect it evilly. If he were an orator he might have stated what was his idea from a constructive point of view, but he would simply second the motion.

Mr. Adams (Southport) did not think Mr. Carteighe would have much trouble in answering their friend, Mr. Ward. He spoke of the system of the country businesses being carried on by apprentices as being very objectionable. It upheld the sweating system and what educationalists were trying to put down. Perhaps be might be too great a hero worshipper, but he did admire Mr. Carteighe. It had been argued that they should not put into a Parliamentary Bill more than they expected to have enacted, but his idea was that they should put into it as much as they could get. If they asked for a lot they would not get more than they asked for. Regarding their friend Mr. Smith's argument as to the widows' clause, his opinion was that the resolution would cut it off altogether. One thing they had at Southport was a feeling that something could be done to restrict the sale of poisonous patent medicines. He should be for attacking Lewis, or, if they were too big, then some smaller vendor. On another point he remarked that a doctor had told him that he thought chemists and druggists made a great mistake in regard to the limiting of their stock. They should be able to supply everything, from a cork leg to an artificial nose. On the other hand, if they poached on the domain of the doctor he would poach upon theirs. So long as they had stores against them the businesses of the regular chemists would go down. If they educated themselves to a higher standard of efficiency it would be to their advantage. Doing such work as fitting a truss was within the province of a chemist and druggist, but there were not many who could do it. When he went out to fit a truss he got 25*s*. for doing it. If they insisted on their apprentices passing their Preliminary examinations before the end of their apprenticeship there would be a far better chance of getting members.

Mr. Peet pointed out that if they wanted to have a restrictive Bill in regard to the sale of poisons, it ought to be as strong as possible. If not they should throw the business open to let everyone come into it who liked. He was not sure whether restriction in regard to the sale of drugs was advisable. He was rather in favour of the public saying whom they would purchase from and whom they would trust in preference to others.

Mr. Riddel defended Mr. Ward against what he spoke of as the charges of Mr. Adams. He was sure Mr. Ward had come there with the noblest intention and at considerable inconvenience to himself.

Mr. Harold Wyatt had great pleasure in listening to Mr. Carteighe's remarks. It brought him back in a sense to forty years ago, when Mr. Jacob Bell travelled from province to province on much the same errand as Mr. Carteighe. He agreed that it was advisable not to ask for too much in the Bill, but throw overboard what they did not want. He quite agreed as to the desirability of commencing with the Bill first as an educational Bill, and going on improving upon it. Education was a primary measure for the improvement of the trade. The more they educated their young men the better assistants they would be, and he could not quite agree with Mr. Ward, because his experience both in regard to the town and the country was that the better educated the apprentice the better he did his work, the greater credit he was, and the more likely he was to be successful in business. If every master would take care to get an educated boy and not a charity school boy, with just a smattering of this and that, he might depend upon it there was more likelihood of his doing his work well and becoming a credit to himself and getting into the way of earning a livelihood afterwards. He was convinced also that the more they educated the better they would be supported by medical men. If they could show him that they could answer every question he put to them, they might rest contented that a medical man would come to them again. With regard to the restrictive clause he thought it was quite as far as they could go at present, and he did not think the country was prepared to throw over the widows' clause. If they were not able to do that he quite saw that there was a weakness. Having been accustomed to study Acts of Parliament he quite saw that that was a weak point. When they went to Parliament they must not blow hot and cold, but must strengthen the Bill as much as they could in every clause. He must say that he felt great pleasure in listening to the remarks of Mr. Carteighe, which reminded him very much of what he used to hear in the discussions with Mr. Jacob Bell, who had told him (Mr. Wyatt) that they could not expect to achieve everything at once, but must content themselves with a little at a time. What he wanted to do was to get the Pharmaceutical Society recognized, and it would be for his successors to drive in the wedge still further. Altogether, therefore, he thought that if they would be content to support the Bill on its present lines it would be of very great advantage. The whole of their failures hitherto had resulted from the fact that they were not sufficiently united, and there was always opposition when a Pharmacy Bill was brought in. Four years ago, when they had unitedly to oppose the Poison Bill brought in by the Government, he did not believe that the chemists outside wilfully asked for it, and certainly they objected to some of the provisions which were being made by the Pharmaceutical Society in the Pharmacy Bill. Passing on to speak of the curriculum, he said he had assisted in the work at "The Square," and was not likely to oppose it to-day, but he was bound to say that the necessity for a curriculum was not one quarter what it was four years ago. The Board had now formed a syllabus which was of a comprehensive character, and that syllabus had introduced a good deal of practical pharmacy. Now he had himself always kept hammering away at the necessity of young men being well up in practical pharmacy, because he thought that they could teach too much chemistry—*i.e.*, chemistry to the neglect of practical pharmacy. In teaching practical pharmacy they diminished the necessity for a curriculum, while still holding the conviction that if they insisted on a candidate going through an examination in practical pharmacy for which it was impossible for him to cram, but which he must have learned thoroughly in order to pass. When the President began to tell them that they had not enough of education, some might begin to fear that they were going to make the thing extra professional, and therefore they ought to have it thoroughly discussed before submitting it.

Mr. H. B. Thornton said he would like to ask whether the object of a Curriculum Bill was to get a better educated class of men and thereby thin the ranks of the present assistants; or, rather, as the curriculum which medical men had to undergo enhanced the medical profession to-day, would such a curriculum raise chemists to a better position? Also he would like to ask how would chemists then be defined? If they kept shops people regarded them as mere tradesmen, and they would not pay a tradesman professional prices.

The Chairman said he would have liked to see a little increase in the fees for examination, and it would not require a large increase for every man to enable him to be elected a member of the Pharmaceutical Society, without the necessity for paying an annual subscription. If they could do that he would call it the consolidation of the Pharmaceutical Society. Referring to clause 7, and its exemptions, he expressed an opinion that they should be better safeguarded in that respect than appeared in the Bill, as they were going upon very delicate ground. It was not to be supposed that those who framed the original Bill intended to say that the person who sold poison must be a qualified chemist, and that the person who compounded it might possibly be an errand boy, but this was really the present reading of it, because it left the question of compounding to be done by anyone. Now, they had that provision put into it to make it consistent with the recent action of the Pharmaceutical Society, and he held that they must consider the question very carefully in regard to that clause before supporting it, so that no medical prescription whatever should be dispensed unless the person who dispensed it was qualified. The judges, trying to get at the intention of the Act, held that if a qualified person superintended the dispensing it would be right; but there was no such language as that in the Act, and it was only a matter of definition. One point which the President omitted to speak about was the juries' clause, and whether he had faith that that clause would ever get through. Considering the attention that would be attracted to the subject by raising the question in Parliament he thought they would be better without that clause. The only other point on which he would touch, and it was of vital importance, was that the Bill in no way attempted to restrict the title of chemist and druggist. Any man, say Jones, Brown, or Robinson might know something about the business of a chemist and druggist and yet be totally incapable of passing an examination, and still he could take to himself six or more persons and become a limited company, and as Jones and Company, Limited, he could call himself a chemist and druggist. These were amongst the things to be whispered as secrets of their trade, but these were yet things which were practised daily, and a man with £100 capital could register a company, as had been done within the last few weeks. Well, if it was as easy to qualify as that, it was a pity if they could not put more restrictions round themselves and not leave the field so open. It was like putting on a new gate on one's field to keep the cattle from getting through, while they left the hedges all broken down. In a great measure he supported the Bill, but he could not conscientiously fall in with it out and out, unless it embodied some means of restricting this multiplied method of becoming qualified. The widows' clause in its intention was a very excellent one, but it was not framed with the object of enabling a widow to carry on business perpetually, but the loose drafting of the Bill brought about this. The original intention was to enable executors and trustees to carry on for a year or two, until they could conveniently wind up the estate, but there was no limit to the time of a company. Once registered it went on for all time. He thought Mr. Carteighe would be consistent in respect of going in for restricting this company affair. One other matter occurred to him. They were told that in the Pharmacy Bill they must be logical and act simply for the benefit of the public at large. He recognized that, but still he thought that 13,000 chemists and druggists belonging to the middle class of society formed no insignificant part of the British public. He wanted to tell them where he thought the Pharmaceutical Council were not quite logical. He thought any intelligent person would tell them it was for the benefit of the public that every deadly poison should be so labelled that there was no mistaking it. Why did not the Council or the Society enforce that provision? Finally, he expressed the opinion that the drafting of the Bill was fairly well done so far as it went. The drafting of the 1868 Act was very wide. He believed it was held to be very clever to be able to draft a Bill in that way, but what had it done for them? It had certainly been good for the lawyers, but bad for the chemists and druggists, having led to all the litigation they had suffered.

Mr. Carteighe wished to say, in regard to an observation of the Chairman, that the drafting was not final. The Bill had really not yet been drafted by a lawyer, and under the circumstances they had done the best they could to make their meaning known, and when they had got a lawyer to draft it on the lines indicated by the Council it would be quite a different thing. His friend, the Chairman, had really been beating a windmill on that question, as they knew what they meant now, but when it came to be interpreted, perhaps twenty years hence, they would not have to decide it themselves, and it might be taken to mean something quite different. The Chairman had really delivered the address, and it appeared to him (Mr. Carteighe) that he had really nothing to do except to go back to London: so that if they would not consider him discourteous he would now just refer to what seemed to him to be a burning question, that of company trading and the so-called unqualified seller, and the question as to whether under clause 7 it would affect the assistants of chemists and druggists in regard to the provision in the clause. That, he thought, was the main point, although there were of course a number of subsidiary ones which could readily be answered. He would assume that for general purposes the members were pretty well agreed upon most of the other clauses. They certainly ought at all events to be agreed about the jury clause. He would therefore confine his attention to the question of company pharmacy. He was sorry to say that the Chairman, in quoting him (Mr. Carteighe), had quoted him in a way in which he was very frequently quoted as to what he had stated in public in regard to company trading. What he had said upon the question of rejecting and all that were not his views, but the views of the members of Parliament to whom he went for advice. He agreed with the chemists and druggists, from the very bottom of his heart, as to the desirability of preventing this very unjust form of trading. He suffered in the same way that they did. As a chemist and druggist he had had to oppose these companies for twenty years, and long before they were heard of in Liverpool. He was one of a body or association which was formed to watch the whole subject, and to that he subscribed five guineas a year, and therefore he and others who had been associated with him claimed to know something about the matter. Now what he had said in Manchester and at the Council table and elsewhere was not what Mr. Carteighe had said, but what those said with whom he had to deal. They had got to pass two Houses of Parliament and the departments of a Government, or, at all events, one House of Parliament and a Government, before they could get their nose into the House. He thought, therefore, they would consider him very ungracious, and, what was more, deceitful, if for the sake of gratifying them, he should refrain from bringing forward what was to be said on the other side. The whole thing was a question of practicability. Gentlemen connected with the trade naturally talked about their grievances, but he wanted them also to talk about the constructive parts of intended legislation. The Council of the Pharmaceutical Society was a constructive body, and what encouragement had it had from any department of the State to go on the lines which had been suggested? Mr. Symes was a member of the Council with him some time ago, when they drafted a Bill affecting their trade, and Government not only refused it, but gave them a slap in the eye. The Government said the Society might discuss matters affecting education, but must not touch the sale of drugs. Then they got another slap in the eye when it was sought to legalize these companies by saying that the man who had the management of a company should have his name stuck over the door. They argued it in the same way that a judge had done by saying that so long as the person who handed over and dispensed the medicine was duly registered, they did not see that in those cases it was a matter of consequence to the public who it was who took the profit. Now, they must please remember that these were not Mr. Carteighe's words; these were what was complained of when he was criticized in the way he had described. He would like very much that he had a Parliament like the meeting before him. If they had they could get along, but it must be remembered that they had to deal with those who had companies and who were interested in companies up and down the country, and at the present moment the Government department absolutely refused to entertain the question of company trading, excepting in the form of legalizing it. Well, then, another point came in, and it was the question of the widows' clause. As had been pointed out, two blacks did not make a white, but he had now been in communication with members of the House of Commons for some years, and had used his opportunities in the lobby to feel his way for the benefit of the trade. In fact, the Curriculum Bill had been a useful baby for him to handle in order to get some friends in Parliament, for it must be remembered that they had not friends of their own in Parliament. They had to make friends, and those he had been able to get to listen to their demands argued in regard to a certain point. They pointed out what had been pointed out to him the other day, in regard to the compiling of a directory in which the list of chemists and druggists was all wrong. The compilers, in answer to his communication, said that the Government said the same thing. "In your own Pharmacy Act, as it stands, seven executors of a deceased chemist and druggist, or three, two, or one more or less can carry on the business for any length of time by means of a qualified assistant partner." They said, "If that is in your judgment safe for the public, we fail to see how the other cannot be so." In fact, they said point blank that it was a question of profit and nothing else. Well, was it not so? He was not ashamed to say that it was so very largely. Let them face it in that way and ask if it was logical. He had been taunted about it, but the judgment in the original case submitted to the House of Lords, when the Pharmaceutical Society fought a company, was brought about in that manner, and the reason that members of Parliament and the Privy Council knew all about it was because of the words of this judgment. At that time the Society approached Parliament on the subject, they turned up all the papers, and they found that the judges were in a difficulty to know what should be the law under the circumstances, and they interpreted it in this way, that a corporation was outside the Act, and that as widows were allowed to be outside the Act by means of a qualified assistant, they thought there was no harm in a corporation doing the same, provided that the assistant sold the poisons. It was needless to say that he did not agree with that. But they had sent him to the Pharmaceutical Council to do some work for them. They wanted something done, and so did he; but then he had to deal with unsympathetic persons—with laymen and with lawyers and others—and had got to preach to them with tact and judgment, and the question was whether they should go for a whole or part. Now the judgment of his colleagues—absolutely their unanimous judgment—was that they could not attack existing corporations. His friend, Mr. Harrison, proposed that on and after the passing of that Bill no more companies should be formed, but no one else in the Council of twenty-one held that this should be touched. Were these men all so purblind as to refrain from doing this, after very serious consideration, without good reason? Was there no reliance to be placed in their judgment? Of course, he was very glad to hear all sorts of criticisms and arguments, and he wished them to remember that his object in coming to see them in Liverpool was to receive suggestions of a constructive character, which could be carried out. It was the easiest possible thing to put in a clause, but they had tried that way. It could only be done in one way. They must have at their back the 13,000 chemists, and they must have organization in which politics of every kind must be sunk in favour of one great object. How could they ask the Council of the Pharmaceutical Society, representing only a small number of the trade, to go to Parliament and wrench, as it were, this particular thing from companies, unless by thorough combination? How could they do it without making it a special application of their trade? How could they do it without showing that it was just, and that to some extent it would benefit their pockets? How could they expect to be successful if the judges, the Press, and the department through which they approached Parliament said it was unnecessary? They said that in the case of a company or corporation it must have a qualified person to sell and (probably he had mentioned it before to some of them), two members of the House of Commons whom he had approached on the subject had actually claimed it to be a benefit to the rising generation of chemists that there should be companies ready to take them in hand and provide capital to enable them to carry on their businesses. It was his work to measure the forces against them, and he found that he could not go forward unless he could get the undivided support of every man in the craft. It had been said to him, "You go and get this, you go and shut up these companies, and we will support you afterwards and join the Society." But that would not answer, and unless their undivided support could be obtained, they must be content with piecemeal legislation. He himself saw no difference between a widow's business carried on for say twenty years time by trustees till her youngest child was twenty-one years of age, and a company carried on for twenty-years, both being conducted by qualified assistants, and he was utterly incapable of persuading laymen that there was any difference in the danger to the public. To use an Australian's phrase they should go for the safety of the public in the first place and for their own pockets afterwards, but if they put the cart before the horse, members of Parliament quietly turned round and said, "No, thank you." But supposing the trade were a power in Parliament, and if he could find half-a-dozen members of Parliament who would introduce a Bill based on the principles they required, he would have nothing more to say, for the Bill would be drafted at once. But what happened in the case of the Irish Pharmaceutical Society would most likely happen to them. Its Council drafted a Bill and sent it to be introduced by a private member, and he politely told them that the company clause must be cut out. As far as he had read the Act of Parliament passed as for Ireland it was a distinct legalization of company trading. It provided for a qualified manager, and in fact it practically legalized that form of trading. Some of them might say "Better to regulate the trade lawfully than have it in its present position," but they could see that their interest in the existing law gave them greater powers against a corporation than they held before. From time to time they had had three or four important cases, and they had in one case been able to take the principal man who formed the company for selling poisons, and obtain as many as five penalties of £5 each from him, and he believed that in one case the place was shut up or about to be. Now, if they went to Parliament to deal with these companies with any form of suggestion, the utmost which, in his opinion, they would get would be a regulation as regarded the manager, whose name would be made to whitewash the whole concern. In his opinion, therefore, it was better to leave it as at present, believing that in time their power for evil would be more or less diminished. But was this company trading the sole form of competition with which they had to deal? It was not a large part of what they had to complain, though they were apt to imagine that everything arose from this company trading. It happened that in certain parts of London they had gone through the first phase and were now in the second, and that was not the difficulty and danger arising from these companies, but difficulties and dangers arising from their own brethren, who were opening stores and sending round circulars, abusing the prices of their brethren and pointing out what splendid stores their own were. Here (producing an octavo handbill) is one of them, and they had heaps of such in London. Here was a handbill sent to his private house, and it was much more detrimental to them from a trade point of view than any company, because it not only quoted low prices, but abused the whole lot. Now, was company business the whole difficulty with regard to their trade? [A voice: No.] Certainly not, and if the chemists and druggists in Liverpool had an association to which everyone belonged, and formed a code of ethics among themselves they could keep companies at bay. But so long as they were hankering for little things they could not get along. As was said by one of the speakers, the qualification must be real or nothing at all. Now, coming to the unqualified seller, it was not necessary for him to defend it, because it had been actually made the law, but he wanted to point out that both in the assistant's interest and in the effect of the judgment given, he did not think the balance was on the wrong side. That prosecution was undertaken on the appeal of a Government official on account of a death, and he wished to observe that if chemists and druggists could take off their qualification just as they took off their coat and put it upon their assistant, or errand boy, what good could they claim for the Act? It was intended for the benefit of the public, and it was intended to apply to the young man who passed his examination to-morrow, as well as to the old man who happened to be seventy-five to-day. They had to deal with all classes, and how were these young men to get on in the world on passing their examinations if they were to be told that a man should have an exclusive right to keep a shop and hire as many men as he liked to dispense without their having obtained a qualification at all, and therefore the very judgment of Justice Hawkins and his colleague strengthened their position. He believed that the fear so many of them had about the hardship in regard to rising prices was a delusion. He wished that assistants were a good deal dearer than they now were from a trade point of view. They would value their services proportionately, and they would get the public to value them too. If their company trading clause would get rid of the competition of their own people it would be good business if they could get it; but, as he had stated before, the Society with its present powers could not get that for them unless they adopted all through the country the plan he had suggested, and that would require two or three years' organization. If that was so, he thought they would consider that he and his colleagues had arrived at their conclusions with a certain amount of judgment on their side. They must prepare something that would be introduced into the House, because it was not a question of a clause being discussed in the House and rejected, but a question of getting a Bill into the House at all. Some of them knew the prejudice there was there in regard to all forms of trade, and he had no doubt they could pick out from among their customers those who thought the chemist and druggist was robbing them. Let them just conceive of the presence of such men in Parliament, and there were plenty of them there, who thought they were doing good to the country when they opposed trade interests. And these were the men they were asking to throw over what they considered their grand principle of association. With regard to the jury clause, he hoped that Parliament would be willing to pass a Bill of this kind providing for the exemption of the future chemist and druggist, and imposing upon him or giving him the duty of compounding medical prescriptions; they had a much stronger argument than before for asking for it. He thought the arguments put together were quite sufficient to justify them in asking Parliament to assent to that, and he was quite sure it would. Mr. Symes had asked him a question about apothecaries, and he wished to say in reply that the examination for assistant only enabled him to dispense for apothecaries, and that the status of an assistant did not give him power to keep an open shop. He might have saved himself a good deal of trouble and the audience a good deal of forbearance and patience if he had said at the beginning what he now said, and anticipated to some extent the discussion which had followed his first remarks. He hoped, however, that they would say he had been perfectly parliamentary in not travelling outside the Bill. There was one other point, and it related to patent medicines. There was some probability that that might be attacked under their present powers with a probable chance of success. He used these words because it did not do to prophesy before they knew. They did not know what any particular clause would really be held to mean until it had been under discussion in a superior court. Their experience was that it would be far better if some other body were called upon to move in the matter than the Pharmaceutical Society. If they moved they would have to do so with great caution, because if they fought that case they must win, else a very awkward thing would happen. If the grocer were compelled by one portion of the statute to put a poison label on his poisonous patent medicines and the sale were not restricted, they would create a grosser form of the evil. It was not for them to educate the public in the opinion that the grocer should be able to sell poisonous patent medicines. It was not for them to approach this subject excepting in such a way as to make it compulsory that a preparation of say morphine bearing a certain name should be labelled "poison." It was essential that with it should go the restriction of the sale to registered chemists and druggists. Certainly it would be better left as now than to risk the loss of an action. Still, when they considered that the Pharmaceutical Society had been carrying out the law with regard to poisonous preparations, and had been restricting their sale for years, he thought this might be used as a very strong argument in its favour. In conclusion he desired to thank them for their courtesy in listening to him, for he had really been practically put upon his defence. He thanked them very much for their patience, and assured them that in this measure presented to them for approval, he presented it in the interests of the entire trade, with the conviction that it would benefit them both immediately and prospectively. If it did not go far enough he had only to say, "Use your powers to push this Bill on to a second reading, and perhaps you may be able to amend it on the second reading." But help they must have in getting it inside the House.

The resolution of Mr. Smith, as presented by the Secretary, was couched in the following words: "That in the opinion of this meeting no Bill will be satisfactory unless it endeavours to prevent corporations from using the title and carrying on the business of a chemist and druggist."

Mr. Abraham moved as an amendment: "That this meeting desires to express its approval of the draft as passed by the Council of the Pharmaceutical Society in 1890, and pledges itself to support the same."

Mr. Wyatt seconded the amendment.

On being put to the vote by a show of hands, the amendment was carried by 16 to 6, and was afterwards passed as the substantive motion.

Mr. John Bain, the Secretary, said he had been called upon to perform the pleasing duty of moving a vote of thanks to Mr. Carteighe for his admirable address. Having had experience of his quality, he was sure they were all well pleased with the simple, yet energetic and honest manner in which he advocated the claims of the Pharmaceutical Society. He considered that Mr. Carteighe, as the President of the Pharmaceutical Society, was the right man in the right place, and from all he had heard and read, the success attending his efforts was only equalled by the energy he displayed in securing them. A friend had informed him that at the Manchester meeting, about twenty members went with opposing resolutions in their pockets, but after having listened to Mr. Carteighe's arguments, their resolutions remained in their pockets. The Pharmaceutical Council seemed to be doing the best it possibly could for the interests of the general body.

Mr. Richard Parkinson rose to second the proposition very heartily, and to say that he was in sympathy with the Bill. He had no doubt it could be improved, but so far things appeared to him to have been done in a legal and scientific manner.

The Chairman added a few sympathetic words, mentioning as a proof of Mr. Carteighe's great capacity for work the fact that he had arrived from London only twenty minutes before the meeting commenced, and was going back by the night train.

Mr. Carteighe very briefly expressed his thanks, and the meeting terminated.

COMPLIMENTARY DINNER TO MR. CARTEIGHE.

In the evening a large and representative assemblage of the local members of the Society entertained Mr. Carteighe at dinner in the Royal Restaurant, Old Hall Street. The great majority of the company appeared in evening costume, and the gathering was a brilliant one.

Dr. Symes, the Chairman, having given the customary loyal toast after dinner, proposed the toast of the evening, "The Pharmaceutical Society of Great Britain," coupling with it the name of its worthy President, Mr. Carteighe. The Pharmaceutical Society had now been in existence for about fifty years, and next year would be its jubilee. It had done so much useful work within their own day and as it had a history of which its members might so well be proud it needed no commendation at his hands. He wished to say, however, that many were inclined to look upon the Pharmaceutical Society as a big institution somewhere up in London, which was getting a very grand building and surrounding itself with educational arrangements and with a good deal of ornament at a very elaborate cost, and that it was only useful as being at the head of the profession. He wished to say, however, that the Pharmaceutical Society was in the present day the only institution which could represent not only their professional but their trade interest. So far as the Pharmaceutical Society could be consistent with the position it held it had done very well in taking up some of the matters it had done. Some of them thought it might do a little more than it was doing. It was doing so much, at any rate, that it deserved their earnest support. In its origin education was not so much one of the objects, though certainly education was one of its features; but the Pharmaceutical Society was distinctly founded to protect trade interests also at a time when the rights and privileges of chemists and druggists were being threatened by medical Bills which were going to take the chemists and druggists over to their care, and make all sorts of regulations for preventing them from doing any business. The Society made a determined stand against such innovations, and if it had not accomplished all that everybody wished it to do, it had certainly never been afraid to oppose any legislation which appeared to be inimical to the interests of chemists and druggists. Confining himself to what it had done within the last nine or ten years since it had been under the rule and guidance of its present President, Mr. Carteighe, he thought that all would agree with him in saying that it had spent a vast amount of money, and that it had done much more than in the early days to which Mr. Carteighe had referred in the afternoon, and it would no doubt do much more in the future. Some of them were strongly opposed to spending the funds of the Society, but the benefit funds were then invested in such securities as brought very little interest. They were not able to do much in helping their needy fellow pharmacists, but by investing the funds as securely as ever but judiciously, Mr. Carteighe had been able to create, as it were, a certain amount of money, and having accomplished that he thought he had a right to spend it as he thought best for the benefit of the Society. The usefulness of the Society depended upon the judicious expenditure of the money at its disposal. To say anything about the President himself would be to gild gold. They all knew very well what an amount of time and energy he gave to the work of the Society, and how he had always been ready to come forward when he thought he could be of use to the trade generally, much as he had come that day at very considerable sacrifice to himself. Wherever useful work had to be done amongst pharmacists Mr. Carteighe was there, and he thought the company would agree with him in thinking that their guest deserved their very best thanks for the good he had done generally for the Society.

The toast was drunk with great enthusiasm.

Mr. Carteighe, in responding, thanked all most heartily for the honour they had conferred upon him, in the first place in asking him to partake of their hospitality and in the second for the way in which they had drunk the toast of their *alma mater*, the Pharmaceutical Society of Great Britain, with which his name was coupled. Of course he knew that they were all loyal to the Pharmaceutical Society, more or less. He said more or less because he knew there was just a little difference in the intensity of their affection for the Society, and one's loyalty was sometimes severely strained if anything happened which was personal to himself. He was one of those unfortunate individuals who during the last twenty-five years had contributed to the misery of a number of parents, probably in Liverpool as well as elsewhere, whose sons had not passed the examination. Now loyalty was of course a very good thing, but when one's dear boy, who was so splendidly trained, and who was such a splendid specimen of what a pharmacist should be, came back from London without having passed, he left them to infer how their loyalty stood. He was happy, however, to see that that assemblage, some of whom had sent boys up for examination, and some of whom had been up themselves, had not been backward in cheering their President. After all he thought that from the point of view of their examinations the examiners deserved a little sympathy at the hands of their members. He confessed it was to him a source of disappointment to find so many of his friends throughout the country whose minds for a time rankled against the Pharmaceutical Society, because their son or relative or assistant or apprentice had failed to pass, He would venture to point out to such that the Pharmaceutical Society was only the instrument of the Government in that particular part of its work, and if it did not perform its duty satisfactorily some other body not amenable to themselves would be substituted for it; therefore when he spoke of loyalty more or less, and sometimes less, he would have them believe that they performed their duty to the best of their ability, and even if it sometimes caused partial suffering and distress, to regard it as part of those evils of life which every parent had to undergo, believing that no governing body that ever existed could be a very popular one. He did not mean to say, however, that their examinations or examiners were perfect. They did the best they could with the lights before them; but when he pointed out to them that the examiners had to sit down deliberately and examine a candidate at one sitting, without any evidence as to what the man had been doing or how he had been occupying his time during his apprenticeship he thought they would agree with him that it was not easy to be perfectly fair and just in their results. One or two things might happen, either that they might pluck the candidate or pass him, but in either case there was a very considerable proportion of those who presented themselves for examination at the boards, both in London and Edinburgh, about whom the examiners were placed in the greatest difficulty, simply from the fact that they had no record of the man's previous history. They might say, "What has that got to do with the subject; all you have got to do is to examine the man as to his qualifications for a pharmacist." He had himself been a tutor of chemistry before being a pharmacist, and the older he got and the more experience he had, the more he became impressed with the enormous responsibility and with the almost absolute impossibility of coming to a definite conclusion in one sitting of about half a day or three quarters of a day, as to whether a man was competent in six subjects, and of some which were taken *viva voce* without previous knowledge. It was not, as had been insinuated at the afternoon meeting, a purely restrictive process that was being aimed at. It was a process which would enable the student who had worked, to get marks for his work, and moreover it would enable the examiner to know that when a man by a slip of the tongue said black was white it was only a slip of the tongue. The most eminent men when put in the witness box were often made to contradict themselves, and if that was so with men of mature age, how much more so was it the case with young men rendered more or less nervous by the cruel stories about the examiners, especially one particular examiner. The scheme they had been talking about so long, as to an enforced curriculum, he regarded as an essential piece of justice to the candidate. He did not think it was fair that the candidate should be sent before the examiners and dealt with in these six subjects in one day. Unfortunately, while the law remained as it was, they could do very little to improve the examination. They might be able to extend the examination in the practical part of it, or extend it with advantage for a week, but all that meant expense. Probably the candidate and his parents would prefer to pay a somewhat higher fee for a more prolonged examination, but that was a matter for the future and might be undertaken. But what he submitted to them in regard to the candidate was briefly this, that the curriculum which was sought to be imposed and the examinations for which they were seeking for power in the Bill discussed in the afternoon was one which, he thought, should be insisted upon by parents for their sons' sakes. If he were an autocrat in the Pharmaceutical Society and could do exactly as he liked, he would let every candidate send in to the Board of Examiners any evidence of his previous training so as to let the examiners consider it along with other things. But some of them might say, "But then you would know where he was educated, and might be prejudiced." The examiners, however, especially of the London Board (because it did not affect Edinburgh so much), if they had any prejudice, it was in the opposite direction from what was supposed, and more was expected from those who were known to have been brought up in the Society's school than others. Further, he thought it would be a very good thing if they were to do as Jacob Bell did in recommending the council of a voluntary society, that candidates should go through certain courses of instruction before coming up for examination. They would be surprised to find how many men there were who did not know how to proceed in preparation for the examination. There were very many who did not know how to proceed in order to acquire the necessary knowledge, and it would obviously be a very good thing if some recommendation of the kind were made. Dropping that part of the subject, he remarked that there were in the room several members of the Pharmaceutical Society who were neighbours of their own in Liverpool, including Mr. Parkinson and the two Messrs. Abraham, who ought to have had a share in the responsibilities of the toast, but who had allowed him to absorb them, so that he had to respond for the Pharmaceutical Society in Liverpool as well as throughout the country. It was a source of gratification for him to attend that dinner, although latterly he had been very anxious not to encourage demonstrations of hospitality towards himself, because he felt that as the official head of the Society he would not willingly put the trade to any stress in regard to expense. The attendance he had given that afternoon was a matter of personal pleasure to him as well as of duty, and he felt amply repaid by having the opportunity of discussing matters with them. He should not require, and no president should require them, necessarily to form themselves into committees, to get up a grand banquet to do him honour. He appreciated their kindness, but still he thought it necessary to say what he did, because he was in this difficulty, that he had distinctly objected to being entertained in some other large cities, and his Liverpool friends did not ask him, but simply got up the banquet and waited till he arrived before telling him. A little incident occurred to him which appeared appropriate to the circumstances. There had amongst them several members of the wholesale trade who, he had reason to believe, were in perfect accord with them in all things respecting their welfare—among others, Mr. Conroy and Mr. Evans. There were among the wholesale men those who were old enough to remember him in the first or second year in which he was elected a member of the Council of the Pharmaceutical Society of Great Britain. It happened to have been, then ten years since, there had been a benefit fund dinner in London. In those days there were no annual dinners, and he was then a young man with plenty of impetuosity, which had all gone. They got up a tremendously big dinner, at which there were no fewer than three hundred and seventy-five people. As a dinner from the point of view of enjoyment and donations it was a very great success. He was himself a member of the Committee of the Council which had to deal with the dinner, and he was like his friend Mr. Conroy on this occasion, at the end of the table in the position of Vice-Chairman, or, as their Scottish friends called it, the croupier. During the progress of the event his friend Mr. McCulloch (of Heron, McCulloch and Squire), a man of considerable height, tremendous thickness, with a pleasant, deep and jolly voice, patting him patronizingly on the back (as he now did to their Chairman), said, "Very good, Carteighe; capital! But I say, Carteighe, I only wonder where they all got their dress coats from." The origin of the affair was that dress should be made indispensable. Listening that afternoon in the Royal Institution to the grievances that were being poured forth into his ears, he certainly did not expect to see such a sight in Liverpool as he saw that night, but he supposed they were the same gentlemen. He was extremely glad to see them all in such good form and enjoying themselves so well. And now he wished to turn to the social aspect from a different point of view. He should be very glad if a gathering like that could take place in every considerable city in Great Britain at least once a year, and at which some representatives from that unfortunate place, London, would assist. He should be glad if in Liverpool and all the other places of what might be called relative importance in Great Britain there was a local association, well organized and well equipped, associated with the school for teaching purposes, partly endowed by the parent Society. Indeed, if they would give him what he had asked for—the support of the whole trade—he believed it would be possible for the parent body to provide such throughout the whole of Great Britain. He need not say that, apart from purely educational matters, the influence on politics and policy that such bodies would have for the general good would be immense. Unfortunately they had not the powers and means to do all that they desired. Local associations, however, he was sorry to say, did not apparently strike root in new places; indeed, there seemed to be some difficulty in keeping those in existence alive at all. He did not know exactly how they stood in Liverpool, but he believed they were a prosperous body, and he was told that they were the oldest body, and so they ought to be flourishing, not only in the matter of finance, because he did not care about having a large balance at their bankers. He considered that if they had sufficient men to back them from year to year they did not require to save a penny. He was one who did not believe in a society saving money for another generation, but he would leave posterity to take care of itself. But what he ventured to suggest was this, that with regard to the associations it appeared to him that a difficulty cropped up every now and then from what was called trade jealousy. Some men would sell at lower prices than others, and were popularly called cheap jacks, while others did things sometimes that were a little bit crooked or shady. Well, no association could flourish unless it could get the whole body into the fold, and whatever the apparent offence that they thought their neighbour was committing, they must first try and get him into the fold and then convert him, and very often it would be found that these became the best people afterwards. Supposing, for the sake of illustration, that Mr. Abraham and he were in business next door to each other, and were "cutting each other's throats," the very best thing for them and for the other members would be to get hold of them, as they were both registered and qualified, and therefore belonged to the general democracy of pharmacy—not putting their backs up and ignoring them, but talking to them professionally, according to a general code of ethics. It struck him that that was one of the difficulties of local associations. In big associations they had to deal with all classes—they had many members of the Pharmaceutical Society and many associates in business, who, he thought, were acting unprofessionally from his point of view, in the matter of prices; but it was not for him and it was not for the Council to judge of a man's code of morals until they had laid down a code of ethics amongst themselves, by which all would be bound. It appeared to him to be a wiser plan to forget all forms of politics, and associate themselves together for the reading of literature and social conversation, and for that night he would shut his eyes as completely to what he judged to be his neighbour's shortcomings as he did when he went into certain London clubs. It was, perhaps, a piece of impertinence on his part to speak to them in this way, but he thought it might possibly apply to them, because in certain professional centres he had noticed shruggings of the shoulders when A was spoken of, and shakings of the head when B was referred to. He would have every association coax into the fold the most troublesome men in the town or city, as the case might be, and treat them with the utmost consideration, and make them happy, and he believed that a course of patient drill of that kind would do more to get rid of this jealousy than one could imagine. As the President of the Society, it was imperative that he should be frank in what he said. He was interested in this matter, because wherever there was a local association that covered the whole city or town in which it existed, there they had what might be called germs of active work. As he had indicated, he looked to the time (it might possibly be a utopian idea) when the President of the Pharmaceutical Society should come down to the occasions of the Liverpool branch of the Pharmaceutical Society as part of his annual duty—when, in fact, a subscription to one body in London would practically give to everybody in a locality all the local advantages which now were somewhat unevenly distributed between London and the provinces. And as he looked forward to that, he would suggest to them that until this could be obtained, let them be charitable towards each other in the highest sense, meeting together frequently, not seldomer than six times a year, on terms of professional equality, keeping at a distance for that night at least the irritability of professional life. In the British Medical Association there was as much friction going on about prices as amongst themselves. That sort of thing was going on constantly, but they adopted a general professional tone regarding it, and said: Let us hope that he will see better. Medical men sometimes gave their services gratuitously to the poor, and that would be a good thing also if it were done in some cases by pharmacists. He in his own business had not to sell many pennyworths of poison, but if a man asked him to do him a professional service, and he tendered in payment the largest coin that he could afford, and that was not a coin that he considered adequate remuneration, he thanked him and did it for nothing. He saw no objection to a chemist and druggist supplying a pennyworth of poison, for instance, gratuitously to poor people and charging a fair price to those who could afford it. He considered it perfectly absurd to treat this matter of poisons as if it were something sold in penny packets. To go through the necessary formalities of weighing or measuring, as the case might be, and labelling a certain quantity of poison for the very modest price of 1*d.* or 2*d.* continuously and regularly was, he thought, unwise policy on the part of the seller. In such cases it would be better to let those who could not afford to pay have the thing for nothing, and charge 6*d.* to those who could afford it. In this connection Mr. Carteighe referred to the practice in Scotland whereby a small scale-price was charged to the poor. In finally thanking them for their kindness he wished to say what a source of pleasure it would be to his colleagues on the Council, as well as himself, to tell them how well he was treated in the name of the titular Society, big as it was, much abused as it was, and never grander than when in 1868, with its comparatively small number of members, it handed over the whole of its capital of the benefit fund—something like £12,000 or £14,000—for the benefit of the trade unconditionally. On behalf of that Society he begged to tender them his sincere thanks.

The Chairman briefly took occasion to refer to a portion of Mr. Carteighe's speech by saying that there was no branch of the Pharmaceutical Society that he knew in which less jealousy existed than that of Liverpool.

Mr. Hockins then proposed "The Wholesale Trade," coupling with the toast the names of Messrs. J. J. Evans, Hugo and J. Jackson. The wholesale firms of Liverpool could supply all the wants of the local retail shops, and do it in a different manner from that described in connection with a recent adulteration case, in which the culprit was rewarded with six months' imprisonment. The Liverpool wholesale trade was of a very different character from that, and the Liverpool firms could supply drugs of as great purity as it was possible to be done, and this was what they could appreciate in these days of adulteration, prosecutions and public analysts, that they could have confidence in the honesty and trustworthiness of the wholesale firms who supplied them. They had just had assistance from a member of one of their wholesale firms on a matter that affected them very nearly, the railway rates question, and he took that opportunity of tendering him the thanks of the association for his very energetic and able services. They highly appreciated the honour conferred upon the same gentleman (Mr. J. J. Evans) by being admitted a justice of the peace for the neighbouring county of Chester. They had others in the wholesale trade who were also very highly respected. Referring to the 7½ per cent. transaction recorded in a publication identified with the trade, he said he hoped that if applied to the firm would supply Liverpool chemists and druggists on the same generous terms if the generosity of their own wholesale firms would not extend so far.

The toast was enthusiastically received.

Mr. J. J. Evans, in response, said he rejoiced to think that such very cordial relations as had been described existed betwen the wholesale and the retail branches of the trade in Liverpool, and he believed he might also say in the neighbouring towns, wherever his firm had the pleasure of doing business. The trade between them must essentially be one of confidence, and he felt that that confidence did exist to a very large extent between them. As regarded the matters which had brought them together in the afternoon, he personally abstained from attending the meeting, because he had always felt that when retailers were gathered together on matters that concerned themselves, it was presumption on those who were strictly engaged in the wholesale trade to interfere; although at the same time he felt very interested in the proceedings of the Pharmaceutical Society. He wanted to say how much the whole trade was indebted to Mr. Carteighe, the guest of the evening, for his active exertions on behalf of the chemists and druggists of the United Kingdom during many years. Alluding to the question of railway rates, spoken of by Mr. Hockins, he said that he (Mr. Evans) took a great interest in that, because he could well understand that if railway carriage was high, it would affect the amount of drugs sent out of town, and therefore it was to the interest of all of them that these rates should be kept as low as possible. Mentioning that they had had to deal with the Railway Rates Question on the County Council, on the London Chamber of Commerce, etc., he expressed satisfaction that the Board of Trade had decided almost entirely in the interests of the traders and not that of the railway companies. There were other matters which touched the interest of wholesalers and retailers mutually, such as the supply of pure drugs. His experience was that the public analysts throughout the country were frequently a little over zealous, and his firm's customers had sometimes vexatious prosecutions to face. In such cases his firm had taken up the cudgels on their behalf, and had always been successful in proving that the public analyst was wrong and that their friends and they were right. He knew that many chemists and druggists throughout the country were in fear and trembling of the public analyst, and he thought it was the duty of all the wholesale houses to back up their customers when accused of selling goods which were not up to the proper standard, and defend them in such cases, and in this way confidence would increase between them. Allusion had been made to prices, which he knew constituted a great difficulty with both branches of the trade, as there was a great competition going on between the wholesalers. They had not got to seven and a half per cent. but they seemed to have approached it to some extent.

Mr. Hugo, in also responding to the toast, said that the President had spoken encouragingly of longer examinations than they had at present, but he had himself a lively recollection of the examination and of thinking it interminably long.

Mr. Jackson also briefly responded in suitable terms.

The speeches were agreeably varied by vocal and instrumental music, &c., the artistes being all connected with the trade, and altogether the event was an exceedingly enjoyable one.

CONFERENCE OF MIDLAND COUNTIES CHEMISTS AT BIRMINGHAM.

Discussion on the Pharmacy Bill.

A special gathering of the members of the Midland Counties Chemists' Association was held on Tuesday evening in the saloon of the Great Western Hotel, Birmingham, to meet Mr. Michael Carteighe, the President of the Pharmaceutical Society, and discuss with him the merits and demerits of the Pharmacy Act Amendment Bill now being promoted by the Society. Mr. A. E. Southall, President of the Midland Counties' Society, occupied the chair, and there was a large audience of chemists resident in Birmingham, Coventry, Leamington, Walsall, Wolverhampton, West Bromwich, and many other Midland towns.

The Chairman said the large attendance augured well for the movement in connection with which they were met, and now they had for the first time in the history of their Society the presence of a real live President of the Pharmaceutical Society they must make the most they possibly could of him. He (Mr. Southall) was old enough to remember the time when Jacob Bell visited Birmingham. He addressed the then chemists of Birmingham three times. The first time he had an audience of six, which seemed to show that the chemists of Birmingham were in great need of education at that time, but the second time he had a much better audience, and the third time a very good meeting. That was before he succeeded in passing the Pharmacy Act. Now they had another President of the Pharmaceutical Society with them, and he hoped they would imbibe from Mr. Carteighe the spirit in which he entered upon the work he was trying to do for pharmacy. He (Mr. Southall) was sure that no man worked harder for pharmacy than Mr. Carteighe.

Mr. Carteighe first thanked the meeting for the invitation to attend it and for the cordiality of his reception. It was often said that the Pharmaceutical Society had done nothing for the trade, but he knew that during the eight or nine years in which he had been President of that body he had never, until a very few months ago, been asked to say anything to the trade, so that it could not be said to be the fault of the Society that it had not placed itself in connection with the trade. He did not say it was the fault of the trade, but it was certainly not the fault of the Society. If they expected a formal address from him now he was afraid they would be somewhat disappointed. It would not be difficult to deliver a formal address at such a meeting of the trade, but the object of their gathering was to elicit the views of the trade on the past work of the Pharmaceutical Society and what it proposed to do in the future. There were, it was true, certains views expressed in a certain journal, which might or might not represent the trade. It was impossible for him to say how far it did or did not, but anonymous communications in trade journals did not count for much in regard to any policy. He was therefore most glad to have an opportunity of meeting a large body of the trade, and asked them to be perfectly frank with him in their criticisms of the action of the Pharmaceutical Society. It was possible that in that meeting they might find a general consensus of opinion in one direction, or suggestion of a practical and modified form in another, which would render the efforts of the Society much more likely to be successful than they otherwise would be. Mr. Carteighe then proceeded to sketch the provisions of the Pharmacy Act Amendment Bill, as to the general lines of which he premised there was not likely to be much difference of opinion, but some of those present might think that certain other things should be added to it. There were many men brilliant pharmacists who had not troubled themselves much about pharmacy law, which was not one of the subjects of their examination, and it was necessary, therefore, that he should talk to them somewhat on pharmaceutical politics, and if he had been chosen for that duty by the process of natural selection, he had only one claim for it, and that was his absolute devotion to his *alma mater*. He was in the enjoyment, happily, of good health, and he thought he had shown, during the last six months, that he was prepared to devote some portion of that health for the benefit of those with whom he was in association. The first two sections of the Bill, numbered 2 and 3, had to do with educational and examination matters, and these two sections were in some quarters spoken of as Mr. Carteighe's pets. Well, he had not many pets; like a good father of a family, everybody connected with the Pharmaceutical Society was a pet of Mr. Carteighe, and if these two sections were pets of his all he had to say was that a good many other things in the Bill were equally pets, and he should find very great difficulty in making up his mind which he liked best. He and others had in these clauses attempted to do many things which they thought practicable, because they had also thought other things impracticable at the time, but it did not follow that they had lost sight of these other important things, which did not come within the scope of education or examination. He did not think there could be any serious objection to those two clauses, the meaning of which was that after the passing of the Bill it should be lawful for the Council of the Pharmaceutical Society to make byelaws, which, before they could come into force must be approved by a special general meeting of the members of the Pharmaceutical Society, by the Privy Council as representing the public and the trade. There was no curriculum in the Bill, and there could not be in it any definition of what was to be recognized and what not. All that was to be left was a free hand to the Council of the Society, subject to the approval of the Privy Council. It had been said, "What do we care about these curriculum clauses?" But that was an unfair thing to say, because they did care about them, for it was under them that they had examinations, and it was a matter of serious importance that they should endeavour to make their arrangements for these examinations, such as would on the one hand give fairness and the utmost latitude to the timid lad, and on the other hand, enable them to find out the person who was simply veneered. Clearly it was to the advantage of every candidate that he should have laid out before him the courses of instruction in which he was to be examined, and that he should have a certain amount of work done before he proceeded to examination. Of course it was a grand thing to be an examiner, and he felt very proud to belong to that body; but he did not believe any examiner could, with a proper regard to the condition of things, to the capacities of the candidate and the safety of the public, sit down and examine a number of candidates in one day, when each candidate had to be examined in six different subjects, and in two to do practical work which would take the best part of his day, without any evidence of previous training of the candidate. The candidates no doubt regarded them not as examiners but as cross-examiners, but he believed it was never contemplated that examiners should pass judgment on a candidate without knowledge of previous training. In all other bodies, such as the accountants of the Institute of Bankers and other classes of professional men, evidence of previous training and apprenticeship was required previous to the examination. These were, therefore, important clauses for the future, and those who were inclined to think that all this education was a vain thing must remember that education was the basis upon which they went to Parliament before and obtained powers, and that upon no other basis could they go to Parliament for further powers. Whether they liked it or not they were in for it, and as men of business they must deal with it as they found it, and deal with it in a comprehensive manner. These were the views which guided the Council in its support of these two clauses. The next clause referred to the consolidation of the Pharmaceutical Society by repealing certain clauses in the present Act which placed restrictions on the membership, and replacing them with two clauses in the new Act. At present the membership of the Pharmaceutical Society was limited to those who had passed the Major examination or were chemists and druggists in business before the passing of the Act of 1868, but by the new clauses it was proposed to include every chemist and druggist in business, whether in business before 1868 or passed since, those men now called associates, and every chemist and druggist who passed the Minor examination, to embrace them all in the one class of members, the only difference to be made in regard to associates being that in the case of the Minor men they had at the request of a number of the younger men laid down that a man should be eligible for membership at twenty-five years of age or when he went into business. Generally speaking, there was no reason why the Minor man should not join the Society as a member at once, but as a matter of experience they found that he would prefer to remain an associate for a little while, till he was twenty-five years of age or goes into business. For practical purposes the Minor man who had passed the examination based on the education which the new Bill proposed to deal with was sufficiently and properly educated and worthy to be associated with the common brotherhood of the Pharmaceutical Society on perfectly equal terms. And why did the Council take all this trouble? Because years ago they were told that they were a select few, and wanted to keep themselves select, that, in fact, the Society was composed of Londoners only. That day had gone by, because they had at all events got to Birmingham, even if they did not go any further. Various objections—or excuses—had been raised for not joining a body which, under the leadership of Jacob Bell, opened its doors as wide as it was possible for a corporate body to do, and all he knew was that the best Bill ever proposed dealing with the trade (the Poisons Bill) was wrecked by the misunderstanding that the general members of the trade did not wish to become members of the Society. They were now proposing to do what Mr. Sandford, one of his predecessors in the presidency, and one of the wisest and most farseeing leaders the Society ever had, actually proposed doing in 1868, but which he was unable to carry, owing to the action of some men who said that it would be bartering their privileges. They had then to do what was always unsatisfactory, accept a compromise. Now they proposed to admit every chemist and druggist, and every future chemist and druggist, on equal terms, and he did not see what more they could do to make the relationships between the Society and the trade the most friendly and democratic possible. Of the two next clauses in the Bill, one had reference to penalties, which was a mere matter of detail, and the other to jury service, giving the chemist and druggist the right to exemption from jury service. It seemed to him that in the view of the recent judgments as to unqualified sellers of poisons, the safety of the public would be better cared for by keeping the chemist and druggist in his shop than by sending him to a court of justice, and if they could persuade Parliament that the educational clauses of the Bill were desirable—and a great many members of Parliament had already agreed to that—they might reasonably ask for the same exemption which the pharmaceutical chemist now enjoyed, not because of any pharmacy law, but by the energy of their late Registrar, Mr. Elias Bremridge, who, when the Juries Bill was going through Parliament, managed to include the pharmaceutical chemists in the list of those to be exempted. Clause 7 asked for special powers and privileges, to confine the compounding of medical prescriptions to the trade. They had already got the compounding and selling of poisons, and they now applied to have that power extended. Medical prescription was a very wide term. The Council of the Pharmaceutical Society had frequently cases of alleged infringement as to the sale of poisons in which it was unable to touch the individual because, although he dispensed the prescriptions of medical men in which poisons were ordered and kept open shop he did not call himself chemist and druggist, and he dispensed the prescriptions with poison in them in his own way by leaving the poisons out. Sometimes he told his customers that these poisons were dangerous things and it was better to leave them out, but in many cases he left the poison out without telling the customer anything about it. If they could persuade the Government that the public safety demanded that prescriptions should be compounded by only qualified persons they might be able to introduce a clause in the present or a later Bill limiting the sale of compounded preparations in like manner, but they must proceed gradually remembering that they had to deal with a force which was not altogether sympathetic with them. The credit for this suggestion as a reasonable thing to ask for was due to his friend and colleague, Mr. Walter Hills. Of course, they knew that a great many members of the trade, present and outside, clamoured to have the sale of all drugs restricted to them—using the word clamour in the sense of making a great noise and not offensively—and at first sight this was a reasonable thing to ask for, but if he were asked to define a drug he would have to say that it was simply impossible to do it. There were no such things as drugs which could be covered by a statute except poisonous drugs, and therefore it was practically impossible to limit the sale of what they sold over their counters as drugs, and with all the disposition in the world it would be impossible to do anything more than give a list of things of a more or less combatant character the sale of which should be limited. But it did seem to him if they could get the compounding of prescriptions, and later on get the other added to their armament, they made a distinct step in advance. They should then try to come to terms with the medical profession in regard to their dispensing. Now chemists were in the habit of quarrelling with their colleagues—for the members of the medical profession must be considered their colleagues—because the general practitioner so often dispensed his own prescriptions. It would be well to remember that general practitioners, like chemists, were in adversity; they formed a more numerous body; they had a much higher qualification; they had to pass a curriculum extending over five years—and taking the whole country it would be found that the struggling medical man was not in so good a position for obtaining his bread and butter as the struggling chemist and druggist. It might be said, "That is all very well; but let me look after myself." But that policy would not do. The chemists and druggists had stolen the clothes of the apothecaries and taken their retail customers; and the apothecaries chose to ascend to celestial regions and to become fully fledged medical practitioners. But as the apothecaries were armed with dispensing powers by statute before the present generation of chemists and druggists were born, it would hardly be wise, to say the least of it, to ask that those statutory powers should be at once swept away. The better way would be to co-operate. The medical profession was organized; the chemists and druggists were at present but poorly organized; both should agree to influence the public, to teach the public that the medical man should be remunerated for his skill in diagnosing and treating disease, and not for doing the work of another profession by dispensing. The doctor now was very much at the mercy of his patient, and it should be the part of the chemist and druggist to assist him to fight the patient. At all events, as President of the Pharmaceutical Society, he would not countenance antagonism between the two professions. The medical men were 16,000 strong, well-organized, well led, well able to take care of their interests. When would the Pharmaceutical Society have 16,000 members and as many branches as the British Medical Association had? Only when such a state of things had come to pass would it be worth while talking about whether it was their right to dispense medicines. The doctor had a right above theirs, and all honour to him for it. He had taken a qualification immeasurably higher than and including their qualification; the law had conferred the privilege of dispensing upon the doctor; the doctor was an educated man, a gentleman, and a professional man, and surely he was not to be robbed of part of his birthright. Far better would it be for the chemist and druggist in the country to organize and join hands with the medical man in making war upon the ignorant public, and so settling the thorny question of dispensing. Having touched upon that which the Bill contained, it now remained to say something about what the Bill did not contain—and here a lively discussion would be likely. They were all aware of the weak point in the old Act—a weak point made emphatically evident in certain decisions of the courts some years ago. How serious that weak point was, and yet how difficult to amend was to be gathered from the fact that the Council of the Pharmaceutical Society had not dared to touch the subject in drafting the Pharmacy Act Amendment Bill. It certainly was incongruous and a hardship that seven unqualified men were by law placed on a footing with a man who had obtained his qualification. The history of the matter was that in the Act of 1868 the sale of poisons was restricted to persons registered as chemists and who had passed an examination, but in one clause it was enacted that the widow of a deceased registered person might continue to carry on the business for the benefit of herself and children on condition that the business was under a qualified person, and was managed by trustees. The trustees so appointed constituted a corporation in the eye of the law, and when such a corporation was prosecuted by the Pharmaceutical Society the judge held that a corporation could not be examined and could not be registered, and that as the safety of the public was expressly cared for by the enactment that a business so conducted must be under the charge of a qualified assistant, it was held that the prosecution could not succeed. The judges said in effect, "We should have had a difficulty in coming to this conclusion if in the Bill itself there was not a provision for the safety of the public by means of a qualified assistant." In that case a man named Mackness, owning a grocery store, annexed a druggist's shop next door, and annexed the druggist too. He was proceeded against for keeping a shop without being a registered person, and was fined, but as he persisted, another prosecution was begun. In the meantime Mackness had formed his business into a company, and so the Council of the Pharmaceutical Society was powerless to touch him. And to the lay mind it seemed perfectly logical that if a man employed a qualified assistant he himself need not be qualified. The members of Parliament cared nothing for pharmacy as a trade; their sole interest in the Bill now under consideration was as to the safety of the public, and how were they to be convinced that the safety of the public was not sufficiently guarded by the provision that a chemist's shop kept by an unregistered person or persons must be under a qualified assistant? Some members of the trade might say, "Abolish the widows' clause." But in a good many instances the very men who favoured such a proposition in the abstract would decline to concede that they had not a perfect right to dispose by will of their own property, and so secure an income for their families. The Council had no power to compel trustees to disclose facts, so many corporations might be carrying on business illegally, and there was no sufficient power to protect the registered man from the competition of unregistered men under the guise of trusteeship or administratorship. It had been suggested that the business of a deceased registered person should not be carried on for more than three years after his decease by virtue of the widows' clause, others had suggested five years, but the moment the question was raised in a practical form the trade was up in arms. Affection came into play. Men declined to be limited in their power to deal with their own. Of course it would be best for the whole trade that the widows' clause should be wiped out—best in the long run even for the widows—but the time was not yet ripe. The circumstances being as thus stated, whoever went to the House of Commons and asked that corporations should not be allowed to trade as chemists and druggists, because it was unsafe in the public interest to let them so to do, would at once be met by the question, "What about your widows?" and what could he reply? It was quite true the cases were not on all fours, but how convince members of Parliament of that fact? The Government frankly advised, "Legalize the companies, let them put over that part of the shop where drugs are dispensed the name of the qualified assistant in charge of that part, and let him be responsible and liable to fines." Such a proposal had absolutely been introduced into Parliament, and the Pharmaceutical Society had to oppose it, deeming it best to leave the stores as they were, rather than to legalize that which it was desired to stop. Some might say: "That is all very well, but it does not satisfy our pockets." That was quite true, but if the Government thought the public safety could be guaranteed by legalizing the stores, and if the public agreed, organization was their only hope. He felt the facts in his own pocket; had been driven to anger and hard words, and had after all been compelled to see that at present there was no redress. The whole principle of limited liability companies was immoral. Under the old rule a private trader was responsible for all the debts he contracted, and his belongings, even to the shirt on his back, could be seized to satisfy those debts; yet a trader so circumstanced had to fight rivals in the shape of limited liability companies whose responsibilities might be limited to £1 per shareholder. This was in effect an inducement to fraud in trade; the limited liability principle was sapping the foundation of commercial morality, and if the corporations were to be attacked openly the Pharmaceutical Society would at once find a certain number of great corporations that could not be touched—civil service stores and the like, whose members had contracted themselves out of the law. There was nothing to prevent three carpenters from making themselves into a corporation for the purposes of buying beer and spending all Sunday in drinking it. So when a grocer was fined under the Pharmacy Act, he could at once get his brothers, his sisters, his cousins, and his aunts to the number of seven, and then defy the law and the Pharmaceutical Society. The present Bill would assist the Society to obtain such a position as would enable it to put an end to such a state of things. It was proposed to make a chemist and druggist a professional man by examination and by proof of work done. If the Bill were read a second time and the ears of the House of Commons gained by the evidence of a desire to secure the safety of the public by raising the qualification of chemists and druggists, there might be some chance for putting in Committee a clause to restrain corporations that could have no qualifications. The Council of the Pharmaceutical Society had no body of eighty members at its back; the votes of the members of the Pharmaceutical Society were worth no more than the votes of grocers and hucksters, and it could not be expected that the President should descend to political dodges and manœuvres. Having but a comparatively small number of members, and regarded by a good many chemists and druggists as their enemy, the Pharmaceutical Society could only hope to succeed by proceeding with a modest Bill; if it were not careful the bottom might be knocked out of whatever power it possessed. The proposed Bill would show the House of Commons an intention that every chemist and druggist should be an educated as well as an examined man, and that he ought to be the person by whom prescriptions should be compounded, and that bogus companies, as an immoral combination to defeat the law, should be rendered impossible. He had found that in Birmingham as in the metropolis those who were doing most harm to the drug trade, those who are prostituting its truer professional attitude, and throwing mud at their competitors, were not so much grocer companies as individual chemists, and no legislation that the President and Council of the Pharmaceutical Society could devise would prevent that. This state of things could only be prevented by union in the highest sense among members of the trade, and a broad, but not too exact code of ethics. Union was the first thing; so long as members were content to compete with each other and to get rid of part of their birthright, so long would union be impossible; once united the profession would soon be able to secure legislation to protect its interests, and then each member would be properly paid for his services.

Councillor Barclay (Southall and Barclay) said he had had a resolution put into his hands, and he had pleasure in moving it. "That this open meeting of registered chemists, residing in and around Birmingham including representatives from Coventry, Leamington, Walsall, Wolverhampton, Shrewsbury, Oldbury, West Bromwich, Evesham, etc., having considered the various clauses of the proposed Pharmacy Act Amendment Bill, is of opinion that it is deserving of the support of the entire trade, and hereby pledges itself to do its utmost to secure the passing of the said Bill in the next session of Parliament." They were all convinced by the lucid and interesting speech of the President that the Bill deserved their support. It was admittedly a Bill for the future, affecting future chemists—it would not very much affect those now in business—but it was the duty of wise men to look to the future, and to build up the future of pharmacy as their predecessors had endeavoured to do. Pharmacy would not have become a profession but for the foresight of their forefathers. Dealing with the speech of the President in detail, Mr. Barclay said he did not believe Mr. Carteighe properly understood chemists and druggists' opinion touching the widows' clause. His knowledge of the trade in all parts of the country led him for his part to believe that chemists and druggists would readily give up the widows' clause if thereby company trading could be suppressed. His experience, too—extending over a great number of years and in all parts of the country—showed that it was unwise, for the widows' sakes, that widows should be allowed to carry on their deceased husbands' businesses. If Sam Weller had been alive when the Act was passed, and had whispered in the ears of the Council, "Beware of widows!" it would have been a very good thing for chemists and druggists. Many a good business, left in a flourishing state, had dwindled into next door to nothing in a few years after the husband's death, and while a good price could have been got for it immediately after the death, it had to be sold at a pittance later on. If the President and Council had a little more courage and went into the country and proceeded on a bolder tack much more might be done. The President had said that a chemist had only a vote like a huckster. As a matter of fact anyone who had anything to do with public life knew that an educated chemist could educate public opinion and influence the public mind to a very considerable extent, and if the Council framed a measure calculated to directly benefit the trade while safeguarding the interests of the public, the public would be with them, and members of Parliament, if a little pressure were brought to bear while they were struggling through the little narrow gate of an election, members of Parliament, too, would see that the trade was entitled to further protection. The difficulty as to prescriptions was a serious one. In a small Yorkshire town of 10,000 inhabitants the other day he found that the chemists had practically no prescriptions to dispense. He asked "How many prescriptions do you get in a week?" and was answered "In a week? Why we do not get one a month among the lot of us." At the same time the grocers sold patent medicines and drugs—everything that chemists and druggists could, save a few poisons. And there were gentlemen created by Act of Parliament to dispense medicines and carry on the business of a chemist and druggist with nothing to do. He would put it to the President as a conundrum "What were these gentlemen to do?" If the public understood the subject the medical man would not be allowed to dispense nor the chemist to prescribe. It was for the safety of the public that these two things should be separated, and the argument of the President was curiously beside the mark to say in this 19th century that because the old apothecary dispensed, the present medical practitioner should do the same, and have no regard to the fact that a body of men had been created and trained for the special purpose of dispensing. Undoubtedly the doctors passed through an excellent curriculum and were examined in and entitled to dispense; but dispensing was a detail of medical practice, and the whole business of a chemist, and it was to the interest of the two professions, and of the public, that the doctor should have his whole energies concentrated on his profession, and that the compounding of medicines should be left to the chemist skilled in compounding. He would with all his heart and force appeal to the President to take up that position, and he believed that if he would do so, with his characteristic energy and ability, he could bring about this much-needed reform. It was a matter which could not be worked out by force; it must be done by educating public opinion, and he believed public opinion could be educated up to it. He believed that if the public knew that the same man who dispensed the medicine was entitled to write the death certificate, they would say that such a course was not consistent with the public safety, and if the President would only make such a pronouncement he would not only have the professional and trade press with him, but the lay press also, and public opinion would very soon be educated to the necessary point. In Scotland this sort of thing already obtained to a very great extent, and he was only recently in a small town in that country where nearly all the medical men did not dispense, and where only the fourth-rate men did that which was so common in England. The medical men's fees for prescribing were so arranged that it cost the patients no more than under the other system. Something in the direction indicated might be done by offering prizes for essays on the subject and by conference with the medical profession, a great many of the best men in which were with the chemists in the matter. They had no desire to do an injustice to the medical profession, a great many of whom were under even harder stress than the chemists, but he did not believe it was to the interests of the medical profession, and certainly it was not to the interest of the public, that they should be dispensers. He (Mr. Barclay) was glad to hear the President insist that branch shops should be managed by only properly qualified men, because that was a thing for which he had long contended. He was not so afraid of stores as the President seemed to be, but they would have a much better chance of preventing these companies of chemists if the law made the business of the chemist a personal one, and he had a great deal more faith in the power of chemists to influence public opinion than the President seemed to have.

The President: I said influence with Parliament, not with the public.

Mr. Barclay: My opinion is that the educated chemist has exceptional opportunities to educate public opinion, and I believe that if the Council of the Pharmaceutical Society would only move forward with a little more alacrity men would join the Society more readily, rally round the Council, and help to carry the reforms we need. I believe this Bill is a step in the right direction. I heartily agree with its provisions, and I think it is very desirable it should be passed.

Mr. Pullin (Leamington) said he thought the objection that the Bill did not go far enough was a very poor one. They could not expect to get everything at once. In everyday life they saw that great movements were made in stages, and it should be no excuse for non-support of the Bill that they could not get at once all they desired. They should accept what they could get and then work for more, and it would be exceedingly foolish to sacrifice some advantages because they could not get the many. He did not see why the widow of a chemist should be placed in a different position to the widow of a medical man. The qualification of a medical man was purely personal, and why should it not be so with the chemist.

They said that they desired a personal qualification and aimed at it, and at the same time they were trying to get at it by a side wind. They had no right to do so; their position was illogical, and therefore they should let the widows' clause go. He quite admitted the sentimental reasons in its favour, and would therefore limit it for a time, say three years, but they should certainly deal with it.

Mr. Barrett (Leamington) said the President of the Pharmaceutical Society was taking the step of coming among his constituents rather late in life. He would like to have seen such a step taken years ago by Mr. Carteighe's predecessors. He was in harmony with many of the views expressed by that gentleman, and would like to see the chemists of the country rally round the Pharmaceutical Society and insist on it representing the real opinions of the trade. But it was unreasonable to expect any society to represent their views unless they became members of it, and so entitled themselves to a voice in ruling the councils of the Society. As to the widows' clause, he contended that it was perfectly easy to find out if a business was being carried on in trust, and his feeling was to permit it to be so carried on for, say, eighteen months, to give the widow a chance of disposing of it to the best advantage, and he believed that this would be advantageous to the widows, and it would certainly be in the interests of the profession. The educational curriculum was certainly a step in the right direction. For many years the chemists of Germany and other continental countries had been educated in a much wider curriculum than our own, and the consequence was that the standing and attainments of the trade there were higher than with us. The present move would go a long way to place the English chemist on an equal standing, and also enable them with greater justification to approach Parliament for reforms and favours.

Mr. Magor (Birmingham) urged the necessity of the President and Council of the Pharmaceutical Society placing themselves in closer and more regular touch with the general body of the trade, and said if leading politicians did not visit their constituents because they were not asked the politics of the country would be very different from what it was. The time had come when the Society should ascertain the views of the trade before promoting Bills, and they could never do that by sitting still in Bloomsbury Square. When the chemists themselves were thoroughly educated they could bring a very powerful pressure to bear on public opinion.

Mr. C. Thompson (Birmingham) emphasized the remarks of the previous speakers as to the desirability of frequent visits of the President and Council to various parts of the provinces, so as to arouse enthusiasm among the trade, and place themselves in a position to get all that they desired.

Mr. Hampson (of the Council) said it was very pleasant to hear the earnestness with which the gentlemen present regarded the matter before them, and it showed that they generally approved the Bill which the Council had prepared, and took an intelligent interest in the efforts of the Council, which certainly increased the prospect of the Bill being carried. He believed in what had been said as to the advantage of the President and Council visiting the various centres, but he had a rather painful experience of the apathy with which a good many members of the trade regarded its interests. They had a sort of trades union for their common protection, but it languished and died because they would not subscribe 5*s.* per annum, not even half-a-crown to support it. In the interests of the medical profession and for the safety of the public he believed that dispensing should be restricted to qualified chemists, but they must remember that it was a question affecting much more than the chemists, and public opinion would have to be very much enlightened before they could secure what they desired.

Mr. Branford agreed that the trade should be protected as far as possible by the societies which were supposed to represent it, but in Birmingham almost every house that could be made into a shop sold medicines of some kind—pills, powders, and mixtures, and other things not containing poisons, and there were many chemists in Birmingham who would be very sorry to lose their branch shops. But he certainly thought some action should be taken which would result in benefit to the trade without injury to the public.

Mr. Perry and Mr. Arblaster spoke in support of the Bill, which the latter gentleman said he believed was as good a Bill as they could possibly get. As regarded the co-operative stores, he should be very glad to see them dead and buried, but he did not think they would do any good trying to stop them. If they succeeded to-morrow in preventing them from selling and dispensing poisonous medicines, they would the next day open a shop next door or on the opposite side to their own stores and put in a qualified man.

Mr. Perry said that a gentleman at the Bristol Conference the other day solved the problem by advising qualified men never to take posts in stores.

Mr. Carteighe, replying to questions and comments, mentioned that as the law stood, branch shops must be under the conduct of a registered person, and if that fact was not sufficiently known already, it would be necessary for the Pharmaceutical Society to make it known. As to the case cited by Mr. Barclay, men qualified to dispense could not be encouraged to go to places where there were no prescriptions to dispense. It was a fact that there were a great many people qualified as chemists and druggists $\frac{99}{100}$ths of whose business could be equally well carried on if they were not qualified. But this did not constitute an argument in favour of abolishing the qualification, rather did it supply a reason for urging the medical profession in England to carry out the practice existing, as described by Mr. Barclay, in Scotland. In England at present chemists had not even a concomitant right as to the dispensing of prescriptions, and certainly it was absurd to hope for or talk about an exclusive right until the concomitant right was conceded. Would the chemists maintain their enthusiasm and work directly and indirectly for the Bill and generally place confidence in and support the Council of the Pharmaceutical Society? In no other way could the Bill be passed. Combination was as necessary to chemists and druggists as to any body, trade or profession, and they must sink petty differences and unite in supporting the Council of the Pharmaceutical Society before anything could be done to better the condition of pharmacy. Mr. Barclay had said in effect, "Produce something for us to go upon, and we will join the Society." But the Council was powerless to attack the grievances of the trade, the corporations, and so forth, until the support of the whole body of chemists was forthcoming. And as a matter of fact the chemist outside the Pharmaceutical Society would never move whatever the Council might do for him; such a man had an inherent dislike to be associated with anybody requiring the payment of an annual subscription. Mr. Barclay had suggested that chemists and druggists should use their influence with local M.P.'s Quite so; but how many had done so? How many chemists had been content to sink their politics and vote for the man who would do something for pharmacy? Yet it was quite clear that this must be done; one could not fight a blacksmith in white kid gloves. But unfortunately it had been found in the past that men who had spoken in favour of the Bills of the Pharmaceutical Society had afterwards been seen in the lobby instructing members to block the measures.

That was not the way to encourage the Council either to go round the country or to sit in Bloomsbury Square. Given from 10,000 to 15,000 members prepared to take an intelligent interest in the affairs of the Society, the Council would soon be able to accomplish what was desired. At present the Society was not strong enough to enable the Council to do much; but even now the Council was a standing protection against hasty and prejudicial legislation affecting pharmacy. As to patent medicines, there was a strong probability that something would be done before long. The proposal to label patent medicines "poison" and then to legalize their sale by grocers and others could not be commended. At present only one body was qualified by law to dispense poisons—chemists and druggists; the proposal referred to would constitute grocers equally qualified. The safety of the public could only be assured by requiring that poisons and patent medicines containing poisons should only be sold by qualified chemists and druggists. There would be no protection at all if poisonous patent medicines could be sold by every trader.

The resolution was unanimously agreed to, and a vote of thanks to Mr. Carteighe (proposed by the Chairman) concluded the proceedings.

MEETING OF CHEMISTS AND DRUGGISTS AT BURNLEY.

A meeting of the chemists and druggists of Burnley and district was held on Tuesday afternoon at 3 o'clock in the rooms of the Photographic Society, Bank Chambers, Burnley. Invitations had been sent out to the chemists of Burnley, Colne, Nelson, Barrowford, Padiham and Crawshawbooth, the principal clause in the circular of invitation being as follows:—"It is hoped that by more fully understanding the powers possessed by the Society, and considering that it is the only legally constituted body from which can emanate those efforts and future powers that will so materially effect beneficially the chemists' interests; that the whole trade will tender full and hearty support to the Pharmaceutical Society."

A fairly representative meeting was assembled; amongst those present were Messrs. R. Hitchin, J. Heaton, J. Brown, J. Holden, Councillor Barlow, W. Wilkinson, T. Stuttard and others. Messages and communications were received from several stating their inability to be present, but expressing their hearty sympathy with the meeting and the object it had in view.

After the opening remarks of the Chairman, Mr. R. Hitchin,

The Local Secretary, Mr. B. H. Cowgill, explained in as lucid a manner as possible the object, aims and powers of the Pharmaceutical Society, endeavouring to show that at its formation in 1841 and since, its main object had been the education of the future chemist and druggist, and that its powers did not and could not obtain for the chemist the exclusive dealing in all drugs and chemicals. He also read two or three letters received from Mr. R. Bremridge, Secretary of the Pharmaceutical Society, bearing upon the question of prosecutions by the Society on all known, distinct and clear infringements of the various Pharmacy Acts.

Mr. Counciller Barlow then proposed that this meeting approves of the Pharmacy Act Amendment Bill as submitted. He felt that after having heard the statement of the Local Secretary, and the letters read from the Society's Secretary in London, he now understood the workings of the Society better than he had ever done, and he for one would join the Society in the coming year.

This motion was seconded by Mr. J. Brown, and, on a show of hands, was carried without a dissenting voice.

At the same time the meeting was pretty unanimous in opinion that the Bill should be extended so as to include within its scope all the various trading associations and companies who were enabled, by banding themselves together, to over-ride the Pharmacy Acts, and to accomplish that which was illegal by the private individual. Mr. Wilkinson of Colne strongly expressed the feeling of himself and others that something should be done to restrict them.

Mr. Brown also moved that a clause be added to further protect the title of chemist and druggist, and that the managers of companies and corporations should be personally held responsible.

It was further decided that a deputation should be appointed to wait upon the member of Parliament for the borough, and urge upon him the necessity of aiding with all his power the furtherance of the Pharmacy Act Amendment Bill through the Houses of Parliament.

It was also desired that another meeting should be called in a few weeks time to still further consider subjects relating to the interests of the trade.

After the usual vote of thanks the meeting terminated, an hour and a half having been spent agreeably and beneficially to those present.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the present session was held in the North Silver Street Hall on Friday evening, October 31. It was well attended. Mr. Geo. Cowie, President, occupied the chair, and the minutes of the last annual meeting having been read and approved, delivered an inaugural address.

The President commenced with some words of congratulation upon the position of the Association, and said it was a debt the present members owed to those who had hitherto nourished and supported it to zealously carry on the good work they had begun. They lived in a progressive age, when to "rest and be thankful" meant retrogression, especially in the scientific world. Science—chemistry standing *facile princeps*—had done much for the benefit of humanity and in the cause of civilization, and was destined in the future to do more. It had pressed its claims so forcibly upon the public mind that a knowledge of one or more branches of science now constituted a part of a liberal education. It was imperative that pharmacists should keep pace with this educational movement. The struggle for a competency, if not even for a livelihood, was becoming more and more severe, and he believed that no weapon would stand them in better stead than a thorough knowledge of their business in all its details. Fresh knowledge was continually being brought before them in the introduction of fresh drugs, by fuller investigation of those already in use, and by improved methods of manipulation and administration. To neglect the study was to do an injustice to themselves, their calling, and the public. As illustrating the interest of pharmacists in recent advances in organic chemistry, the speaker referred to the paper by Mr. Hodgkin, recently published in this Journal, careful study of which was recommended. The artificial synthesis of some plant alkaloids was also referred to. The speaker then illustrated by diagrams upon the blackboard the composition and constitution of a number of compounds of the aromatic series used in medicine, after which he gave a *résumé* of the results of recent investigations into the nature of some of the alkaloids.

At the conclusion of the address, a very hearty vote of thanks was awarded to Mr. Cowie.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hill, Blount, Rowell, Currie, Thompson, Cottam, McAdam, Forret, Ager, Wilson, Sale, Halliwell, Cowie, Walton, Jones, Boa, South Devon, An Old Druggist, W.M.

"THE MONTH."

Zinc Sulphite for Antiseptic Dressings.

Twenty years ago, in a paper read before the British Pharmaceutical Conference at Liverpool, Professor Tichborne called attention to the possible value of zinc sulphite as an antiseptic (*Pharm. Journ.*, [3] i., 351). Recently he has again suggested it as a material for the preparation of antiseptic dressings, and Dr. Heuston reports that for this purpose he has found it superior to sal alembroth, it being non-poisonous, non-irritative, and highly antiseptic (*Brit. Med. Journ.*, Nov. 8, p. 1064). Professor Tichborne states that zinc sulphite is best prepared by mixing in solution six parts of zinc sulphate and five and a quarter parts of sodium sulphite. The reaction takes place slowly, but goes on to completion, the new salt, which forms as a white crystalline precipitate, being very insoluble in water, though soluble in excess of sulphurous acid. Dried at 100° C. it has the composition represented by the formula $ZnSO_3 \cdot 2H_2O$, but if only dried at the ordinary temperature it contains another molecule of water. In contact with water it undergoes a slow but regular oxidation, which in an experiment with a saturated solution was complete on the eighteenth day. Zinc sulphite can be used for the saturation of any fabric, such as gauze or lint, without the intervention of an adhesive material. The fabric is first boiled with water, to cleanse and sterilize it, after which a boiling solution of zinc sulphate and sodium sulphite in equivalent proportions is poured upon it, and when thoroughly mixed and saturated the whole is allowed to stand for twelve hours. The zinc sulphite is said to be deposited in and about the fibres of the fabric in microscopic crystals, soft and even unctuous to the touch. The fabric is then passed under rollers submerged in water to remove traces of sodium sulphate. It is suggested that this kind of dressing might be dyed with an organic pigment to distinguish it from others, and for the purpose of indicating the progress of the discharges by the action of liberated sulphurous acid on the colour.

Potassium Tartrate.

Mr. Bancroft calls attention (*Pharm. Runds.*, Novemb., p. 264) to the variation existing in the statements occurring in the more important Pharmacopœias with regard to the amount of water of crystallization contained in the neutral tartrate of potassium and the solubility of the salt in water. The British Pharmacopœia represents it by the formula $K_2C_4H_4O_6,H_2O$; the United States Pharmacopœia by $(K_2C_4H_4O_6)_2 \cdot H_2O$; the Codex by $C_4H_4O_6 \cdot K_2$. As to its solubility the B.P. says it is dissolved by its own weight of water; the U.S.P. says it is soluble in 0·7 part of water at 15° C. and 0·5 part of boiling water; the German Arzneibuch that it is soluble in 0·7 part of water; and the Codex that it is very soluble in water. By experiments with a sample of potassium tartrate prepared by himself Mr. Bancroft found that the compound when air-dried upon bibulous paper contains only one molecule of water to two equivalents of the salt, its composition being correctly represented by the formula $(K_2C_4H_4O_6)_2 \cdot H_2O$ given in the U.S.P. Its solubility he found to be 1 in 0·7 part of water at 15° C. and 1 in 0·4 part of boiling water, or in fairly close accordance with the statements in the U.S.P. and the new German Arzneibuch.

Talc.

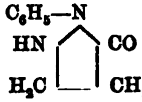
The constitution of talc is represented by the empirical formula $H_2Mg_3(SiO_3)_4$, and the compound may therefore be considered either as an acid metasilicate $3MgSiO_3 + H_2SiO_3$, or, according to Groth, as a basic pyrosilicate, $Mg(Si_2O_5)_2(MgOH)_2$, derived from an acid of the formula $H_2Si_2O_5$. Messrs. Clarke and Schneider (*Berichte*, xxiii., 1537) have examined a normal specimen of talc from Virginia, and, from its great resistance to the action of hydrochloric acid, they conclude against the basic pyrosilicate formula of Groth. Their opinion is further strengthened by the behaviour of talc upon calcination, a quarter of the silica present in the molecule being set free and rendered removable by boiling soda solution, a result in accord with the acceptance of the acid metasilicate formula.

Volumetric Estimation of Manganese.

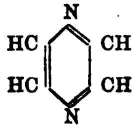
The ready oxidation of manganese salts of the MnO type to the dioxide, by means of iodine in the presence of an alkali, has suggested to Herr Vortmann (*Berichte*, xxiii., 2801) a new volumetric method for the estimation of manganese. The weighed salt is dissolved with 2·3 parts of potash alum in water, a measured quantity of decinormal iodine solution and pure caustic soda solution added, and the mixture heated upon the waterbath five to ten minutes. The solution is then cooled, diluted to a definite volume, and an aliquot part acidified, and the excess of iodine determined therein with sodium hyposulphite. From this result the total amount of iodine used in the oxidation, and consequently the amount of manganese oxidized may be reckoned.

Dehydromethylphenylpyrazine.

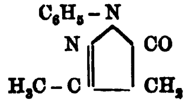
Dehydromethylphenylpyrazine is the systematic name attributed to the latest claimant for a place among the now numerous band of antipyretics, though the description given of its preparation leaves considerable doubt as to the correctness of this designation (*Pharm. Cent.*, Nov. 6, p. 663). The first stage in its preparation is stated to be the formation of phenylpyrazine by heating upon a water-bath equivalent quantities of β-brom-, chlor-, or iodpropionic acid and phenylhydrazine, dissolved in water, alcohol or benzol, until free phenylhydrazine can no longer be detected, and separating by shaking with water. Phenylpyrazine, $C_9H_{10}N_2O$, is described as difficultly soluble in cold water and in benzol, somewhat more soluble in hot benzol, freely soluble in alcohol and chloroform, and as melting at 121° C. It is stated to be represented by the formula—



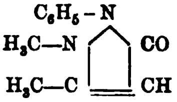
This compound is submitted to an oxidation process by agitating 20 parts dissolved in 500 parts of chloroform with 32 to 35 parts of dry mercuric oxide, which is said to result in the removal of two atoms of hydrogen from the fatty acid residue, $CH_2—CH_2$, and the formation of dehydrophenylpyrazine, which crystallizes out in flat needles, melting at 154° C. Upon heating this product with methyl iodide and wood spirit to 100°, the so-called dehydromethylphenylpyrazine is obtained. It is described as possessing powerful basic properties, and occurring, when crystallized from chloroform, in large crystals, melting at 120° C., and readily soluble in water. With respect, however, to the statement quoted as to the formation of phenylpyrazine it may be remarked that the general structural formula for the pyrazines is—



which differs from the formula given in being a six-membered ring, having the two atoms of N in the para position to one another, and containing no CO group. In a phenylpyrazine an atom of hydrogen in one of the CH groups would be replaced by C_6H_5. In fact, the alleged formula of phenylpyrazine is that of a phenyldihydropyrazolon, which is a compound that might be expected to be formed by the condensation of phenylhydrazine with iodpropionic acid. The subsequent elimination of two atoms of hydrogen and the substitution of another by a methyl group would result in the formation of phenylmethylpyrazolon, a compound closely allied to antipyrin, which is phenyl*di*methylpyrazolon. A compound having the constitution of (1)-phenyl-(3)-methyl-(5)-pyrazolon has been described by Knorr (*Annalen*, ccxxxviii., 147), who represents it by a formula that shows its close connection with antipyrin.



Phenylmethylpyrazolon.



Antipyrin.

Antipyrin in Puerperal Fever.

The value of antipyrin in puerperal fever is the subject of a communication by Dr. W. McBeath (*Lancet*, Nov. 22, p. 1097), he having found it act almost as a specific in four cases, one of which he describes. The antipyrin was administered in ten grain doses, eighteen of which were taken in two days and a quarter, the temperature being kept down the whole time. Dr. McBeath orders each powder to be dissolved in two teaspoonfuls of brandy and then water to be added to bring the draught up to about an ounce and a half.

Diuretin.

It is now generally understood that the compound introduced under the name "diuretin" is a mixture of theobromine sodium and sodium salicylate. Its great instability forms the subject of a note by M. Lambert (*Journ. Pharm. Chim.*, Oct. 15, p. 346). He points out that it is decomposed by all acids, and that even simple exposure to the carbonic acid of the atmosphere is sufficient to render it partially insoluble through the formation of sodium carbonate. It is also decomposed by bicarbonates, biborates and other acid salts. For this reason M. Lambert raises the question whether any useful purpose is served by the administration of theobromine in this form of compound, since it is sure to be decomposed by the acid of the gastric juice. In his opinion it is preferable to prescribe it enclosed in cachets or as a clyster dissolved in lime water. M. Lambert proposes to utilize this behaviour of diuretin towards carbonic acid for testing its strength in theobromine, by passing into a solution of it a current of the gas, or treating it with seltzer water, washing the precipitate with water saturated with theobromine, drying and weighing. But, according to Dr. Eckenroth (*Pharm. Zeit.*, Nov. 12, p. 708), the results obtained by the method of precipitating by carbonic acid are vitiated by some theobromine remaining dissolved in the solution of sodium carbonate formed, and a similar error occurs when hydrochloric acid is used for precipitating. From a compound containing equal molecular proportions of theobromine sodium and sodium salicylate, or 49·72 per cent. of theobromine, only 41·08 was recovered, and the loss amounted pretty regularly to about 8 per cent. when a minimum quantity of water was used.

Cytisine and Ulexine.

Some months since, Professor Kobert reported that cytisine, the alkaloid obtained from the seeds of *Cytisus Laburnum*, and ulexine from the seeds of *Ulex europæus*, so closely resembled one another, especially in their physiological action, as to suggest that they might prove to be identical (*Pharm. Journ.*, [3], xx., 978). This led Messrs. Gerrard and Symons to point out that the characters attributed by Husemann and Marmé to cytisine differed from those they had found to belong to ulexine in respect to molecular composition, hygroscopicity, solubility in chloroform and capability of sublimation (*Pharm. Journ.*, [3], xx., 1017). Some recent experiments by Dr. Partheil appear to have eliminated one of these points of difference, since he reports that in his hands analyses of the platinum and gold salts of cytisine have given results corresponding with the formula $C_{11}H_{14}N_2O$, attributed by Gerrard to ulexine, and not with Husemann and Marmé's formula, $C_{20}H_{27}N_3O$ (*Apot.-Zeit.*, Nov. 8, p. 691). The cytisine was prepared by extracting coarsely powdered laburnum seeds with alcohol containing hydrochloric acid, distilling the alcohol, dissolving the residue in water, filtering through moistened paper to separate oil and treating the filtrate with lead acetate; the liquid was then repeatedly filtered, made alkaline with potash solution, and shaken with amyl alcohol, from which the alkaloid was removed by shaking with water containing hydrochloric acid. Upon evaporation the hydrochloride was left strongly coloured, but the colour was removed by treating the powdered salt with cold absolute alcohol. Dr. Partheil states that he is still occupied with the seeds of *Cytisus Laburnum*, as well as those of *C. capitatus* and *Ulex europæus*.

Sulphaldehyde as a Hypnotic.

In the course of an investigation as to the physiological action of some aldehyde derivatives, Professor Lusini has made some experiments with sulphaldehyde (*Nouv. Rem.*, Nov. 8, p. 500). Sulphaldehyde, or thialdehyde, is obtained as a malodorous oil by the action of sulphuretted hydrogen upon ethylic aldehyde in aqueous solution. When this liquid is treated with acid, polymerization takes place, two solid trithialdehydes, $(C_2H_4S)_3$, being formed, constituted similarly to paraldehyde. The α-compound melts at 101° C. and the β-compound at 125° C., but commercial specimens of trithialdehyde vary in their melting points. The sample actually used is stated to have been a mixture of aldehyde and trithialdehyde melting at 45°–50° C. It was administered to frogs and rabbits, and was found to induce deep tranquil sleep, without any symptoms of excitement. In consequence of its slight solubility the hypnotic effects did not supervene until some time after its administration, but it acted more powerfully than paraldehyde, 0·010 gram of sulphaldehyde sufficing to narcotize a frog of average size equally with 0·025 gram of paraldehyde. Sulphaldehyde is entirely eliminated by the urine, which is characterized by its peculiar odour.

Thialdine and Carbothialdine.

Some experiments were also made by Professor Lusini with thialdine and carbothialdine. Thialdine is produced by the action of ammonia upon trithialdehyde, an atom of sulphur being displaced by the imide group $(C_2H_4)_3S_2\cdot NH$. It occurs in large aromatic crystals, melting at 43° C., volatilizing without decomposition at the ordinary temperature, slightly soluble in water, but freely in alcohol, ether and acids. Carbothialdine, $CS<\substack{NH_2\\SN(CH\cdot CH_3)_2}$ is produced by the combined action of ammonia and carbon bisulphide upon aldehyde. It occurs in small crystals, insoluble in hot water or ether, slightly soluble in cold alcohol and freely soluble in hot; it is decomposed by boiling water. Notwithstanding the similarity in chemical constitution and common origin from aldehyde of these two compounds, they proved to differ entirely in their physiological action. Carbothialdine acted powerfully as a tetanizing agent, and never caused irregularity in the action of the heart, which it arrested in diastole; whilst thialdine acted as a general paralysing agent, its administration being always followed by irregularity in the action of the heart, which it generally arrested in systole.

Trichloracetic Acid as a Caustic.

Trichloracetic acid $(CCl_3\cdot COOH)$ has been found by Dr. A. H. Ehrmann very useful as a local caustic in diseases of the nose and throat, presenting the advantage over chromic acid that its action remains localized and is more persistent. The acid is sent out in colourless rhombohedric crystals, having a slightly pungent odour, melting at 52° and boiling at 195°C., readily soluble in water and alcohol, and deliquescent in air.

Physiological Action of Curari.

The third part of Dr. J. Tillie's contribution to the "Pharmacology of Curari and its Alkaloids," recently published (*Journ. Anat.* and *Physiol.*, vol. xxv., p. 42), treats of the action of curarine on the blood pressure. The author shows that in dogs, cats and rabbits the injection of a watery solution of curarine causes an almost immediate fall in the blood pressure, which after small or medium doses is only temporary, but when the dose is very large, *e.g.*, 50 to 100 times the minimum paralysing dose, the decrease of pressure is marked, of long duration, and the original level of pressure is not usually regained. The fall appears to be due to the direct action of curarine on the peripheral nerves or on the muscle of the blood-vessels. The inhibitory action of the vagus nerve is suspended by curarine, and the heart seems not to be directly affected by the largest doses of the alkaloid. From a clinical point of view the author remarks that it is very interesting to find that albumen, and frequently also blood pigment and blood in considerable quantity, could be readily, within an hour, caused to appear in a healthy rabbit paralysed by a small dose of curarine, if simply severe vasomotor spasm were induced by slight stimulation (blowing the breath) of the skin. Curine, on the other hand, has no apparent action on motor nerves, but acts on the heart as a paralysant, both in frogs and rabbits, when injected subcutaneously, its interference with the heart's action being of a similar character to that caused by veratrine or the digitalis group of poisons. Curine may be present in different curaris in unknown proportions, so that the possible presence of this alkaloid when large doses of curarine are employed should not be overlooked. Dr. Tillie found that a watery extract of a *Strychnos* received from Kew, and obtained from Antioquia, New Granada, as *Strychnos toxifera*, but which seemed to him to agree exactly with Planchon's description of *S. Gubleri*, had no curari-like action, while two arrow poisons, named "corroval" and "vao," from New Granada, were found by Hammond and Weir Mitchell to produce paralysis of the heart. Dr. Tillie's experiments therefore seem to indicate that the curari of commerce will vary in its composition according to the district in which it is prepared, and the species of strychnos employed, the relative amounts of curarine and curine present being likely to vary considerably.

Florida Camphor.

According to a paper read by Professor Maisch at the October meeting of the Philadelphian College of Pharmacy, the camphor tree is being cultivated successfully in Florida (*Am. Journ. Pharm.*, Nov., p. 565). It seems to flourish in almost any soil and the tree grows rapidly. It is believed that in ten years time there will be more camphor trees than orange trees in Florida, and that the camphor industry will prove to be more profitable than that of sugar. The camphor obtained from the Florida trees approaches more nearly to that of Japan than to Chinese camphor, since the odour of safrol is distinctly recognizable.

Cassie from Georgia.

At the same meeting Professor Trimble exhibited a sample of "cassie," from Georgia, which he stated is largely used as a perfume, but has the singular property of imparting to the breath of those who eat it a strong alliaceous odour, which, while imperceptible to the user, renders his company intolerable to all near him. A somewhat similar occurrence takes place with the pretty spring flower *Tritelia uniflora*, which has a delicate violet perfume until bruised, when a garlicky odour entirely overpowers the odour of violets.

Methylal as a Solvent for Odorous Principles.

Various volatile compounds have been recommended at different times as solvents for the extraction of the odorous principles of flowers, but none of these have displaced fats and hydrocarbons as used in the processes of maceration and enfleurage. The principal obstacles to their use have been the relatively high boiling point, which has not allowed of the recovery of the odorous principle unaltered, and the pertinacity with which minute quantities of the solvent adhere to the extracted substance. It is now stated that methylal affords a solvent free from these disadvantages, it having a relatively low boiling point (42° C.) and volatilizing readily and to the last trace (*Chem. Zeit.*, Oct. 29, p. 1474). Practical experiments upon violet flowers are reported to have resulted satisfactorily, and it is expected that methylal will come into use for the purpose on an industrial scale.

Larixolin.

A German patent has been issued for a compound named "larixolin," which is alleged to be a perfect imitation of French oil of turpentine (*Pharm. Centr.*, Nov. 6, p. 669). It is described as consisting of a mixture in definite proportions of petroleum and camphor oil, and is alleged to not only have nearly exactly the same odour as oil of turpentine, but to be a mixture of hydrocarbons of the terpene series almost identical with the terebenthene of French oil of turpentine. Its specific gravity at 15° C. is given as 0·8535 as compared with 0·8660, and its igniting point as 55° C. as compared with 45° C. for French oil of turpentine. Larixolin is said to be applicable for all the purposes for which turpentine oil is used.

Optical Isomerides of Glucose, Gluconic and Saccharic Acids.

Reference has already been made ([3], xx., 789, 890) to the syntheses of glucose (dextrose), fructose (lævulose), and mannose sugars, belonging to the mannitol group, by Professor E. Fischer. A communication (*Berichte*, xxiii., 2611) has now been published by the same chemist describing the preparation of the missing optical isomerides of these sugars and of their corresponding mono- and di-carboxylic acids. Arabinose and mannose afford the parent materials, being representatives of the laevo- and dextro-compounds respectively. By employment of reactions already described on previous occasions a lævogyrate and also an inactive glucose (dextrose) have been obtained, which correspond exactly in their properties to ordinary grape sugar, except in their behaviour toward polarized light. The monocarboxylic acids, l- and i-gluconic acids, corresponding to the ordinary d-gluconic acid from common grape-sugar, and the dicarboxylic acids, l- and i-saccharic acids, optical isomerides of ordinary saccharic acid, have also been prepared. Gluconic acid has also been obtained crystalline in the form of its lactone, as well as the phenylhydrazine derivative of a new sugar with the empirical formula $C_6H_{12}O_6$, derived from the xylose, $C_5H_{10}O_5$, discovered in beechwood as a product of hydrolysis by Tollens and Wheeler.

Formation of Phloroglucin and Tannins in Plants.

At a recent meeting of the German Botanical Society Herr T. Waage put forward an hypothesis concerning the formation of tri-hydroxybenzenes and their derivatives from starch, the first recognized assimilation product within the plant organism. As glucose is considered to be reconverted into starch for reserve purposes by removal of one molecule of water from each molecule of glucose, it may also be assumed that this loss of the elements of water from the sugar molecule can under favourable conditions be increased to the extent of the removal of three molecules of water from glucose, $CH_2OH\cdot CHOH\cdot CHOH\cdot CHOH\cdot CHOH\cdot CHO$, a body with the composition of a triketohexamethylene, $\overline{CH_2\cdot CO\cdot CH_2\cdot CO\cdot CH_2\cdot CO}$, being produced. The constitution of this compound corresponds to the secondary or pseudoform of phloroglucinol, generally designated by the normal or tertiary formula $C_6H_3(OH)_3$, since Baeyer has shown that both bodies yield a trioxime, $C_6H_3(N\cdot OH)_3$, when acted on by hydroxylamine. As experimental proof of his theory Herr Waage asserts that halves of leaves laid for a period of six days in the dark in a sterilized grape-sugar solution, were found to contain a larger amount of phloroglucinol than the other halves of the leaves which had been kept the same time in pure water. That the phloroglucinol is not elaborated like starch, directly from carbonic acid gas, the author further considers to be indicated by the absence of phloroglucinol from the chlorophyll grains, and by the non-observance of an increase in the amount of this substance in isolated leaves exposed to light. Not only does the amount of phloroglucinol, but also of tannin, increase in leaves immersed in sugar solution, and from anatomical considerations it is probable that this is due to the combination of phloroglucinol with the carbonic acid gas that occurs in the cells in *statu nascendi* as a product of respiration, and the formation of its carboxylic acid, gallic acid, $C_6H_2(OH)_3,COOH$. Two molecules of the latter may again, as Schiff has shown experimentally, condense under elimination of a molecule of water to form tannin, but as this condensation is not always completely carried out in the plant, most of the tannin of commerce contains gallic acid. Since by oxidation tannin and allied bodies are converted into tannin reds, phlobaphenes and anthocyanes, widely distributed colouring matters in the cell sap, and phloroglucinol also yields many other derivatives of ethereal and glucosidal nature, phloroglucinol cannot be regarded as a plant excrement, although this thought may be suggested by the fact that it is not withdrawn from the leaves with the starch and nitrogenous matter in the autumn.

Effect of Coloured Light on Plants.

At a recent meeting of the Linnean Society a paper was read by the Rev. W. Henslow on the effects of coloured light on assimilation. The results he obtained seem to show that green light is more injurious than either red, yellow or blue. Plants grown under clear glass are also at a disadvantage as compared with those in the open, possibly in consequence of increased heat, which increases respiration and so reduces the amount of dry substance. The relation between the amount of solids and that of water in any plant, which seems to be taken in this paper as an index of assimilation, must of necessity be considerably affected by the conditions under which a plant is grown, particularly those of moisture of soil and atmosphere. The amount and kind of light cannot alone be taken into consideration. In the discussion that ensued Mr. J. G. Baker remarked that the use of green glass for the ferneries at Kew had been discontinued.

The Chrysanthemum as a Medicine.

In some interesting notes on the garden chrysanthemum in the *Gardener's Chronicle*, by Dr. Augustine Henry, it is stated that dried flowers of certain cultivated kinds are much used in medicine in China and form a considerable article of trade. The chrysanthemum is called chu-hua. The Ningpo variety, known as Hang-chu, is a yellowish flowered variety, and sells at three times the price of other kinds. Specimens of the varieties used as drugs are preserved in the Museum in Bloomsbury Square. In addition there is a specimen there labelled Kan-chu, *i.e.*, sweet chrysanthemum, probably some plant like *Cotula anthemoides*. The species brought home to Kew from North China by Dr. Henry have been identified as *Chrysanthemum sinense*, Lab., and *C. indicum*, L. Another one, number 3681, does not appear to have been identified. Dr. Henry speaks of it as a very fragrant plant flowering in October and common in field ditches and on the banks of the Yangtze near Ichang. These remarks suggest the possibility of crossing the plant with the garden flowers and of thus obtaining a perfumed chrysanthemum.

Production of Spines in Dry Air.

In the *Bull. Soc. Bot. de France*, M. Lathelier gives the results of some experiments made to ascertain the conditions under which thorns and spines are produced. He grew young plants of *Berberis* and *Cratægus* in dry air and in moist air, under otherwise similar conditions. He found that dry air, which retards the development of the soft tissues, promotes the growth of the hard tissues of which spines and thorns are formed.

Cinchona in Bengal.

According to the report of the Government cinchona plantation and cinchona factory in Bengal for 1889–90, the amount of cinchona bark harvested amounted to 304,705 lbs., as against 373,100 lbs. in 1888-90. Of this quantity the largest amount was *Succirubra*, 140,310 lbs., *Ledger* bark, 131,065 lbs., being next; of hybrid bark 28,030, and of *Calisaya verde* and *morada* only 5,310 lbs. At present there are 4,682,401 trees in the plantations, and there is a stock of 264,000 seedlings. The amount of sulphate of quinine turned out was 1,833 lbs., and of the febrifuge 6,578 lbs.

Cultivation of Gambier.

Mr. D. Morris, formerly Director of the Botanic Gardens in Jamaica, has this month gone to the West Indies to advise in regard to the proposed scheme of botanical stations for the Lesser Antilles, intended to supply the smaller islands with new industries or to improve the older ones. He takes out with him some Wardian cases of gambier plants, with the view of the cultivation of the plants and the ultimate industrial production of gambier in the West Indies (*Gard. Chron.*, Oct. 25, p. 472).

Medicinal Plants of Alabama.

Professor Carl Mohr, of Mobile, has published in the *Pharmaceutische Rundschau* (Oct. and Nov.) a list of the medicinal plants of Alabama, which when complete will form a very good representation of the plants having medicinal properties that have been or still are used in domestic practice in the United States and which are procurable from the large herbalists. The vernacular names are also given. Such a list, if published in a separate form, would prove very useful for chemists, who are occasionally asked in this country for American drugs under vernacular names almost unheard of in England.

New British Plants.

In the *Journal of Botany* for November a new bramble, *Rubus dunmoniensis*, is described by Professor C. C. Babington, the distinctive features of which are, leaflets flat, doubly serrate, prickles long, slender, terminal leaflet obovate-subcuspidate, panicle nearly cylindrical with patent prickles, pure white petals. Mr. Arthur Fryer also describes and figures a new hybrid *Potamogeton* of the *fluitans* group, which he has named *P. crassifolius*. It is a hybrid between forms of *P. Zizii* and *P. natans*.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE POSITION OF UNREGISTERED ASSISTANTS.

THE position of unregistered assistants, to which attention has been directed by Mr. MCADAM, of the Glasgow Apothecaries Company, appears to have been very much misconstrued by those who infer that the recent interpretation of the Pharmacy Act in the WHEELDON case will have the effect of depriving unregistered persons of the means of obtaining their living as assistants to chemists. It is equally incorrect to urge that the same objection applies to the provisions of the seventh section of the Pharmacy Amendment Bill. If that part of the Bill became law it would only disqualify unregistered persons from dispensing medicines, unless upon each occasion they acted under the personal supervision of a qualified employer or his qualified assistant; just as it is now held that they are disqualified for selling scheduled poisons or compounding medicines containing them. Both restrictions are perfectly in accord with the main object of the existing Pharmacy Acts, to secure the safety of the public, and as regards those who have obtained the qualification requisite for that purpose, of being registered, these restrictions are only a just protection of their interests. As in that respect they are perfectly consistent with the object of the Society's charter, it is clearly the duty of the Society to uphold them. But it is erroneous to say that the executive of the Society has sought to administer the Act in that sense after twenty-two years recognition of a contrary practice. It was not until the WHEELDON case came before the Courts that the question was raised, and even then the Council was called upon to prosecute by an independent authority acting on behalf of the public. To say that the fact of a man having been for several years infringing the Pharmacy Act gives him any right to continue doing so seems a proposition too absurd for refutation. It might as well be contended that a man who had been unlawfully carrying on business as a chemist and druggist for some length of time would therefore be entitled to continue doing so.

If the Pharmacy Act is to be of any real value to the public the qualification it requires for the performance of certain duties must be a real qualification, and if the Act is to afford any protection to those who are qualified to perform those duties there cannot be any pretence for allowing them to be undertaken by persons who have not the qualification of which registration is the evidence. If the fact of being registered were held to entitle a man to delegate to unregistered persons the duties which registration authorizes him to perform the result would be, to use the words of Mr. Justice Hawkins, that the whole object of the Act would be frittered away. Both protection of the public and the protection which registered men are entitled to look for would be sacrificed. But it must be remembered that however stringently the restrictions of the Pharmacy Act are upheld in regard to the sale of poisons, it does not follow that chemists would be enforced to employ no assistants but those duly qualified. This was distinctly pointed out by Mr. Justice Hawkins in regard to the general business of a chemist's shop; but he also held that if unregistered persons were allowed to sell poisons it could only be under the actual and efficient supervision of a duly registered person. The restriction to registered persons of the dispensing of medicines, which is at least as important a part of the chemist's duty as the sale of poison, is therefore a requirement that should be regarded as desirable, not only in the interest of public safety, but also as being a reasonable measure of protection for those who are registered in accordance with the Pharmacy Act.

It has been argued that a qualified chemist would not be likely to employ as assistant anyone who is not actually competent, although not legally registered, but if this latitude were allowed there would not always be adequate security. As an illustration of the danger of trusting to such a system we may mention two instances which show the defective state of the dispensing of medicine in Glasgow. A medical man in that town wrote a prescription ordering exalgine, and it was taken to a Medical Hall to be dispensed. The lad to whom it was handed showed distinct uncertainty with regard to it and so much excited the doubt of the customer that the matter was reported to the physician. On his calling at the "Hall" the boy admitted that he did not know the drug ordered, and so rather than lose the prescription had put in glycerine, which he said could not in any event do harm. In the other instance, for a prescription of "conf. sulph." not only was sulphate of copper supplied, but the direction, "a teaspoonful at bed time," was actually put upon the box and followed by the unhappy patient. It is not surprising that such experiences should induce medical men to express their satisfaction that the Pharmaceutical Society is endeavouring to confine the dispensing of medicines to competent hands, and it may be expected chemists will also perceive that their support of that endeavour will be conducive to the protection of their interests.

Mr. Munday, the Society's Local Secretary at Cardiff, informs us that at a meeting held on Wednesday last it was arranged that the Conference to be held on the occasion of Mr. Carteighe's visit, on the 4th December, should take place at the Town Hall at 3.30 p.m. There will be previously a reception at 3 o'clock, and after the Conference there will be a complimentary dinner at the Angel Hotel at 6.30 p.m. The chemists of Swansea, Newport, Pontypridd, Merthyr, and surrounding districts have intimated their intention of being present at the Conference.

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We have received from Mr. G. J. R. Parkes information that a general meeting of the Northern and North Western Chemists' Association of London was held on Thursday last, at 9 p.m., at the Railway Hotel, West End Lane. This Association has been formed for the purpose of promoting social intercourse and friendly feeling amongst members of the business and with the ulterior view of assisting efforts to obtain the legislation so much needed for its protection and benefit. Chemists desirous of joining the Association should communicate with the Honorary Secretary, Mr. Parkes, 196, Belsize Road, Kilburn.

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An interesting obituary notice of Miss North, whose beautiful drawings of plants in the North Gallery at Kew are well known to all visitors to the Gardens, is given in the *Journal of Botany* for November. Although Miss North painted so accurately that many persons supposed she was a botanist, she never attempted to master the details of systematic botany, and the truthfulness of her drawings was due almost entirely to her accuracy of observation. Her name is commemorated in the genus Northea, a sapotaceous tree of the Seychelles, and in *Crinum northianum* and *Nepenthe northiana*, the second of these having been described from her drawing, which, as Mr. Hemsley justly says, is the highest compliment that could be paid to their accuracy.

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The next meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, on Thursday, December 4, when a paper on "Our Best Pasture Soils, what they are and what they Grow," by Miss Emily A. Munro, will be read.

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A meeting of the Newcastle Chemists' Assistants' and Apprentices' Association will be held in Lockhart's Café, St. Nicholas Square, Newcastle, on Wednesday evening, Dec. 3, when a paper on "Some of the Uses of Colours in Flowers" will be read by Mr. G. Robertson. On the following Friday evening, Dec. 5, the Annual Conversazione of the Association will be held in the Northumberland Hall.

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On Tuesday, Dec. 3, a paper will be read before the Glasgow Chemists' and Druggists' Assistants' Association on "The Microscope," by Mr. J. P. Gilmour, with lantern illustrations.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

Wednesday, November 12.

MR. WILLIAM GILMOUR IN THE CHAIR.

The first evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, November 12, at 8.30. Mr. William Gilmour, F.R.S.E., in the chair. The minutes of last meeting were read and approved.

The **Chairman** said they had not succeeded in arranging for an Inaugural Address on the present occasion. They had hoped to have been able to secure Professor Bayley Balfour, but other engagements had prevented. He had, however, promised to address them on some future occasion. They had also approached the President of the Society, but he had indicated a preference for addressing rather a general meeting of the trade. In these circumstances they had decided to open the session with an ordinary meeting at which one or two papers should be read in the usual way.

The following papers were then read:—

ARSENIC IN SULPHURIC ACID.

BY D. B. DOTT.

It is well known that commercial sulphuric acid frequently contains arsenic, derived from the arsenical pyrites from which the acid is prepared. For many purposes for which sulphuric acid is employed the presence of arsenic is of no importance, but for nearly all the purposes of pharmacy such acid has to be rigorously excluded. It is not long since attention was first called to the fact that glycerin is sometimes seriously contaminated with arsenic, and it was at once recognized that arsenical sulphuric acid is the source of contamination. In view of these facts it is interesting to know the amount of arsenic which is occasionally present in oil of vitriol. I have noticed only one published statement on the point, and as the amount given is much less than I have found, it occurred to me that it might be worth while to bring this note before you. In the sample in question arsenic was found by Marsh's and Reinsch's tests, which gave unusually intense reactions. Therefore 50 c.c. were diluted with water, and one-fifth volume of strong hydrochloric acid added, to prevent precipitation of lead sulphide. The solution was warmed and hydric sulphide passed till complete precipitation. The bright yellow precipitate, after washing, was dissolved in ammonium sulphide, solution filtered, and the filtrate treated with slight excess of hydrochloric acid. The precipitate so obtained was collected, washed, dried, washed with carbon disulphide, dried and weighed. The weight was 0·1945 gram, =0·1565 gram As_2O_3. The precipitate volatilized when heated on porcelain in the Bunsen flame, leaving a trace of residue, and without doubt it consisted to all intents and purposes of arsenious sulphide. It will be admitted that 12 grains of arsenious oxide in the pound of acid is a considerable proportion.

SOLUBILITY OF LEAD SULPHIDE IN HYDROCHLORIC ACID.

BY D. B. DOTT.

It was mentioned in the previous note that hydrochloric acid was added to the solution to prevent the precipitation of lead sulphide. This is a subject which does not seem to have received sufficient attention, and is often a stumbling-block to students. For the latter circumstance some of the text-books are largely responsible. It is generally stated that lead sulphide is insoluble in dilute hydrochloric acid. Fresenius says that the sulphide is "insoluble in cold dilute acids." But what is "dilute acid?" We know what the dilute acids of the Pharmacopœia are, and an acid containing about 10 per cent. HCl is very commonly used as dilute hydrochloric acid. In the seventh edition of Fresenius' 'Qualitative Analysis,' "dilute hydrochloric acid" is directed to be prepared as a reagent by mixing one part of strong acid with two parts water. Now, such an acid will to a great extent prevent the precipitation of sulphide of lead. Fresenius likewise says, "in solutions containing a large quantity of free hydrochloric acid, hydrosulphuric acid sometimes produces a red precipitate." It would be more to the purpose to say, "In solutions containing a large quantity of free hydrochloric acid, hydrosulphuric acid produces no precipitate at all." Dittmar is more accurate when he says that lead sulphide is "insoluble in highly dilute acids." A single experiment will suffice to show the necessity for the expression "highly dilute." 0·165 gram acetate of lead was dissolved in 100 c.c. water and 20 c.c. hydrochloric acid (strong). Hydric sulphide was then passed in a steady stream for half an hour without any precipitate being produced. On the solution being further diluted, a black precipitate immediately appeared. That is to say, that in a solution containing one sixth per cent. plumbic acetate and about one sixth per cent. HCl, no precipitate is produced by hydro-sulphuric acid. Similarly in solutions containing less lead and at same time less hydrochloric acid than above, no precipitate is produced with hydric sulphide. In actual practice it is, of course, generally preferable to partially neutralize rather than to largely dilute a solution containing excess of hydrochloric acid.

Mr. **Hill** said he thought there was one point in connection with the recent statements about the presence of arsenic in glycerine which was unfortunate. When the general public got hold of the idea that so deadly a poison as arsenic was present in what was generally considered so harmless an article as glycerine it was apt to be unduly alarmed. It would have been well to have emphasized the fact that the quantity of arsenic was very small and not such as to give occasion for any alarm. It was well known that solution of perchloride of iron occasionally contained appreciable traces of arsenic and he was not sure but that the virtues of the perchloride were not sometimes to be attributed to the arsenic it contained. It was well to have it pointed out that some samples of sulphuric acid contained so large a percentage of arsenic, and perhaps by directing the attention of manufacturers to the fact this note might lead to an improvement.

Mr. **Boa** said with regard to the presence of arsenic in glycerine he had been asked by a purchaser the other day if his glycerine contained any lead. He replied that it did not and that the impurity that had been recently found was not lead but arsenic. The purchaser said he was specially particular about the lead; arsenic was medicinal, and he did not have the same objection to it.

The **Chairman** said it was important to direct attention to the quantity of arsenic in some samples of sulphuric acid. Doubtless such a statement as that in this paper would attract the notice of manufacturers and lead to the supplying of a purer article. He would commend the note on the solubility of lead sulphide in hydrochloric acid to the notice of the younger men, who, he had often observed, were puzzled by the unexpected results sometimes obtained in practical analysis.

Mr. **Dott**, in reply, said the sample of sulphuric acid he examined was the ordinary commercial acid.

The next paper was on:—

Blue Glass.

BY D. B. DOTT.

It used to be the custom for each student on entering the chemical laboratory of our University, to be supplied with a printed list of apparatus which he was expected to purchase for himself. Among the articles prescribed was a piece of blue glass. I well remember of a fresh student, with all his new apparatus displayed before him, asking the then assistant, "What is the blue glass for?" The assistant replied, "When a potassium flame is obscured by a strong sodium flame, by looking through this glass, you are *supposed* to distinguish the potassium." I noted the peculiar emphasis on the word *supposed*, and subsequent experience soon convinced me of its propriety. That is a long time ago, and yet there is still a widespread belief in blue glass. I am not sure who is responsible for this, as none of the text-books of analysis with which I am acquainted recommend its use. The blue glass is supposed to absorb the yellow sodium rays, and allow the violet potassium rays to pass on to the eye of the observer. Unfortunately, however, cobalt glass has a tendency to give every luminous flame which is viewed through it a purplish appearance. Hence, nothing is more common than the case of a student, with a flaring yellow sodium flame staring him in the face, interposing a piece of blue glass, and confidently pronouncing the substance under examination to be a potassium salt. The same thing frequently happens with calcium and magnesium compounds. I would venture to recommend that much more might be learned by looking at the flame with the unaided eye. The temperature of the Bunsen flame is not sufficiently high to give us the luminous vapour of many metals, but for calcium, barium and strontium, sodium, potassium and lithium, and for boric acid it affords a useful means of detection. Perfect satisfaction can only be obtained by the use of the spectroscope; but still the prevailing colour of each of these flames is sufficiently characteristic to enable the practised eye to pronounce with considerable confidence which of the above elements is present. In the case of a potassium salt containing a slight contamination of sodium, the violet tint in the flame is still quite perceptible; but when a large proportion of sodium salt is present, it is hopeless to expect to detect the potassium, except by the spectrum or by chemical reactions. Speaking generally, these flame tests are very useful in the examination of a single salt, but are of very limited value in the analysis of mixtures—even with the aid of blue glass.

The Chairman said he could confirm from his own experience what had been said by Mr. Dott. In the case of volatile compounds, such as those of mercury or arsenic, it was no uncommon thing for a beginner, using blue glass, to declare that the substance under examination was potassium, though a moment's consideration and observation would prove the statement to be erroneous.

Mr. Dott then exhibited the apparatus and read the following note on—

Determination of Melting-Points in the Air-Bath.

BY D. B. DOTT.

The ordinary method of determining a melting-point is fairly convenient when the substance is one which melts below the boiling point of water, but when it becomes necessary to use such a bath as oil of vitriol or melted paraffin, the process has decided drawbacks. It would be much more satisfactory in every respect to determine the melting point of a compound in the air-bath, if that method could be made as accurate as the other. The conditions of the two cases are different. In the one we have immersion in a liquid, in the other, immersion in a gas. In the one case, the thermometer and tube receive their heat from the surrounding liquid, we might say by convection currents in the surrounding liquid; in the other case, radiation and sometimes conduction come seriously into play. For instance, it will be observed that if a substance be placed in a small tube attached to a thermometer bulb, and the arrangement lowered to near the bottom of a copper air-bath, on heat being applied in the usual way, the melting-point indicated will be much too low. This is doubtless due, in part at least, to the bright surface of the mercury preventing its being so readily affected as the substance in the tube attached, by the heat radiated from the bottom of the bath. An accurate result cannot, of course, be obtained by placing the substance on a metal shelf in the bath, as the shelf has by conduction attained a higher temperature than that indicated by the thermometer above.

The small air-bath placed before you has been made for the purpose under discussion. It is constructed of copper with glass front and back. There is only one opening, that in the top for the introduction of the cork which holds the thermometer. Two brass wires passing through the sides of the bath support a piece of sheet asbestos. The substance whose melting-point it is desired to determine is placed in a thin glass tube attached to the thermometer bulb, and the couple then placed in position well above the asbestos. The temperature is then very gradually raised, and the melting of the substance is easily observed through the glass front of the bath. From experiments made with standard compounds, I believe the results obtained are very nearly correct, and when dealing with a substance having a very high melting-point the apparatus is specially useful.

Mr. Hill said he had recently had occasion to determine a good many melting points of bodies melting considerably above the boiling point of water. He had employed a sulphuric acid bath and had frequently observed the unsteadiness of the thermometer produced by the disturbance due to the formation of convection currents in oil of vitriol. The apparatus shown by Mr. Dott, which was free from the objections applying to oil of vitriol and similar media, would be a valuable acquisition to those who had much work in the determination of high melting points to do.

The next paper was a—

Note on the Assay of Scammony.

BY PETER BOA.

The Pharmacopœia states that about 75 per cent of scammony should be soluble in ether. In assaying scammony in accordance with this the usual way is to powder the scammony, take a weighed portion, exhaust it with ether, evaporate the ethereal extract on a water bath till it ceases to lose weight and note the residue. I have observed that in drying, the weight of the extract may become constant before it is really dry. This arises from its varnishy nature including some of the solvent even after prolonged heating. If it be not carefully broken up the estimate may be too high.

I made a few experiments with the object of ascertaining what the probable error might be. The details of two of these experiments I may record by way of illustration.

Experiment I.—25 grains of scammony were taken and extracted with ether, sp. gr. ·717, and the extract evaporated on a water bath.

First weighing	17 grains.
Second „	15·75 „
Third „	15·75 „

After breaking up taking care that no loss resulted from chips flying off.

First weighing	=15·5
Second „	=15·5

Experiment II.—20 grains were taken and treated as in Experiment I., but using ether, sp. gr. ·735.

First weighing	=15·75 grains.
Second „	=15·25 „
Third „	=15· „
Fourth „	=15· „

After breaking up—

First weighing	=14·75
Second „	=14·25
Third „	=14·25

The first experiment indicates a possible error of only 1 per cent. The second, however, indicates 3·75.

Ether of sp. gr. ·717 gives an extract which dries quickly and is easily broken up; ether of sp. gr. ·735 gives a tougher extract, more difficult to dry, and the possible error is always greater.

The CHAIRMAN said this note reminded him of an accident which he once met with. He was overlooking a student who was evaporating a chloroformic solution. A tough impervious film had apparently formed over the surface of the liquid, under which the volatilized chloroform accumulated till it acquired sufficient pressure to burst the covering with an explosive force, by which he (the Chairman) was nearly blinded.

Mr. NESBIT (Portobello) said the point brought forward by Mr. Boa was an illustration of the great pertinacity with which some substances appeared to retain a small quantity of ether. He had at present some tannin which smelt very strongly of ether, and apparently scammony resin had a similar tendency to retain the solvent.

The next paper consisted of—

NOTES ON THE PHARMACY OF EXALGINE.

BY PETER BOA.

Exalgine is now frequently prescribed, sometimes in powders, rarely in pills, most frequently in mixtures. When ordered in the form of a mixture it is nearly always accompanied by a little alcohol in some form or other, such as brandy, rum, rectified spirit or an aromatic tincture, with the object of ensuring its solution. It frequently happens that the spirit specified in the prescription is insufficient to keep it in solution unless certain precautions be observed.

The solubility of exalgine in water is stated by Martindale in the 'Extra Pharmacopœia' to be 1 in 60. For practical purposes this may be accepted. I find that one part dissolves in fifty of cold water, but it requires six hours and frequent shaking to effect this. The substance is volatile and its solubility cannot conveniently be determined by evaporating to dryness a saturated solution. It is readily soluble in warm water, and this property may be utilized in dispensing, as I shall presently show.

The following mixture is the favourite form of a local prescriber:—

Exalgine	ʒss.
Sp. vini rect.	ʒij.
Aq.	ad ℥iss.

If the exalgine be dissolved in the spirit and the water then added it falls out of solution. On the other hand, if the exalgine be dissolved in the water by the aid of heat and the spirit added last, a clear and permanent solution results.

Another mixture by a different prescriber is—

Exalgine	gr. ij.
Sp. vini gall.	ʒss.
Syr. aurantii	ʒiij.
Aq.	ad ℥ij.

The spirit here is insufficient to dissolve the exalgine, and although there is great excess of water beyond the saturation point I have seen this mixture with a "shake the bottle" on it, an excusable circumstance, because solution would only be effected after some hours in the cold.

The following mixture presents no difficulty at what may be called a comfortable temperature:—

Exalgine	gr. xij.
Sp. vini rect.	ʒi.
Aq.	ad ℥ij.

If the exalgine be dissolved in the spirit and the water added, a clear mixture is formed. It was prepared on one occasion at a temperature of 46°F., and separation took place. The water had been added *gradually*; when added *all at once* no separation ensued.

Alcohol has a useful effect in keeping exalgine in solution. For example I dissolved 16 grains in one fluid ounce of water by heat, and allowed the solution to cool. A copious recrystallization took place. To an ounce of another solution of similar strength, while warm, ʒss. rectified spirit was added. The solution was permanent. To obtain the best effect from the alcohol it should not be used to dissolve the exalgine but added after solution has been effected in the water by heat.

The little heat that is required does not appear to change the substance. I compared the crystals obtained from a solution in hot water with the original crystals and no difference was discernible.

The dose of exalgine generally prescribed is small—usually one or two grains—and it is not necessary to give it with a deluge of water. When asked to suggest a vehicle I say tinct. card. co. It ensures solution, covers the taste, and does not possess any therapeutic properties of its own beyond being a pleasant aromatic.

Mr. DOTT said this was a very interesting and useful paper. There were many anomalous things to be met with in the case of solubilities aided by addition of spirit. It would almost seem as if there were some slight physical change in the substance produced by the warming. It had been frequently pointed out that a solubility determined by the cooling of a hot solution gave a higher result than one determined by maceration in the cold. Why that should be so was not known, but it was very marked in the case of such a body as salicin, for instance. In the case of volatile bodies there were difficulties in the way of determining the solubility. Such a body, for instance, as boracic acid readily passed off with the steam, and in the case of an alcoholic solution the loss was much greater. Fairly accurate results could sometimes be obtained by carrying the evaporation so far on the water-bath and finishing off in the desiccator. Pretty accurate results could also be got by adding definite quantities of the solvent to a known weight of material till complete solution was effected. For ordinary purposes digestion of a weighed quantity and in large excess of the substance in a definite weight of the solvent answered well. By this means the influence of mass was brought to bear, and a saturated solution could be rapidly obtained. The solution was passed through a pair of counter-poised filter papers, on which the undissolved residue was collected, pressed, dried in the desiccator, and weighed.

The CHAIRMAN said there were two points in the paper which were worth noting. First that the exalgine should be first dissolved in water and the spirit added. Secondly, Mr. Boa had indicated the minimum quantity of spirit required to keep the exalgine in solution. He (the Chairman) had noticed that in Merck's *Bulletin* the opposite plan to the former was recommended. Two formulæ were given, cherry cordial being the solvent in the one case and rum in the other. In both cases the exalgine was to be dissolved in the spirit, and added to the water. But Mr. Boa had shown that it was better to reverse the process. He thought tincture of cardamoms would make a very suitable vehicle, both from its colour and its fine aromatic flavour. It was a great advantage to have papers such as this, showing the most suitable way in which to dispense these new remedies, and he found that medical practitioners depended a good deal on pharmacists to suggest the best forms.

Mr. HILL said he could confirm what Mr. Boa had said as to the solubility of exalgine in water. In some experiments which he had made he found that in the proportion of one to sixty of water at 60° F., it took a very long time to effect solution; but by a gentle heat a solution of one in forty-five could be rapidly prepared. He had prepared such a solution, and after exposure for twelve hours to a temperature of 40° F. there was no separation. He thought therefore that a solubility of one in fifty would be quite safe for practical purposes. He happened to be in Professor Fraser's laboratory at the time when he was conducting his experiments with exalgine, and in reply to an inquiry by the Professor had suggested compound tincture of cardamoms as a suitable vehicle, and he was pleased to observe that Mr. Boa's experience had lead him to recommend the same.

The next paper was a—

NOTE ON SALICYLIC ACID.

BY J. RUTHERFORD HILL.

I have the pleasure of submitting to the meeting a specimen of physiologically pure salicylic acid received from Messrs. Duncan, Flockhart and Co. I had occasion to take some interest in the recent prosecution for the sale of Kolbe's salicylic acid in Glasgow, and it was my intention, had time permitted, to have made a communication on commercial salicylic acid to one of our meetings during the present session. I observe, however, that the subject has been taken up by Professor Dunstan, who is much better qualified to deal with it than I am, and therefore it is unnecessary that I should do anything further in the direction I have indicated. I may be allowed, however, to take this opportunity of communicating some of the facts which have come under my observation. I have no doubt that those responsible for the Glasgow prosecution are now of opinion that their procedure was a very ill-advised one. It is much easier to make a charge against a man than to get people to understand that no serious offence has been committed, and that the only intention of the prosecution is to let the public know that a certain drug in common use contains an impurity having marked poisonous properties.

A sample of the salicylic acid in question in this case was sent to me with a request that I would give my opinion of it. I subjected it to the pharmacopœial tests and reported that it answered to the official characters and tests, and was an ordinary commercial specimen of salicylic acid prepared by Kolbe's process, and added that the seller was perfectly safe if he claimed that he sold the substance sanctioned as salicylic acid by the British Pharmacopœia. I took the trouble to procure, from ordinary commercial sources, twelve samples of salicylic acid, and found that eight of them appeared to be identical with the Glasgow sample, while four were in slightly larger and rather whiter crystals and had a slightly higher melting-point. But all of them yielded the buff coloured impurity referred to by Professor Charteris. In no instance did I find that the natural or purified acid was supplied.

You will observe that the sample of pure artificial acid now shown is in much larger crystals than the ordinary acid, as is also the natural acid, of which I have a sample here. The pure acid produced in court by Professor Charteris was in even larger crystals than those I have here. It is evident that the reference to "light easily diffused" crystals in the official characters of the acid cannot apply to any of these samples of natural or purified acid, but that it does apply to the two varieties of commercial acid containing impurity, of which I now show you samples. The official characters and tests seem to be taken from the Pharmacopœa Germanica, 1882, and manifestly apply, not to the natural acid, but to the commercial acid prepared by Kolbe's process and well known to contain impurities derived from cresol and other bodies present in the carbolic acid or phenol of commerce. No doubt characters and tests applicable to a purer acid will be introduced in future editions of the Pharmacopœia, but as long as the present edition remains authoritative, no prosecution for the sale of Kolbe's acid can succeed.

With regard to the melting point of the acid sold in this case, Dr. Clark, the analyst for the prosecution, stated in evidence that he found it to be 154·7° C. The B.P. says it ought to be *about* 155° C. On being asked to give an opinion as to what might be considered a fair variation from the official standard, Dr. Clark said he thought 0·5° C. either above or below the standard stated would be reasonable. Even on his own showing, therefore, the sample answered the requirements of the official test. It is interesting to note that another analyst, having special knowledge of salicylic acid and its impurities, fixed the melting point of the same sample at 153·4° C. I took the melting point repeatedly with as much care as possible, using a sulphuric acid bath, and I would be inclined to put it at 155° C. as near as possible. From this it will be seen that different observers disagree as to the actual facts. It is very difficult to note absolutely to a tenth of a degree the temperature at which a substance melts, and I would hardly, for practical purposes, draw the line so close as 0·5° C. I should say that 1° C. above or below the figure stated would give more reasonable latitude. At the same time I think it is undesirable to have the word "about" in the official tests at all. It would be much better to fix a minimum and maximum. It is useful to note the narrow interpretation put upon the word "about" by the public analysist in this case.

There is one point in the official tests worthy of attention. It is stated that the acid volatilizes *without decomposition* below 200° C. I found that this was nearly true if the acid were very gradually heated, but even then there was appreciable evidence in the case of every sample of artificial acid examined, whether purified or the ordinary commercial, that it was partially decomposed into carbon dioxide and phenol. By any ordinary method of heating the evidence of such decomposition was very distinct. The natural acid did not seem to be decomposed in the same way, but it gave off a very distinct odour, which, I fancied, reminded me of oil of wintergreen.

An alcoholic solution of the ordinary commercial acid left a perfectly white residue when evaporated spontaneously. I should say, however, that alcohol is not the best solvent to employ in applying this test. Both the acid and the impurity are freely soluble in alcohol and therefore no separation of the two takes place in crystallization. Water answers the purpose much better. The impurity is more soluble in water than the acid. If a considerable excess of acid is shaken up with water so as to form a saturated solution, and the solution evaporated either spontaneously or, what is better, by heat cautiously applied, it will be found that there is a distinct fringe of the buff coloured substance found by Professor Charteris round the outer margin of the crystalline residue. The pure white crystals of salicylic acid being less soluble, separate out first, and the coloured impurity is deposited last at the outer margin.

I did not myself minutely examine this buff-coloured substance, but I look forward with much interest to the results obtained by Professor Dunstan. Dr. Clark stated that it was cresotic acid and that he found 2·5 per cent. in the sample. Another analyst already referred to found 2·1 per cent. in the same sample. I am quite sure that it was clearly determined that this body was really cresotic acid. So far as I could gather the melting point was found to be 151° C., which is the melting point of paracresotic acid, and it seems to have been assumed on this evidence alone that the substance was cresotic acid. I can hardly imagine that a substance so nearly related in its chemical structure to salicylic acid can have such a powerfully toxic action, and, indeed, I have heard that cresotic acid has been found to be an efficacious remedy in cases of acute rheumatism, and has been largely used for that purpose in the Royal Infirmary of Edinburgh. But doubtless the research carried out by Professor Dunstan will give more light on this point.

Professor Charteris appears to be of opinion that nothing but the natural acid or the physiologically pure acid should have a place in the Pharmacopœia. I am not sure that such is the necessary inference from his very important and valuable experiments. My experience is that salicylic acid itself is not largely used in the treatment of rheumatism or other maladies internally. The soluble salicylates are much more generally employed in this way. Salicylic acid is largely used externally in the form of lotions, ointments and antiseptic dressings. For such purposes a comparatively cheap acid, such as Kolbe's process yields, is unobjectionable. I would therefore suggest that there should be, as for instance in the case of ether, an *acidum salicylicum*, having the characters and tests of the present Pharmacopœia, and restricted to external applications, and an *acidum salicylicum purum*, having the characters and tests suggested by Professor Charteris and to be used for internal administration.

Attention was then directed to the following additions to the Museum:—

Physiologically Pure Salicylic Acid.
From Messrs. **Duncan, Flockhart** and Co., Edinburgh.
Rhizome of *Podophyllum Emodi.*
From Messrs. T. and H. **Smith** and Co., Edinburgh.
Specimen of green oil of Aniseed.
From Mr. **William Lawson**, Bellshill.
Specimen of Oil of Bay, *Myrcia Acris.*
From Mr. D. N. **Wylie**, Edinburgh.
Specimen of Badsha Salep with descriptive paper and plates. From Dr. J. E. T. **Aitchison**, C.I.E., F.R.S., Edinburgh.
Specimen of Trichloracetic Acid.
From Mr. A. **Kinninmont**, Glasgow.
Specimen of Piperazidine Hydrochloride.
From Messrs. A. and M. **Zimmermann**, London.
Fine Specimen of Kola Nuts.
From Mr. J. C. **Pottage**, Edinburgh.
Specimen of Kola Nuts and other nuts found in original packages.
From Mr. E. J. C. **Christie**, Edinburgh.
Fruits of *Daphnidium Cubeba.*
From the **Museum**, 17, Bloomsbury Square, London.

Messrs. T. and H. Smith and Co. also sent for exhibition fine specimens of aloin, muriate and sulphate of morphine, scammonin, piperine and tannin.

On the motion of the **Chairman** cordial votes of thanks were awarded to the authors of papers and donors to the Museum.

Mr. **Maclaren** proposed a vote of thanks to the Chairman and expressed the gratification of the meeting at seeing him presiding again in improved health.

The motion was passed with acclamation and the meeting then closed.

Proceedings of Societies in London.

MEETING OF CHEMISTS AND DRUGGISTS AT SOUTH KENSINGTON.

A meeting of the chemists of Hammersmith, St. George's, Hanover Square, Chelsea, Fulham and South Kensington, for the purpose of discussing the draft Pharmacy Act Amendment Bill, was held on Thursday evening at the Queensberry Hall, South Kensington. The chair was taken at 9 o'clock by Mr. J. T. Tupholme, Divisional Secretary for South Kensington. There was a fair attendance, though the meeting looked rather small in the large hall engaged, which it is understood was the only one in the neighbourhood available.

The Chairman, in opening the proceedings, said the Council of the Pharmaceutical Society wished in going to Parliament to receive the unanimous and hearty support of the trade. At the same time he did not think any Act of Parliament would ever make a man prosperous. They must after all depend on their own individuality.

Mr. Gulliver moved: "That this meeting approves the draft Pharmacy Act Amendment Bill, and promises to assist in passing it through Parliament." He felt they would all be glad if they could get something more, but in going to members of Parliament and asking for their support they must go for something which could be shown to be in the public interest. He did not see that they could seek to substitute the plural for the singular in one clause, especially in view of the widows' clause, which he did not think the chemists of the country would be willing to give up.

Mr. Hickey, in seconding the resolution, said he had full faith in the Council, and did not think it was any use to criticize details.

The Chairman said he had received letters from Mr. Cooper and Mr. Hall regretting their inability to be present.

Mr. Hickey said one important question was the possibility of a widow left sole executrix being able to carry on business with a qualified assistant, and if she married again what was the result.

Mr. Carteighe said his impression was that in that case the privilege lapsed, but he was not sure.

Mr. Robinson said there was a pretty strong feeling that this was a good Bill as far as it went, but many people thought it might go farther, and that if it was to do any good to trade interests it ought to go farther, and attempt to prevent trading by companies. It was also said that to pass by this opportunity without making an attempt to remedy this evil, was in effect acquiescing in it. On the other hand they had to consider whether there was any chance of getting a Bill with such a clause in it passed or even introduced. It was pretty well understood that those who were ready to back the present Bill would not do so if it contained such a clause, and even if any one else could be found to take it up there was no doubt it would be blocked, and would never get through. He was not sure that even as it stood it would pass without alteration; and it was therefore wise not to add to its difficulties. The only ground on which they could appeal to Parliament was security and benefit to the public, not with a view to protecting trade interests, which would never be listened to. Still, this Bill if passed would tend to consolidate the Society, and in that way would indirectly subserve the best interests. The failure of the trade association showed that the Pharmaceutical Society was the only body which could really benefit the trade as a whole; and seeing that the Council had deliberately adopted this Bill as the only one it could promote at the present time, he thought they ought to all give it their hearty support. If there was any strong feeling in the country that something more should be attempted, let them get someone to introduce amendments in Committee when the Bill had passed the second reading. He concluded by an appeal to gentlemen to do their best individually to raise the status of the profession, and to discourage cutting and unfair competition of all kinds. He hoped at all events there would be no division or opposition throughout the country, but that those who were not fully satisfied would, as he had said, endeavour to amend it at a later stage.

Mr. Jackson asked if it would not be possible to have a clause preventing the sale of patent medicines containing poisons by unqualified persons.

Mr. Urwick thought it was a pity the widows' clause was inserted, but being in the Act it would never be repealed unless good cause were shown from statistics that it had acted mischievously. He joined in the appeal of Mr. Robinson to those who were not satisfied to try to amend the Bill rather than oppose it. If they were all true to one another they had the case in their own hands. If qualified men would not go to the stores and grocers' companies they could not be carried on. A new form of competition had come under his notice that day, powders and pills being distributed gratis from house to house in a very respectable neighbourhood as samples.

Mr. Long pointed out that the great evil at the present time was the apathy of members of the Society and of the trade. The Council was thoroughly representative and its members, especially the President, had great experience, and ought to be supported. It was only 6*d*. a week, and he would not mind collecting it in his own district, and that would also include a subscription to the Benevolent Fund carrying two votes. The dockers and gas stokers stuck together, and why could not chemists do the same? He pointed out the advantages of the educational clauses and the one enabling all to become members of the Society.

Mr. Pickard said he had hoped to hear something from those who opposed the Bill. Many did not like the educational provisions, but twenty-five years' experience of examinations had shown that they were not sufficient, that training also was requisite. This part of the Bill, however, was only enabling, and would have to be carried out by bye-laws which would be fully discussed before adoption. It was possible that the apprenticeship clause would require amendment, in view of the recent decision that limited companies could take apprentices, in order to make sure that a young man could only be apprenticed to a *bonâ fide* chemist. He feared clause 7 as it stood might lead to difficulty in the words "or by acting under the immediate supervision of such qualified person." He would rather leave that to the lawyers. He should also like to see a further power to remove undesirable persons from the Register, which could now only be done for some offence against the Pharmacy Act.

Mr. Palmer asked what was the reason for the clause enabling any chemist and druggist to become member of the Society. It was always open to him, on passing the Major examination, but that was too much trouble apparently. The associates would, if the Bill passed, have all the privileges of members except the title of pharmaceutical chemist, and if they had the privilege he did not see why they should not have the title. What inducement would there be to men to pass the Major, except the knowledge to be gained? Was it intended that every one should pass the Preliminary before entering on his apprenticeship, because he thought that was very desirable. On the whole he thought the Bill was as much as could be obtained.

Mr. Matthews objected to the clause allowing youths to be apprenticed to hospital dispensers. If this were allowed, managing assistants ought to have the same privilege.

Mr. Carteighe said much that he might otherwise have had to say had already been said by others. He had only to refer to a few points which had been raised in discussion. He often had to apologize for the laxity of the Council and to explain that he was not Prime Minister, and that the Council was not a Government having power to carry out any legislation it liked. What did the trade want? They asked for a Bill to benefit the trade and then they said they would join the Society. His reply was that the Council could not benefit the trade until they all joined the Society and supported its efforts. He did not come there or go anywhere else to beg for the Society. It was respected by all educated men in all professions, and by the Government and public departments; it was only reviled by a few in the drug trade who thought it did not do enough for them. The Society from its foundation had followed a straightforward and honourable policy, that of promoting and insisting on a good education for all engaged in the trade, and, on the basis of that education, to claim certain legal privileges. It had the power and duty of examining all candidates for registration, and that power would remain in its hands. Anything in the shape of protection could only be obtained through the Society, and yet those who wanted more than this Bill would give them opposed the only body which could give them anything. He knew, probably as well or better than anyone, the grievances of the trade, for they were constantly being brought under his notice. The Council knew the difficulties of getting any Bill through Parliament even by a Government, and therefore was modest in its demands. The privilege of dispensing medicines was one they did not yet possess, and if they secured that they would be in a much better position than they had ever been in before. Exemption from jury service would also be valuable, but it could only be claimed in the public interest. The only criticism which called for special notice was Mr. Pickard's on clause 7. Personally he agreed with him, but the words had been insisted on by the majority of the Council at the instigation of chemists and druggists. He had had several letters on this subject, and it was this sort of criticism which was always welcome. He also agreed with him as to the removal of names from the Register, but he feared the trade at large would not like to trust even their own representatives with such a power, though it was possessed by every other body in a similar position. He also sympathized with Mr. Palmer's observations as to membership, but the object was to gather all in the trade into the Society. In the old days every man in business was expected to pass the Major, and the Minor was the assistant's qualification; but as it was now open to the minor men to keep open shop, he thought that membership should be thrown open to all. Those who came up for the Major were those who valued the distinction for its own sake, and he hoped the number of those would be even larger in the future that it had been in the past. With regard to dispensers in hospitals, it was intended that they should be registered men in public hospitals, not anything which might be called a dispensary; and those in charge of such duties were in many cases quite as capable of instructing and training a pupil as an ordinary chemist. The question of companies was a most important one, and it had been felt all along that a clause dealing with this matter would have met with the applause of the whole trade, but they had to consider what was possible, and to consolidate their strength before attempting anything heroic. He had obtained the opinion on this question of all members of both Houses of Parliament that he could come across, and the answer had always been that a registered qualified man must be employed to sell and dispense poisons, and that in that case Parliament had no right to interfere on the question of who should take the profits. That was not his opinion, but that of those most friendly to them in Parliament, and some even suggested that the present state of things afforded openings for young qualified men who had not the capital to go into business for themselves. It would be dangerous therefore even to attempt to amend the Bill, lest it might be altered for the worse, and at any rate the Council declined to go with a Bill which they knew would not be received. Mr. Robinson had dealt with the whole subject very ably, and he was obliged to him and to other gentlemen for the consideration they had given to the matter. The Council could draft Bills easily enough, but it could not pass them. If active support were given to a modest measure of this kind, and it were carried, it would be some encouragement to go forward again hereafter. The question raised by Mr. Pim Jackson would he hoped be tested in a court of law before long, but there were certain difficulties, and it was not desirable to move until a thoroughly good case was ready for trial. He concluded by an appeal for unanimity.

The resolution was then put and carried unanimously.

Mr. Robinson moved:—"That this meeting is of opinion that the Council should insert a clause in the Bill to render it unlawful for any person or persons not duly registered under the Pharmacy Acts to take, use, or exhibit any title implying such registration or qualification."

Mr. Urwick seconded the motion *pro forma*.

Mr. Carteighe pointed out some of the difficulties which would attend such an attempt, and that it would be of no practical use.

The motion was put, Mr. Robinson declining to withdraw it, when four only voted in favour of it. It was therefore lost.

Mr. Carteighe then moved a vote of thanks to the Chairman and his colleagues who had assisted him in organizing the meeting.

The motion was seconded by Mr. Butt and carried unanimously.

A vote of thanks to Mr. Carteighe terminated the proceedings.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The second meeting of the session was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday, November 12, Mr. H. Kemp, Vice-President, in the chair.

The Chairman announced that Mr. Hart would open a discussion upon stamp proprietaries, or so-called patent medicines and the poison label.

Mr. James Hart said he proposed to open an informal discussion, which would be freer and less rigid than if he read a formal and ordinary paper. He thought that the Council this year had taken a very wise step in introducing purely trade matters for discussion. No one present thought more highly of scientific papers or enjoyed scientific work more than himself, but at the same time it was possible to have too much of a good thing. These purely trade or shop discussions were after all a relief to most of them, and would in the end prove more attractive for the bulk of the members of the Association. He took it that the discussion had been instituted partly owing to some remarks which fell from the President of the Pharmaceutical Association at the Grand Hotel, Manchester, a fortnight ago. It was the intention, in having a discussion, to test the feeling of the members of the Association upon the subject, so that the Council might have its hands strengthened by knowing, as Mr. Carteighe said, who was behind it and what power it had to rely upon. Really what was wanted was to feel the pulse of the district upon the question before them. Acts of Parliament were all very well, but it was quite possible to expect too much from them. It seemed to be the opinion of a great many gentlemen in the trade, "only get an Act of Parliament, and the millennium will follow directly." He would point out, as the President emphatically stated, that it was not from outside alone that the greatest danger and the greatest nuisance arose, but from qualified men in the trade. He (Mr. Hart) did not think any Act of Parliament would prevent men from selling cod liver oil at 10*d.* a pint, or from sending out seidlitz powders innocent of tartrate of potash, and hosts of things like that. Even if they got the Act, he did not think they would be a very great deal the better of it. It was well to look as far as they could at the intention of the old Act, because they were told that it was not the intention of the promoters of the Bill that the clause under which the bogus companies acted should operate as it did. That point had been strongly dealt with. With regard to clause 16 he did not think that, when that clause was inserted, it was intended that the term patent should apply, as had been decided in the Matthias case, only to medicines which were sold under royal letters patent. He thought it was the intention that it should be applied to patent medicines and proprietary articles, as they were described in drug lists; medicines totally innocent of any application to the patent office, but really stamped medicines. He felt sure that that was the original intention of the founders of that clause, and the soreness of the trade, he must admit, only came in when they found that grocers were dealing in these so-called patent medicines. This clause was evidently put in to appease the vested interests of the proprietors of patent medicines or proprietary medicines. When the Pharmacy Act was drawn up it seemed that every man, woman and child had a vested interest, except the chemist and druggist, and his vested interest seemed to have been left out in the cold altogether. If they were to take, not what the Act meant, but what it really said, they were justified in falling back upon a recent decision in reference only to medicines which were sold under royal letters patent. If one portion of the Act was to be read in a strictly legal sense they were quite justified, under the circumstances, in insisting that the other portion of the Act should be. If they objected, as they did most strongly, and he thought very rightly indeed, apart from all narrow prejudices of pecuniary considerations, to wholesale evasions of the Pharmacy Act by three halfpenny or *ad valorem* stamps, then they had no alternative but to comply themselves with the provisions of the Act, and to label all preparations which they knew contained poisons. He was speaking now of their own preparations, which they know contained poisons, and also of those which they know contained poisons, though they were not of their own make. He did not think they would be acting consistently unless they did this. They could not ask for a conviction against a grocer for selling under the protection of the patent medicine clause when, at the same time, they themselves were not complying with the Act, which distinctly said that such and such preparations should be labelled poison. He did not think it would make any difference to their own preparations to label them poisons. For years he had labelled most of his, and he thought most of them were in the habit of labelling chlorodyne poison. A great many of the labels he saw had got "poison" upon them, and he did not think they had anything to fear from that. This point he did not think they had any right to take into consideration at all. If they were going to ask the Council to give them the benefit of this latest decision they must themselves be just, and, as the President said, not forget to label their own preparations. Then they could go into court with clean hands and say it was just to the public that the preparations containing poison should be labelled poison, and that those which were not labelled poison were evading the Act. If they did not do that they rendered themselves liable to be attacked, not by the Society, but by the police. Of course, this was a most important point for chemists and druggists, and Mr. Carteighe was wise in urging them not to be too rash, and not to urge the Council too much, because in hoisting others they might be hit with their own petard. Therefore it behoved them to carefully weigh the probable results in the event of securing a conviction of unqualified men and compelling all proprietary medicines to be labelled poison. He did not think he was merely expressing his own opinion as to the manner in which the preparations should be labelled, when he said he never had liked the statement put on some labels, that in accordance with the provisions of the Pharmacy Act the preparations must be labelled poison, but the composition remained unaltered. That seemed to him a roundabout way of telling the public, "We are bound to label it poison, but it will not poison you." It was very much better to take a straightforward line and to label the preparations poison. Let them take their paregoric preparations. He did not find any difference in the sale of paregoric since it was labelled poison, and he repeated that he believed—it might be a whim—that it was much more straightforward and legitimate to label the thing simply poison.

Mr. G. H. Westmacott said people asked why the word poison was on some of the preparations, and then of course one had to explain it away. If everyone really acquiesced in the plan of labelling the thing would be all right; and no doubt it would be in time. He did not know whether any of them had read an article in the *British Medical Journal*, saying that the thing would work its own remedy in time, and that the Lord Mayor had taken the question up, in connection with a recent case in which someone had been poisoned by a patent medicine. The article went on to say that the subject really ought to be taken into consideration, as there were almost daily occurrences of people being poisoned by patent medicines, where things were left about broadcast in the way of young children.

The Chairman said they were all deeply indebted to Mr. Hart for taking the subject up. It was one in which they were all deeply interested, and he hoped gentlemen would give the meeting the benefit of their opinion, so that the discussion might be a profitable one.

Mr. W. Lane joined with the Chairman in expressing obligations to Mr. Hart for introducing a subject so interesting. Into the subject of taking responsibility for patent medicines which were labelled poison they would have to look very deeply. Certainly they could not take responsibility for them unless they knew what the poison was, and its percentages. Supposing the preparation contained laudanum, it should be distinctly stated that each dose, as represented on the label, contained so many minims of tincture of opium, and so on throughout the British Pharmacopœia. If they had that information they could exercise their discretion. Supposing a customer came and said, "I want a bottle of a certain medicine, but a single dose, such as is stated upon the label, does not do me any good—suppose I take double the quantity?" Well, the seller knew nothing about it, only that it contained poison, and could only advise the buyer not to take a double quantity. It would seem that there was a necessity for a board to which preparations could be submitted; whether the board should be bound in secrecy or not would have to be decided hereafter. The medicines, if they gained the approval of the board, could be launched upon the public, and the poisons they contained would have to be stated. Information should also be given as to what was a proper and what a dangerous dose. He was certainly in favour of that, but should like to see the day when all poisons and all preparations of the Pharmacopœia should be in the hands of registered chemists. That, he thought, might be brought about in due course.

Mr. A. J. Pidd pointed out that patent medicines which contained poison must have a poison label upon them, and there was no option. They had to label the bottles and had to put their name and address upon the label.

Mr. Westmacott: The proprietor would do that with a patent medicine.

The Chairman: If compelled.

Mr. Pidd continuing, said that if a patent medicine contained a poison the seller's name and address must be put upon the label. If chemists told their customers that they knew nothing about these patent medicines that contained poison they were placed in a very awkward position. Chemists stood behind their counters supposed to be entrusted with authority for dealing with poisons, whereas other shopkeepers were not supposed to be.

Mr. Westmacott pointed out that most, if not all, patent medicine dealer manufacturers put the word "poison" on their labels when the preparation contained poison.

The Chairman said the law, as they read it, was that all poisons containing poison must be labelled "poison." No exception was made of the wholesale dealer. The wholesale dealer must issue poison labels as much as the retail dealer.

Mr. Pidd asked how high the decision had gone. Had the higher court declared that any of those so called patent medicines, not issued under royal letters patent, and containing poisons, be labelled poison?

The Chairman said the Matthias case had not been carried forward to the Appeal Court. It was withdrawn.

Mr. Pidd: It has not been taken to the highest court.

The Chairman: No; I think the judgment given was regarded as satisfactory.

Mr. Pidd: Until we have the decision of the higher courts we are in the dark.

The Chairman: How can it be settled in the higher quarters now. It has been settled by a judge whose judgment has been received and accepted.

Mr. F. W. Bates asked if the public would derive any benefit if the word poison were put on the label in a very small space. The object was to save public life, and if the word poison were mixed up with a lot of other things, he did not think it would do much good.

The Chairman said he could only give his own opinion for what it was worth in answer to that question. It having been decreed that certain laws should be observed for public safety, their only duty was to see that those laws were carried out, not only by themselves but also by traders who were not chemists.

Mr. Bates: Supposing a patent medicine manufacturer puts up an article and has not labelled it poison, and I think it is poison, and I stick a big red label on it, which gets to his ears; he might sue me for libel. You cannot expect every chemist to analyse every medicine to see whether it contains poison or not.

A Member: That would be rather difficult.

The Chairman: If the Act be carried out in a proper spirit, we shall be able to get them to label their preparations poison if they be poisonous.

Mr. G. W. Pratt: I do not think it would be wise to label anybody else's preparation poison unless you knew it was so.

Mr. Bates: The public should get a clear idea of what is poison and what is not.

The Chairman said he should like to hear some other gentleman as to whether it would be advisable to prompt the Pharmaceutical Society to proceed against unqualified men for selling proprietary preparations containing poisons. That was a point they should not lose sight of in that discussion. It was very important not only that they should know their own position in the matter, but should also know the position of outsiders.

Mr. Pidd said that if he understood aright the President saw a difficulty. Chemists had the exclusive right now of selling preparations with the label poison on, and the President wanted to know whether they were prepared to acknowledge all these outsiders selling these preparations with the name poison on. He had a difficulty.

Mr. Hart: He said if it were taken to a court and we lost the day, the grocers would put these things in their window marked poison. He said there was uncertainty; we might lose the case. Then there would be great difficulty.

Mr. J. C. Husband contended that at present the clause relating to patent medicines meant nothing to anyone. His opinion was that manufacturers ought to carry out the Pharmacy Act. Preparations containing poisons in schedule 1 ought to be entirely in the hands of chemists, and ought to be signed for in the same way as other poisons. And as for the second schedule, the second part, those patent medicines containing such substances as laudanum must be labelled with the name "poison," and the name and address of the maker on it and the name and address of the seller. Grocers and other people ought not to be allowed to sell them. At the present time they had an Act of Parliament, the meaning of which nobody seemed to know; and he did not think they could do anything with the Act as it stood. He might also mention that he was very pleased to hear what Mr. Bates said. The question was being stated far too much on the side of the chemists. The safety of the public should be more considered. In these remarks he did not refer to that meeting, but to correspondence which had been going on about the matter during the last six months.

Mr. Lane: I just omitted one thing. That was in regard to Mr. Hart's definition of a patent medicine. I am strongly of opinion that it was meant to apply to all articles that bear the patent medicine stamp.

Mr. Hart: That is what I said. That is my contention.

Mr. Westmacott: I thought you referred to those under letters patent.

The Chairman: He says that is the legal rendering by this Matthias case.

Mr. Hart: I said it was given as a sop to patent medicine dealers. That was my contention.

Mr. Lane: It is well to view all these things in the right light and consider what we have to contend with. It would never do to take responsibility of medicines of which we do not know the composition.

A Member: If a man came in for a bottle of chlorodyne, which you knew contained morphia, would you refuse him?

Mr. Lane: I should certainly exercise my discretion.

Mr. Pidd: If you carry that out to its strict extent you would have to enter it in the poison book. If you are going to carry it out to its logical conclusion you must do that.

Mr. Ebenezer Yates thought that chemists took no responsibility at the present time respecting patent or proprietary medicines. They simply acted as agent for the manufacturer, whose name as well as theirs appeared upon the label. If a medicine were a poison and they should sell it now without label, they would have just the same responsibility. People came to them and paid a higher price than they paid to the grocer because they thought chemists had more knowledge of the medicine. He maintained that the responsibility was thrown upon the original seller. None of them, he thought, would retail and recommend medicines of which they did not know the composition.

The Chairman said there was evidently some difference of opinion as to what was the duty of the retailer apart from the duty of the manufacturer. He rather inclined to think that if the law was carried out to the letter, as they understood it of late, these things must be labelled poison. They were compelled to so label them, and he did not think any omission on the part of the manufacturer would exonerate them if they knew they contained poison. If they liked they might take neuraline, which they knew to be a preparation of aconite. If the manufacturers did not label it poison chemists were bound to do so by the latest reading of the law.

A Member: On the package containing the bottle.

Another Member: On the outside package which a man throws in the street.

Mr. Hart: The Act says each box and package. You cannot prevent a man taking the label off as most of them do.

The Chairman, continuing, said he was not going to exonerate himself, nor pharmacists generally, from omissions on this point, for he found that either from ignorance or negligence there was a good deal of omission in the labelling of poisons even in proprietary medicines. Take an instance which occurred only on Saturday last. A girl came to his shop to ask for Dover's powder for her father. He knew the father and supplied a 15 grains Dover powder, containing opium, and labelled it poison. At the same time he put on another label with an intimation, to which Mr. Hart rather took exception, that the preparation was labelled poison in consequence of the Pharmacy Act of 1868. There he stopped. He did not qualify beyond that. He gave the reason for labelling it poison. On Sunday morning the girl came back and said her father had not taken the Dover's powder because it was labelled poison and he was frightened. He said, "But we always label Dover's powders poison." She replied, "He has never had one labelled poison before." He thereupon asked to see the father, but the man was too ill and could not come. From those facts he concluded that if they had all followed out the law and labelled that preparation of opium poison, the misunderstanding on the part of the patient would not have arisen. That was only one instance. Another case had frequently come to his notice. A person came to the shop and asked for a packet of vermin killer or something like that. He knew them but got them to sign for it, and he was told that there was no occasion to sign for it after the first time. "When you once know me and I have signed for it that is sufficient." "Oh, no, it is not," he replied, and was met with the remark, "But it always has been. They have never asked me to sign it at other places except the first time." There was not a doubt that these were really violations of the Act, and they could not expect to compel outsiders and unqualified traders to abide by the Act until they carried out the Act themselves. With regard to the stamped medicines, which Mr. Hart kept on calling patent medicines, and patent medicine licences, they would find that the so called patent medicine licence said nothing about patent medicines. It was a stamped medicines licence. In all Acts of Parliament relating to it, it said Acts regulating the sale of stamped medicines, and yet in the reading of the 1868 Act it distinctly states patent medicines. If this Matthias case had decided that the proprietary article, the ordinary proprietary article, was not a patent medicine, it went a long way towards settling this very important question of whether outsiders could be allowed to continue to sell stamped medicines without conforming to the Act by labelling them poison and with the name and address of the seller. Of course there was a further question which Mr. Carteighe pointed to, as to whether, if the law were so strained, they should be allowed to sell with the name of the seller and the label poison. As far as he understood Mr. Carteighe, it was this, you might compel them, perhaps, to label the medicines poison, but you might not be able to stop them selling. If the selling were not stopped matters would be made worse, as there would then be two different classes selling poisons. And considering that the Pharmaceutical Society had on board as much as it could well carry until it settled the new Pharmacy Bill, it would not be well to push it in this matter. In the meantime they might, themselves, very well conform to the law as they read it, and they would, at all events, have a good case when the time came to push the Pharmaceutical Society again. There was another point perhaps worth mentioning, about the labelling of paregoric. If persons came for paregoric and other things mixed up with water, he certainly labelled the mixture poison; but if they asked him what was a poisonous dose he could explain. As regarded a proprietary article he could offer no explanation, except that he knew it was poison. What quantity of it was poison he knew nothing about. In time the public would be educated, by such means, to receiving these things with a certain amount of dubiousness, when they found that the preparations were labelled poison, but no one except the proprietor knew how much was poison and how much was safe. By conforming to the Act and labelling these things poison, they would be serving their own interests as well as contributing to the safety of the public. With regard to sale of arsenic, they were told, or rather the law said, that no arsenic should be sold in any quantity or form, except wholesale quantities, without it was coloured, and then, whether one knew the man purchasing or not, there must be a witness to the sale. He should like to know how many in their own trade had conformed to that part of the Act. He had been on two separate occasions asked for arsenic by people who had wanted it with other things, and they had objected to having it coloured, and objected to bringing a witness, because, as they had said, they had got it before by simply signing a book. One of the most flagrant cases was where a woman came in with some Fowler's solution, about 2 drachms in a bottle, and asked him if that was arsenic. It had on a label of a certain trader, headed "poison and arsenic," and then the name of this seller. He (the Chairman) told the woman it was not arsenic. She said: "I asked for a pennyworth of arsenic, and this is what they gave me." He asked her if she signed a book for it, and she answered no. He also asked her if she took any witness with her, and again the answer was no. "Who served you?" he next inquired, and the answer was, "a woman." When such things as these occurred it was time to look at home, so that the authorities might be pushed to take steps against these people. He might add that it was not a qualified trader who supplied that Fowler's solution for arsenic pure and simple. When the woman whom he had mentioned found that what she had got was not arsenic, she asked him to let her have a pennyworth of real arsenic, but she did not get it.

Mr. Pidd asked whether the licence giving permission to sell stamped medicines was issued under the Pharmacy Act or some other Act.

The Chairman said he could not say.

A short conversation followed as to what are the constituents of several stamped medicines, in the course of which—

The Chairman said if chemists and druggists would only be unanimous on this matter they could compel manufacturers to state whether the preparations were poison or not.

Mr. Westmacott asked how it would be, supposing the makers of stamped medicines were approached by some members of the Pharmaceutical Society, and asked whether it would not be beneficial to deal with chemists only in those things which contained poison and were labelled poison.

The Chairman said that one of the wholesale patent medicine houses, or proprietary medicine houses, this year set itself out for obtaining those particulars from the manufacturers, but how far they had accomplished their task he did not know. Proceeding to consider what constituted a poison, he said they all knew that laudanum was a preparation of opium, but whether a six ounce mixture containing five drops of opium was a preparation of opium was rather a delicate point. They were then selling opium in such a diluted form that nobody could come and say that it was poison.

Mr. Blackburn contended that really at the present time there was very little difference between a grocer and a chemist. A grocer who went in for that line could sell all the things a chemist could sell, except those for which the chemist did not wish to have the responsibility. A grocer could not sell prussic acid, and when a chemist sold it, and got 6*d*. for it, he would rather lose the sale and not have the responsibility.

The Chairman jocularly remarked that Mather's fly-papers and arsenical wall-papers had not yet been brought within the operation of the Act.

Mr. Hart, in replying to the discussion, said he was afraid they were a little bit wide of the original discussion. In the first place, he objected to being sat upon for using the term patent medicines. He used the term patent medicines as they found it used in the wholesale lists. Even in Mr. Lane's lists they are termed patent medicines—

The Chairman: Etcetera, I believe.

Mr. Hart, proceeding, said there was a special list for patent medicines alone. He used the term in the vulgar sense. Mr. Lane declined to accept the responsibity of these patents, not knowing what they were. He (Mr. Hart) did not want to know what they were. He did not think it would be at all to their pecuniary advantage to know the composition of these things. So long as they were satisfied that the preparations were poison that was quite enough for them. To some extent, he thought that they degraded themselves by selling things they knew nothing about. His invariable plan was tell the people they were taking the whole thing on "spec." If he had any idea of the composition of the proprietary preparation, and of most of them he had, he told it. With regard to one patent medicine, for some twenty years he had not sold a bottle, simply on the ground that he considered it extremely injurious to children. For that reason he did not think he should be justified in allowing people to take it away without saying something about it. This preparation, on analysis, had been proved to contain a grain of morphia in 8 drachms of syrup. That had been his standard, especially as regarded proprietary articles prepared for children. Children were very susceptible to the influence of opium, and he did not think chemists did their duty to the public in selling opium-charged preparations for children. One of the speakers had said that the great consideration should be the safety of the public. For 20 years that had been drummed into their ears, until they were beginning to think that public safety was a great humbug. He did not think they were doing their duty to the public. The safest policy, to secure the public safety, was that these poisonous compounds should be labelled poison and not put into the hands of men who knew nothing about them. On that ground they were justified in asking that these things should be put into the hands of men who were supposed to know something about them. One or two of the preparations which had been mentioned that night he never sold at all, and one that had been referred to two or three times never except under protest, at the same time telling the buyers the great risk they ran in using it. Some of the patent medicines he sent out with a big red poison label on them and he did not think it at all interfered with the sale of the medicine. With regard to the sale of arsenic, he was surprised to hear the remarks of Mr. Kemp. One often heard people say that they could get such and such things anywhere else, and that oneself was the only person who wanted a book signing. When these statements came to be tested it was found that there was a great deal of gammon in them, and that the people wanted to get the articles by bounce. His policy was not to sell arsenic at all if he could possibly help it. When he had sold it he had complied with the Act in every case, in respect to the witness and all. Something might be done by including in the examination list an examination as to the laws affecting the business of chemists and druggists. Many of the younger members were very ignorant of some of the laws which druggists came in contact with constantly. Another point germane to that discussion was the use of paregoric, as it affected public safety. Paregoric containing no opium was being sold all over Manchester. Some years ago he (Mr. Hart) drew the attention of Mr. Rooke, the proper officer, to this fact—that it was being sold by unregistered men and labelled devoid of opium. He pointed out to Mr. Rooke the danger. People were in the habit of giving this so-called paregoric stuff to children, and went on increasing the dose, and it was really a spirit which caused the sleep. But the people happened, on some occasions, to go to a chemist, who sold them paregoric containing laudanum, and the child woke a cherub, and they wondered how it was. As he had said, he pointed this out to Mr. Rooke, disclaimed any monetary idea, and regarded the public safety purely. But, as they always did, Mr. Rooke shrugged his shoulders and said there was no decision on the case. Now there had been several discussions up and down, and it would not be outside the duty of that Association to call the attention of the authorities to this fact. This they could do apart from any consideration of filthy lucre. They were not doing their duty in not calling the attention of the authorities to this fact, so long as there had been several convictions for the sale of the stuff. He was strongly of opinion, and he had heard nothing to shake the opinion, that it was their duty, whether they got the contemplated Act or nothing further came of it, whether they asked the support of the Pharmaceutical Society or not, for reasons of public safety, that all the medicines which were known to contain poison should be labelled poison, and that the name and address of the retailer, although they were sold under the Patent Medicine Act, should be upon them.

MEETING OF CHEMISTS AND DRUGGISTS AT HULL.

THE DRAFT PHARMACY ACT AMENDMENT BILL.

On Wednesday evening, the 26th inst., a general meeting of the chemists of Hull and district, convened by the Hull Chemists' Association, was held at the Imperial Hotel, Paragon Street, Hull, for the purpose of considering the draft Pharmacy Act Amendment Bill. There was a large attendance, among whom were Mr. Michael Carteighe (President of the Pharmaceutical Society of Great Britain), Mr. B. M. Stoakes (President of the Hull Chemists' Association), Mr. C. B. Bell (Secretary), Messrs. T. J. Smith, R. Walker, Loten, W. Fields, T. Kenny, J. S. Moulds, John Linford, A. Shaw, Geo. Hayes, E. H. Ewing, John Whitfield (Scarborough), C. L. Metcalfe, Edwin Fowler, J. S. Hollingsworth, C. H. Earle, A. W. Bromley, E. Field, J. T. Lincoln, J. S. Aikman, R. W. Hickson, A. J. Sheffield, A. Richardson, H. Gibson, C. Walker, A. T. Glover, G. N. Newton, A. P. Metcalfe, Geo. Myers, C. H. Kirton, J. E. Law, George Dyson, Alfred Dolling, J. H. Oldham, Chas. Campbell, Wm. Hay, Jas. Baynes, J. Tebb, W. Burnett, J. Ward Shaw.

Mr. B. M. Stoakes, on being elected to the chair, said that he would endeavour to occupy it to their satisfaction, and he hoped that after the proceedings that evening they would all be satisfied with what had taken place. In the first instance he would call upon Mr. Bell (the Secretary) to read the notice convening the meeting.

Mr. C. B. Bell, having read the notice, announced that Alderman Seaton, a very old chemist in the town, had asked him to inform them of his regret at being unable to be present. He then read the following communication from Howden, in the East Riding:—"We, the only representatives of the Pharmaceutical Society in Howden, cannot allow the present opportunity to pass without expressing our entire sympathy with the provisions of the Pharmacy Act Amendment Bill. Train facilities debar us from attending your meeting, but we hasten by letter to do what lays in our power to support our worthy President in his great endeavour to help us, and we feel sure clause No. 9 will be a great boon to many of us country chemists who cannot afford an assistant, and since the Wheeldon decision it seems to have become an absolute necessity that we should be legally freed from jury service. Wishing you a very successful meeting, we are yours very faithfully, Jas. G. Loan, Associate-in-Business; Robert John Latham, Associate-in-Business; R. B. Hill, Pharmaceutical Student. November 24, 1890." The Secretary added that he had also received a letter from their late President, Mr. Hammond, expressing his regret at not being able to be present.

The Chairman then said that he had great pleasure in asking them that night to give a cordial welcome to Mr. Carteighe, the President of the Pharmaceutical Society. As they were aware from the circular that had been sent out, the occasion of his visit was to explain to them the provisions of the Draft Pharmacy Act Amendment Bill, as approved by the Council of the Pharmaceutical Society. This was one of many visits Mr. Carteighe was paying the large towns in the provinces, and, he was glad to say, where he had already been he had received a most cordial welcome, and that his explanations had been more or less satisfactory. After he had addressed them upon this question, it would be open for them to make any suggestions, to move any resolutions, or to ask any question they thought advisable. He (the speaker) was sure they would agree with him that the sooner they got Mr. Carteighe at his business, the better they would be pleased. They had not come there to hear what he (the Chairman) had to say, and any remarks he had to make would come best at the end. In calling upon

Mr. Carteighe, he was sure they would give him a real Yorkshire welcome.

Mr. Carteighe, who was received with applause, first explained that he simply came before them as an expositor of the Bill, and that he wished to hear from them any expressions of opinion, the object of the Council being to find out what was the feeling of the trade with regard to the proposed legislation. The Council put before them a draft, but it was perfectly obvious that without their cordial concurrence, nay, without their active support, no Bill could pass in Parliament at any time, and especially at a time like the present when, as they knew, Irish questions appeared to absorb the whole of the time of Parliament. Any Bill dealing with the subject of pharmacy or dealing with a class was usually entrusted to private members of Parliament, and it was found necessary in practice that such Bill should have in the first instance the assent of the Government before the average member of Parliament would undertake to pilot it in the House. The theory upon which the legislation of a domestic character was carried on in the House was briefly this: that the measures which the Government did not feel important enough for it to touch itself, if they were taken up by private members, were carefully scrutinized by the Government, and if the general principles of the measures were approved, then private members of Parliament were disposed and even anxious to help to try and pass them. Now, they must remember that a private member of Parliament in the ordinary sense, or any number of them, had no particular interest in chemists and druggists. The private member represented a constituency containing chemists and druggists and a lot of other people. Some of these other people they did not always regard as their most intimate friends, as they knew, but the private member, nevertheless, represented them; consequently they had to approach in the first instance a body of men who represented the whole community, the public in its widest sense, and they had to get the support of such members in the first stage of legislation—the introduction of a Bill into Parliament. He made these remarks as preliminary to his reference to the Bill, and he was anxious to impress this upon them, that when the Council proposed that the measure should be submitted to Parliament, they had to consider what prospect there was of its being introduced as well as what prospect there was of its passing. It was an extremely easy thing to draft a Bill which would commend itself to the support of the trade, as far as the printed clauses were concerned, but he took it that even those who had least knowledge of Parliamentary affairs would agree with him that in the present day it would be extremely difficult to get Parliament to consider favourably any too sweeping measure. They would naturally say, why? Were they not educated men; were they not examined men; were they not registered, and did not they have to go through a certain course of study, after which surely it should be proper and right that they should have certain monopolies? Granted. He did not think anything could be said on the other side. There should be a *quid pro quo* for the knowledge and training every chemist and druggist had to go through. But they lived in a free trade country, where there was not a paternal government, and the feeling in both Houses of Parliament and in every Government department was to look with the most rigid care to anything that savoured of monopoly. He would remind them that the Pharmaceutical Society was just now about to enter its fiftieth year, and that until 1852 there was no Act passed at all dealing with pharmacy, that that was purely a voluntary Act, and that it took another sixteen years before the Act of 1868 was passed, an Act which restricted the title of chemists and druggists and pharmaceutical chemists and the sale and dispensing of certain poisons to certain persons, and he would remind them that that measure was the only one that passed the Legislature, and that it was passed after a great deal of fighting between the various members of the trade, between the Pharmaceutical Society on the one hand and members of the trade who did not belong to the Society on the other, and that not only was it fought outside the House, but that a select committee was appointed to consider the matter, and that as a result the committee reported that there ought to be legislation with regard to the sale of poisons. But nothing was said about—and the committee did not care anything about—pharmacy in its wider sense, and the sale of ordinary drugs, although the year was a favourable one for their purpose, inasmuch as politics were not running very high. Notwithstanding the favourable opportunity they had at that time they were unable to do more than obtain a Poisons Bill. He was bound to say that a large part of that result he thought was due to what he considered was the shortsightedness of a large number of their brethren in the trade, who opposed them at that time and thought restriction as to the sale of poisons was sufficient, but he did not wish to refer to that any further. Whether the Pharmaceutical Society was right or wrong the facts were broadly that in 1868 the present Act of Parliament under which they worked was passed and that in itself was a very incomplete Act. They knew that all the chemists and druggists who were then in business were registered free of cost to themselves by the Pharmaceutical Society. They knew that the Pharmaceutical Society handed over the whole of its invested capital of the Benevolent Fund for the benefit of every chemist and druggist in the trade, and his widow and orphans, without reference to his being connected with the Society. Those things were evidences—and should be remembered—of a generous disposition towards everyone engaged in the trade. Every chemist and druggist would not have been unwilling to pay a modest fee for registration, and he thought it was generous for the Society to hand over the fund subscribed by its members—some £12,000 or £14,000—not for the benefit of its own members, but for the benefit of the whole trade. Up to that time it was said the Pharmaceutical Society had very lofty notions, and that its desire to push forward its own views was not always best suited for the then existing state of trade. The same observation was made now, but what he wished them to remember was this, that if there was to be any legislation at all, it could only come in one way. Now as this legislation on the subject of pharmacy must go through the Pharmaceutical Society and be initiated by it, because it was the recognized body for that purpose—recognized by the State, recognized by the Government and recognized by the law—it was a question whether at that particular moment it was wise for the trade to support the Council of the Pharmaceutical Society in a modest measure, or whether they should put off a modest measure, wait for a time, and then go in for something stronger and more far-reaching. Whether they would succeed in one case or whether they would succeed in the other depended upon the force engaged upon them, but his chief object was to point out that although the measure did not propose to remedy many of the grievances under which they suffered, still he thought it was a measure which had in it the means whereby in the future they might accomplish very much bigger things. And he wanted further to remind them that they had never been able to go to Parliament with the support of the whole trade, and he wished them to understand that now they wanted to go to Parliament with the support of the whole trade. As President of the Pharmaceutical Society he was twitted by some people, who said, "Why do you not stop the companies and we will all join you." His answer was, "I want you to join me first before I am strong enough to do it." He wanted everybody in the trade to back up his Council. If these bogies which they recognized as being unfair competitors—not to use a stronger term—had to be dealt with, they could not be dealt with by the Pharmaceutical Society unless every individual member of the trade was up and active and enrolled himself either with the Pharmaceutical Society or gave it his most cordial support ungrudgingly. The demand was a big one and could only be fought by the whole of the trade being united. He did not go there as a representative of the Pharmaceutical Society to send round the hat and ask for subscriptions, but he wanted their individual support; he wanted them to elect officers called a Council, and a leader called a President, and he wanted them to be organized throughout the country, so that at election times and other times the chemists and druggists might have their fair influence in the electoral campaign. The Bill was a modest Bill, and if they asked why it was a modest Bill he might say it was because they had to present a Bill which would be approved by the Government and the department of the Privy Council. They had to persuade members of Parliament that the Bill was in the interests of the public. If it were also indirectly or even directly to the interest of chemists at the same time they would not object, but they must have it proved to them that this Bill was essential for the public good before they would consent to introduce it into Parliament. The Pharmaceutical Society was not a Parliament, but it was simply a suppliant at the doors of the House of Commons, and without the power he referred to it could only go on in a modest way. Mr. Carteighe then went on at length to describe the Bill, and after dealing with the educational and examination clauses, referred to clause 7, which, he observed, might be described as the trade clause. It proposed to restrict the dispensing of medicinal prescriptions to chemists and druggists, and gave certain exceptions. He meant to say certain persons were not interfered with, just as in the same way certain persons were exempted from the provisions of the Act of 1868. Some might say that there was not very much in that, and "what is the good of that, we have it already." They must pardon him for saying that that was not so. In law they were only licensed to sell and dispense poisons, and they were not in the position of being able even to ask a medical man or to coerce him to give up his dispensing, for the medical man was in the position of being able to say, "the law has not recognized you as dispensers of medical prescriptions." They might say, "That is all very well, there is a good deal of sentiment in it, for in practice we have got that." He would point out, however, that in looking after the Act and infringements thereof, they found a number of people went in for shops that might be called anything they liked. The keepers of such shops did not use the title "chemist and druggist" or "pharmaceutical chemist;" they did not in fact break the law. But they had a chemist and druggist's shop; they had the blue bottles and sold everything that the ordinary chemist and druggist did, even most medical compounds, except poisons. They found it very difficult to deal with these people. He had before him now a case where a most brilliant shop in a large town was actually kept by a man of that sort, and next door, too, to a most accomplished pharmaceutical chemist. People in that town looked upon the man as a keeper of a chemist's shop; prescriptions were taken there, and if they contained poison, he quietly said poisons were not good to take, he would dispense the prescription and leave out the poison. If this went on now, he would leave them to judge what some of those people who could not pass the examinations he referred to were likely to do in the future. He thought it wise, therefore, to ask Parliament to give them the monopoly of selling and dispensing medical prescriptions. If they were successful in getting Parliament to adopt this proposition—and he knew the Government would accept it—he thought they might push it, that when the second reading was passed and the Bill was in committee, they might push on the general principle that inasmuch as Parliament had said that they ought to be educated and examined on the one hand, and that on the other they should be the proper persons to dispense the prescriptions of the British Pharmacopœia, then it followed that the sale of compounded medicines ought to be restricted to chemists and druggists. They would, therefore, admit that there was a certain amount of reason in some of their madness—reason for which they were not always given credit. They had found from long experience that they could go to Parliament better with a polite tap at the door of the House of Commons, increasing their demands as they went along, rather than going with a batter of requests, for then the door was banged in their faces, and they did not get anything at all. Mr. Carteighe then referred to the jury and penalty clauses of the Bill, and with respect to the latter said he was bound to admit there was a good deal of force in the argument that the penalties should be increased for the second and third offences, although the spirit of the English law with respect to penalties was that the penalty inflicted on a man was not the measure of the offence, but an indication that he had transgressed the law. In a very large town in the Midlands they had succeeded in crushing two or three bogus companies under one of the sections of the Act by going in for five penalties at one time. They could not always do that, but where they could he thought the Council would be disposed to meet the objections that had been raised in that way. They thought it perhaps reasonable that the penalty for a second offence should be £10, and for a third £20, or something like that. Now, they would probably ask him about these bogus companies and corporations. It was no use beating about the bush, for he knew they would ask whether they had not the courage to take this subject up in the Bill. The answer was that they were not strong enough in their present position to take it up, and if it was to be taken up the Council thought it should be attacked in committee and then put into the Bill. If it was put into the Bill at first, members of Parliament might make an excuse for not taking up the Bill by saying, "You want to raise the price of drugs; take it out and then we will entertain it." But if gentlemen throughout the country, those connected with the Pharmaceutical Society and those who were not, would rouse themselves and interest themselves there might be some chance that they might induce Parliament, when the Bill had passed the second reading, to deal with these bogus companies. He knew he had their sympathy in saying broadly that they did not claim to interfere with the great associations that were true co-operative societies. What they objected to, of course, was the terrible thing that when a grocer sold poisons and the Pharmaceutical Society came down upon him, it was found that he quietly took his relatives into a kind of co-partnership, paid a small registration fee at Somerset House, and then defied them. That was undoubtedly one of the most difficult things they had to face, and unfortunately it was difficult because in their own Act of Parliament, as he had said elsewhere, they had provided that in the case of decease of a registered person, his business might be carried on by his widow or in trust by a qualified person. That clause of their Bill had been laid hold of by judges, by the press, and by those men who had the influencing of opinion, who said it was evidence that the safety of the public was sufficiently taken care of if in the case of a company the man who dispensed and sold poisons was himself qualified. It was difficult to persuade laymen that there was any difference between a company keeping open shop for the dispensing and sale of poisons by means of a pharmaceutical chemist or a chemist and druggist, and the carrying on of a business for a widow by means of a qualified chemist and druggist. His opinion was that there was a difference, but the contrary was talked about and whispered into his ear whenever the Pharmaceutical Society moved with regard to legislation. This difficulty could only be met by a combination of the whole trade, and moreover by such an organization of the whole trade as they had never dreamt of previously in the drug trade. They would have to use their powers with their members of Parliament, putting politics on one side altogether, and going for one thing if they were to get it. Nothing short of this would achieve what they were aiming at. Whether the trade would respond to this suggestion at the next general election, or at any other time, he did not know, but his experience and what had passed induced him to think that the majority of the members of the trade would come to the conclusion that there was reason for the course the Council was pursuing in not touching the companies at the present time. If they attacked them and make the Bill exactly as they wanted it, Parliament might make the position of these companies in the future more disastrous for the chemists and druggists than in the past. The whole tendency of Parliament, as they knew, was in favour of the spirit of co-operation. Company mongering went on right through Parliament. Almost every member of Parliament was a shareholder or a director of some sort of company, and the manner in which trades of the smallest kind, not only chemists and druggists' but small shops of every kind, were being carried on as companies throughout the country was simply astounding. The interest of members of the House of Commons, and members of the House of Lords, in these things was so considerable, and the prejudice in favour of what was called co-operation, for cheapness, was so great that, as he said before, nothing short of the power of having the whole of the drug trade at the back of the future President of the Pharmaceutical Society would be potent enough to cope with it. In conclusion, Mr. Carteighe reminded his audience that all former pharmacy legislation had been of a piecemeal kind, and that it was not always the soundest policy to reject half a loaf because they could not get the whole. Before they decided not to support the measure, he implored them to reflect on the consequences, bearing in mind that if they declined piecemeal legislation, legislation on this subject must in all probability be postponed for many years. He thanked them for doing him the honour of listening to him, and asked for the privilege of replying later on if there was any necessity.

The Chairman said that after having heard the exceedingly lucid and eloquent address from Mr. Carteighe he wished them to understand that he had come to Hull almost entirely for the purpose of hearing what their opinions were on the Bill, what suggestions they had to make and what questions they had to ask. There was no intention or any wish to burk discussion. What they said or what questions they had to ask would be reported in the trade journals, and beyond that no further. It was no use letting that occasion pass, and then when Mr. Carteighe had left, and was not able to answer any objections, to rise up against him and vote him down, supposing there was opposition raised to the Bill. Mr. Carteighe wished them to state any objections they might have and ask any questions.

Mr. John Whitfield (Scarborough) thought there were two sides to most questions, and he thought that great credit was due to Mr. Carteighe that he was stumping it and very much advancing the interests of the Society and them as chemists and druggists. He had been very much interested in one question. He saw in the Bill which was drafted that they would have the sole power of dispensing prescriptions unless the individual who was not registered was under direct supervision. As all legislation would be guided by the public good he thought they should act in the public interest and at the same time not forget their own. In his town a great part of the dispensing was done by incompetent and unqualified people. He did not allude to the druggists themselves, but to the hospitals and unregistered men and surgeons. He could mention two or three who had the large bulk of the dispensing, and who were thoroughly and entirely unqualified and incompetent. The majority of them were or had been errand boys who had been elevated to the position. In a local hospital they had a man—a very worthy man personally—who was voted on to the staff because it was thought he would be useful in cases of minor accidents from his experience in the army. He found this man to have had no training. He, being on the board of management of the hospital in question, had been asked to keep an eye on him. One day this man had a tincture to make, and he made it with rectified spirit because he had no proof. On another occasion he made his solution of bicarbonate of soda 1 in 4. The doctor wrote "ambo" on a prescription and he looked all over the surgery and could not find it. Here was a man who according to the report in the newspapers dispensed 2000 prescriptions during the month. In the interests of the public he (the speaker) should like that question to have ventilation and thought.

Mr. Linford said none of them could doubt Mr. Carteighe's great experience amongst members of Parliament and the procedure of the House of Commons and so on, and therefore it would be absolutely impossible and suicidal to attempt to ram a company's clause down the throats of the members of Parliament. The wise way would be to accept the Bill, and then after the second reading, as Mr. Carteighe had said, endeavour in committee to bring into it a clause which should not only confine the making up of medical prescriptions to chemists and druggists, but the preparation and sale of Pharmacopœia compounds. It would be a very good thing if they could confine the sale of those preparations to those who understood how to make them and understood what they were when they were made. He thought there were a good many in that room who had seen that little book of Procter's, by using which everyone could test his preparations without any more appliances than were used behind the dispensing counter. If that were a regular custom it would give the chemists a right to say, "The grocers cannot do this. The grocers do not know what they are selling, and we do know what we are selling, and they ought not to undersell us with what very often is rubbish." That matter would be very much better introduced in committee of the House than to put it into the Bill at first, and he thought they could not do better than adopt the Bill as it stood, with a request that if the Council could by evidence or otherwise get the other clause introduced into it, so much the better. He then moved:—

> "That this meeting of pharmaceutical and registered chemists and druggists residing in Hull and district, having duly considered the various clauses of the proposed Pharmacy Act Amendment Bill, is of opinion that it is deserving of the support of the entire trade, and hereby pledges itself to do its utmost to secure the passing of the Bill in the next session of Parliament."

Mr. Hayles had very great pleasure in seconding the resolution. Before coming to the meeting he was not quite so much in favour of the Bill as he was after the lucid and eloquent description of it given by Mr. Carteighe. He could see now that the Pharmaceutical Society was prepared to go somewhat further than it appeared at the commencement of the discussion, when the Bill was first drafted, and although they must all admit that the draft Pharmacy Bill did not contain all that they wanted, he thought they should be thankful if they got what it did contain with the promise and assurance from the President that if the Council could see the least possible chance of introducing more it would not fail to do so. The best way those present could help the Council and thank the President for the trouble he had taken would be to do their utmost, and personally see the borough members. Many of the chemists of Hull had considerable interest with the borough members, and if they could approach those gentlemen either by deputation or letter, or by a personal interview. He was sure they would not fail to help them in this matter.

In reply to Mr. Sheffield, Mr. Carteighe said he should regard paregoric as a compounded preparation of the Pharmacopœia.

Mr. Moulds said he believed medical men were prepared to support them in limiting the selling of medicines by grocers to the simpler preparations.

Mr. Ward Shaw asked what length of time was proposed to be taken by the curriculum.

Mr. Carteighe: We thought five or six months, or something like that. Our desire would be rather to encourage taking it gradually during apprenticeship, and not to pile it on all at once, as it is now.

Mr. Walker said perhaps Mr. Carteighe would be able to tell how far the influence of chemists and druggists' associations throughout the country would bear when they were in committee—whether they would have any influence then.

Mr. Priestley said one of the ideas of the Bill was to keep out a few men, but he did not see how it would do that, because by increasing the difficulty of examinations by increasing the fees and all that, they would have far more unqualified men in the business than they had now. He thought the better plan would be to have a Preliminary examination, and make it compulsory to pass that at a certain age—say seventeen or eighteen—and not after that time. One great point would be that if a young fellow could not pass his Preliminary examination during the first year or so of his apprenticeship, or during the first few months, he could be sent out of the trade altogether, and go to some other situation. If they could make the Preliminary examination far stiffer than it was now, they would be able to keep more people out of the trade than at present.

Mr. Lincoln said he quite agreed with the Bill. He thought it was a wise plan to get a little if they could not obtain all they wanted. They certainly all agreed that there was not so much in the Bill as they could desire. Most of them knew the inconvenience they had suffered through competing companies, and they saw very little advantage for the trouble they had had to put up with in order to qualify. There did not seem to be any diminution in the number coming into the trade at present, but if anything could be done in the Preliminary examination it would be an advantage.

Mr. Flowerdew suggested whether it would not be advisable for a youth to pass an examination before coming into the business.

Councillor Loten said he had carefully listened to the explanation of the Bill, and he did not think there was anything in it but what nearly every chemist present would be satisfied with. It did not go so far as they would have liked, and they would want something stronger before they could bring back the good old times he remembered thirty years ago or more. He did not exactly agree with what had been said about the Preliminary examinations. He thought the present examinations were sufficient, and that if they could be scattered over the period of apprenticeship, as shadowed forth in the Bill, it would be of the greatest possible assistance. That was the principal thing that pleased him in the Bill. Taking the Bill as a whole it was a step in the right direction, and one that should be heartily supported by every chemist in the town.

Mr. Tebb thought they would have been better so far without legislation for the trade, as it had done more harm than good, and they would have been better with free trade in their craft. Seeing the position they were in, however, and that they had to pass an examination and could not get out of it, they would do better with half a loaf than no bread. On that ground he supported the resolution. With respect to what had been said about the grocers, he would like to know if something could not be done with regard to those people who supplied the grocers. He believed these persons were members of their craft, and his opinion was that they should be branded as black sheep.

Mr. Stanning said he quite agreed with the objects of the Bill.

The Chairman said there was one remark Mr. Carteighe had made with reference to the second clause in the Bill, the curriculum clause, as it was termed, in saying that it proposed to divide the examinations into two parts. If he (the speaker) understood him correctly it was suggested to take one part during apprenticeship.

Mr. Carteighe: Yes, in addition to the Preliminary.

The Chairman proceeding said, did they also understand that it would be necessary then for the apprentice to attend a school say for half the term during his apprenticeship, or would he be allowed to pass the portion of his examination, assuming he had gained the knowledge during the time of his apprenticeship, or would he be expected to go to London, or one of the recognized provincial schools, say for two or three months before he could go in for his examination.

Mr. Carteighe: No.

The Chairman said that would remove some cause of uneasiness from their minds, because it would be inconvenient to take an apprentice away from his master to allow him to study in London. That would have been his principal objection to the Bill, assuming such had been the case. He agreed with Mr. Carteighe that half a loaf was better than none at all. They would all have liked to see something more drastic—something more in their favour—but, as the President of the Pharmaceutical Society had told them, it was utterly useless to go to Parliament with such a Bill. No member would take it up, for the simple reason that he would not be listened to in the House. The Bill would be rejected, and it would be a waste of their time and the time of the Pharmaceutical Society as well. There were solid advantages to be gained if the Bill were to pass, and he hoped in such an event none of the clauses would be eliminated. With regard to clause 7 he had seen remarks from people in the trade journals to the effect that it ought to be made more sweeping, that it ought to go further, but he did not think that would be the slightest use. As Mr. Carteighe had told them, if they were to take such a Bill to any private member he would not listen to it, and the Government would not take it up, because it would be striking at the stores, which he believed he was correct in saying were principally supported by members of Parliament, and they could scarcely expect them to shut up their own shop. That being the case he thought the Council had acted very wisely in keeping the companies out of the Bill. If they could get what was mentioned in the seventh clause he thought it would reach much further than some of them saw at present. It would, he believed, not only affect the medical men's prescriptions, but it would also prevent pirates from compounding private recipes as well. He might be mistaken in that, but that was the impression he gained from the Bill. Then with regard to the penalties, he thought they had received an amount of information which very few of them possessed before. His impression had always been that these penalties were inflicted for the purpose of stopping offences, but if they were to believe Mr. Carteighe it was not so; and judging from the results of some cases which had been brought forward by the Pharmaceutical Society, it would appear that it was a paying concern to a great many. However, the President had intimated that it was just possible the Council might be able to be rather more severe than it had been, and he hoped that it would be the case.

Mr. C. B. Bell said it was not his intention to have said anything on the Bill, but there was one thing that struck him, and he thought they were in duty bound not to lose sight of it, for it was a matter that seriously affected the chemists and druggists. He thought that every gentleman present would cordially support the clause exempting chemists from service on juries. They had all heard complaints on this matter, and if the Pharmaceutical Society were able to obtain that exemption it would be a great blessing to the trade. He thought they would also be pleased with the manner in which the Society proposed to deal with regard to the election of the Council, and that was another strong reason why chemists throughout the country should support the Bill. Mr. Bell concluded by reading the following from a letter from Mr. Hammond, the late President of the Society, who was fully in accord with their views, but who, owing to illness, was unable to present:—"With regard to the purpose of his visit, the discussion of the Pharmacy Act Amendment Bill, I quite agree with the Bill so far as it goes, especially clause 7, but consider another clause ought to be to prevent so many companies being formed under the title of drug stores. You have only to note a report in last week's *Chemist and Druggist* in which a company was registered, and not one of the promoters a chemist. I for one think if the widows' clause in our present Act, if it prevents us making a bold front to the enemy, should be altered."

Mr. Carteighe, in replying to the discussion, said he was not there to influence the resolution which had been moved; he was there in the capacity of an expositor. But what he did want was their opinion, and he begged everybody to give the Council of the Pharmaceutical Society either a direct and straightforward "yes" or a direct and straightforward "no;" and then they would know where they were. What they had to deal with was the apathy and indifference, and combined with that apathy and indifference a certain secret form of grumbling, which quickly got to a member of Parliament in the lobby of the House of Commons, without any opinion to back it. He submitted that form of opposition was an insidious form—it was not British, and it was bad for the man who indulged in it, because he prevented the trade being benefited. He wished to thank them for the kindness with which they had criticized the measure, and he felt they had understood the spirit in which it was brought before them—that they had looked at it from a business point of view—and were prepared to say what he wanted them to say, that in going into Parliament they might have some few things up their sleeve that those present did not know of, and they would consider him a great fool if he was to go stumping about the country telling them all the little things he and his colleagues were hoping and dreaming for. For although theirs were trade meetings, they were reported widely, and practically there was no secret which the enemy could not find out. Therefore, he held it was necessary for them to be circumspect. The Pharmaceutical Society had asked to be trusted, and their object was to prevent those who were not interested with them to checkmate them before they got into the House of Commons. In force of organized opposition, they must approach Parliament with the same care that a skilful general would approach a citadel. There was not very much in the discussion for him to answer. Mr. Whitfield had referred to clause 7, and no doubt wanted to raise the question of the danger to the public from bad dispensing in dispensaries and hospitals. He (the speaker) agreed with Mr. Whitfield most cordially, but he must remind that gentleman that they must make their own ground secure before they begun to throw stones in the grounds of other people. The medical practitioner was licensed in law to compound medicines; he did not sell them, and until they got the same rights as he had it would be unwise to fight him. They (the medical practitioners) had a perfect organization, which could not be said of the drug trade, 16,000 strong, and he did not think they could touch them at present, but when the druggists and chemists were licensed in law to dispense and compound prescriptions they might do something in that direction. But they must proceed gradually, because they could not afford to begin the campaign by quarrelling with 16,000 medical men. With regard to hospitals he was surprised his friend Mr. Whitfield did not sit upon his colleagues and induce them to appoint registered persons by pointing out the danger they were running in not so appointing. Probably a letter to one of the local papers would meet the case, though he found, he was happy to say, an increasing tendency on the part of public bodies not to allow dispensing at public institutions except by registered persons. But it was not for those who kept shops to lay down the law for people who dispensed medicines to the poor. It was for Government or the legislature. If Parliament chose itself to amend in that direction, all right, but it was not for them to propose a clause. It might, however, be some consolation to Mr. Whitfield that within the last month he had received an official communication from the Government that even the prisoners were going to have their medicine dispensed by registered men. Given a powerful Pharmaceutical Society—powerful in numbers and supported by the trade at large—its effect upon public opinion, upon the directors of all these institutions, and upon the Government would be quite sufficient, without any Act of Parliament, to get all they wanted. With regard to dispensing in surgeries, as distinct from hospitals, he believed that if they were unanimous and a little forbearing when they got the same privilege with regard to dispensing as the medical man had—he might be utopian—they might in another ten, or fifteen, or twenty years educate the public to see that it was to their interest to say that a doctor should prescribe and the chemist should dispense. He thought that would be got by a process of give and take between the two branches of the profession.

In reply to Mr. Walker, Mr. Carteighe expressed the hope that the Society would be well supported when the Bill was before Parliament by chemists throughout the country through their Members of Parliament, and pointed to what was done last year with regard to the action of the Government with reference to the sale of methylated spirit. Mr. Priestley had suggested that the Preliminary examination should be made more difficult and passed at the age of eighteen. There was something in favour of increasing the difficulty of examination, but the great thing was to get the Preliminary passed earlier than now. What they wanted was that the Preliminary should be the representation of a fairly good school education, and if they could get a lad of sixteen or seventeen to pass the present examination they would do fairly well, and they would not do much better if they increased the difficulty of the examination and made it passable at a later period. Mr. Carteighe then dealt with the question of the election to the Council, and maintained that the proposal of the Bill was a fair one.

Mr. H. S. King, M.P. for Central Hull, entered the room at this point and was received with cheers.

Mr. Carteighe then concluded his remarks by referring to his friendship with Mr. King, alluding to Mr. King's qualifications, and observing that that gentleman would no doubt agree with them in their decision with respect to the manner in which the Bill should be brought before the House of Commons.

Mr. Geddes asked whether, if a master were willing and able to teach his apprentice sufficient to pass the final examination, it would be absolutely necessary for him to attend classes at college or school.

Mr. Carteighe answered in the affirmative, pointing out that the majority had to be considered, and that there were other advantages in the course proposed to be adopted in the Bill, such as the association of students.

The motion was carried unanimously.

Mr. J. Baynes (Borough Analyst) moved a hearty vote of thanks to Mr. Carteighe for his eloquent speech, and observed as the public analyst of the borough, and the holder of other appointments under the Food and Drugs Act, he could not remember in all his career that he had had a wrong sample from a registered chemist and druggist.

Mr. Oldham seconded the motion, which was supported by

Mr. H. S. King, M.P., who said he saw a good deal more of the law in the making than in incubation. He was not able to express an opinion on the Bill before that meeting, but he should be quite willing to take the voice of the Hull chemists on almost any topic, because they were a sound and intelligent body of men. He had great pleasure in supporting the vote of thanks.

The proposition was carried, and votes of thanks to the Chairman and Secretary concluded the meeting.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held on Thursday evening, the 20th inst., Mr. Edwards, President, in the chair. There was a small attendance, consisting chiefly of juniors. A debate was held on the question "Ought the seller of poisons to possess the Minor qualification?" the affirmative side being taken by Mr. William Mair and the negative by Mr. Robert M. Lindsay, Secretary of the Association.

Mr. Mair, in opening the debate, said that the question which had been set for him to answer that evening appeared to him to scarcely require discussing. The law on the subject was perfectly clear and the recent judicial decisions had been so decided that it was useless to attempt to advocate any other opinion. He remarked that a great deal of ignorance existed with regard to the Poisons Act, "ignorance of a law which it is a man's business to know being no excuse for its violation." He took up the subject of the sale of poisons in the broader sense of the "selling, dispensing, and compounding" of the scheduled poisons, which had been singled out from the category of drugs as being those for which it was considered absolutely necessary that those to whom the handling of them was entrusted should be trained and in every way competent. He showed that the pages of every prescription book contained a considerable percentage of such potent drugs as morphine, chloral, hydrocyanic acid and the like which called for the highest skill in dispensing them. He reminded them that the law was passed by the public in their own interest and that the administration of it was simply entrusted to the Pharmaceutical Society, and in proceeding to explain in detail the clauses of the Pharmacy Act, 1868, which dealt more particularly with the question it was shown in reference to the exemption of dealings by wholesale that a wholesale transaction is "the sale of any article to any person who is to sell it over again or to sell the products or use it for technical purposes." Thus a "photographic chemist," for instance, might sell scheduled poisons with impunity to a professional photographer who was to sell photographs as the completed products; but he was not at liberty to deal in the same way with an amateur who was not supposed to sell his products or to depend on the sale of them. Similarly it was perfectly possible for a pennyworth of oxalic acid to be a wholesale transaction if required by an analyst who intended to sell his report. Among other points it was proved that registration was the only indication of qualification which could be recognized, and that on the whole the examination could generally be taken as a fair test of competency. In conclusion it was urged that it was perfectly possible to support what appeared to him to be the only possible view of the case, even although the majority of them were, at present, unqualified. The result would be that the status of the trade would be raised and they would be free to put down much of the illegal trading in drugs which was carried on to a large extent outside the craft.

Mr. Lindsay, in his arguments, adhered chiefly to the contention that it was absurdly unfair to interfere with a body of men who were in every way competent to carry on their business, remarking that it would be equally absurd for an army to proceed against an enemy which had proved itself in no way obnoxious. He held that if such a measure were to become law equally stringent proceedings should be taken against painters, who sold poisons to the public with impunity, sellers of matches and such like poisonous commodities, publicans and others. He saw no cogent reason why such a measure should be enforced against chemists' assistants, and deplored the unfairness which would result to any apprentice left in charge, who might be asked for a pennyworth of laudanum. Mr. Lindsay vindicated the position of the unqualified seller on the ground that it made no difference to the public whether they were served by qualified or unqualified hands. He was of opinion that the wants of British pharmacy had not increased in any corresponding degree to the requirements which were exacted of those connected with it, and he thought that the pharmacist of fifty years ago was better qualified and more successful than many of those of to-day, adding that considering the laxity of the poison laws as they existed then it was a wonder the English were still a nation.

The President spoke in favour of the unqualified side of the question, remarking that there were many men who possessed the Minor qualification whose abilities were not to be depended upon.

Mr. John Forsyth, ex-President, followed with a few remarks in favour of the affirmative, adding that those who had allowed their opportunities to slip and were still unqualified had themselves to blame.

Several other members expressed the opinion that one of the chief difficulties lay in providing such emoluments as qualified assistants were entitled to, from which it was contended many principals would shrink.

The openers of the debate having replied, a division was taken, when four voted for the affirmative, and fifteen, including several visitors, voted for the negative. The meeting could not be said, however, to be a fairly representative one.

A vote of thanks to the Chairman concluded the proceedings.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

Under the chairmanship of the President the usual meeting was held on Wednesday evening, the 19th inst.

Mr. Geo. Robertson read a short paper on "Spiritus Ætheris Nitrosi." He noticed the antiquity of its use in medicine; the various methods employed at various times in its preparation, comparing particularly the methods of the P.L. and B.P., somewhat to the disadvantage of the latter; its varying composition; the constituents to which it is supposed to owe its therapeutic value. The essayist then went on to impress on his hearers the necessity, after having got the article in a proper state and by the best methods, of storing it in such a way as to preserve it in a state of efficiency. Instead of keeping it like hair oil or glycerine in partially filled bottles in a strong light on the shop shelf it should be kept in full, well stoppered bottles away from the light. Instances were given of the effect of circumstances on different parts of the same sample, and this led to the essayist passing in review the several methods of testing, some of which he illustrated. The apparatus of Slinn and Stubbins figured and described in the Journal ([3], xx., 181) was shown in operation. The essayist had used a modification of this apparatus consisting of the graduated tube only the open end of which he immersed in a tumbler of water, but otherwise used as directed by Slinn and Stubbins. This modification, he said, gave results slightly favourable to the spirit tested, but sufficiently correct to be a warning should the sample have deteriorated below the requirements of the B.P.

A short conversation followed in which Mr. Lang suggested that the B.P. standard should be lowered in view of the almost impossibility of keeping a spirit of the required strength.

Mr. Gilmour recommended Proctor's colour test as the most simple.

Mr. W. L. Currie advised the substitution of the London spirit for that of the B.P., on account of its greater stability; and the President, after commending the essay as interesting and practical, asked for a cordial vote of thanks to the essayist.

This was readily accorded and the meeting closed.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the second session of this association was held in Lockhart's Café, St. Nicholas Square, on Wednesday evening, November 19, at a quarter past 8 o'clock, Mr. F. Park, President, in the chair. There was a large attendance. The minutes of previous meeting having been read and adopted, the President called on Mr. Geo. F. Merson to read a paper on, and give a practical demonstration of, the methods of estimating specific gravities.

Upon the motion of the Chairman, seconded by Mr. George Weddell, a hearty vote of thanks was accorded Mr. Merson for his paper, Mr. Weddell emphasizing the value of such practical demonstrations, and their value in aid of the acquirement of such subjects.

Obituary.

Notice has been received of the death of the following:

On the 18th of October, Mr. Joseph Longbotham, Chemist and Druggist, Sacriston, Durham. Aged 76 years.

On the 22nd of October, Mr. Ralph Calvert, Chemist and Druggist, Newgate Street, Bishop Auckland. Aged 46 years.

On the 1st of November, Mr. Henry Barker Travis, Brightside Lane, Sheffield. Aged 66 years.

On the 7th of November, Mr. Thomas Willis Smart, Chemist and Druggist, Friar Street, Reading. Aged 25 years. Mr. Smart was an Associate of the Pharmaceutical Society.

On the 12th of November, Mr. Eldred Faull, Chemist and Druggist, High Street, Beeston, Notts. Aged 54 years.

On the 12th of November, Mr. Rees Thomas, Pharmaceutical Chemist, High Street, Merthyr Tydvil. Aged 63 years. Mr. Thomas had been a member of the Pharmaceutical Society since 1865.

On the 20th of November, at Yarmouth, Mr. Matthew Bayfield Brereton, Chemist and Druggist, Broadway, Hammersmith. Aged 49 years.

Correspondence.

PHARMACY ACT AMENDMENT BILL.

Sir,—On reading Mr. Pratt's letter I would just like to add "Them's my sentiments." In spite of our President's eloquence I cannot see any reason why a "company clause" should not be inserted. I feel I would rather for the whole Bill to be wrecked than not have that.

The "widows' clause" could be limited to twelve months, but rather than push the sale of a business to the detriment of a deceased chemist's estate, the executors should be allowed to petition the Council for an extension of time, say six months, and if really needful a second six months might be granted.

My experience has been that businesses conducted by a widow and a qualified manager gradually dwindle away. Hence this would be no real hardship, but better for an estate to sell as soon as possible. SOUTH DEVON.

Sir,—Allow me a line in reply to "Locust" in the Journal, November 15. He would be quite right in all he says had the Council understood and administered the Act from 1868 onward, as it now seeks to administer it; assistants would then have known how they stood.

What I say is that branch managers and others, by no action being taken by the Society for all these twenty-two years, did not consider they were acting unlawfully in selling and dispensing on behalf of a qualified principal; and what is more the past attempts of the Council to get new Acts go to show that it did not think so either. Hence, as I said before, it would be unjust (when many are middle aged) to say they must cease or begin now the work of a student for Preliminary examination.

In view of the changes contemplated under the new Bill they are entitled to some consideration, as were those who were in business on own account before the passing of the 1868 Act. ROBT. MCADAM.

H. Helbing.—We fail to see any distinction or difference between what you are reported to have said and what you write to say that you meant. The question as to the substance to which the term "paracresotic acid" has been applied appears to be open to some doubt.

H. W. Harris.—*Medicago orbicularis.*

J. L. Hallawell.—Information as to the positions and rate of pay of Naval Dispensers will be found in the Society's Calendar.

South Devon.—Your letter has been handed to the Secretary.

W. A.—We cannot furnish you with the name.

W. J. Thomas.—The second title mentioned by you does not occur in the B.P. Æther purus must be $(C_2H_5O)_2O$, free from alcohol and water. Æther, B.P., must contain not less than 92 per cent. by volume of æther purus.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Denham, Woods, Seccombe, Thompson, Aston, Yorkshireman, J. F. L.

LEAVES OF STRYCHNOS NUX-VOMICA.

BY DAVID HOOPER.

The leaves of the nux-vomica plant are little used in Indian medicine, as the seeds, on account of their abundance and the facility of collection, are the best known of its products. The bark, wood, and roots of this and other species of *Strychnos* are occasionally administered as tonics and febrifuges. The leaves are made into a decoction and applied externally in paralysis and in rheumatic swellings of the joints. The juice of the leaves has been given for the relief of headaches. They have also been known to make very effectual leaf-poultices for tumors and sprains; in fact in India leaf-poultices are made from very numerous and widely distributed plants.

The poisonous nature of the leaves has never to my knowledge been investigated, but being informed of some suspected cases of poisoning of animals from their use as fodder, I considered this a sufficient reason for prosecuting an inquiry into the subject. Mr. J. Cameron, F.L.S., Bangalore, about a month ago asked if fresh nux-vomica was known to be poisonous, informing me at the same time that a gentleman residing near him had lost three horses from, it was supposed, their eating the leaves of the tree. Another case was that of a cow dying under suspicious circumstances, and nux-vomica trees were growing in the compound where she was in the habit of grazing. "The cow had convulsions, bled at the mouth and nostrils, and only lived for a short time from the commencement of the attack." Mr. J. F. Duthie has drawn up a list of Indian fodder-yielding trees, shrubs and herbs, including certain bitter leaves and branches of the Simarubeæ and Meliaceæ, but no mention is made of any species of *Strychnos* affording edible foliage.

The leaves forwarded from Bangalore were very variable in size, the largest being 4½ in. (113 mm.) by 2¾ in. (63 mm.), and the smallest 2¾ in. (63 mm.) by 1¾ in. (46 mm.), petiole from ¼ to ½ in., oval or oval-rotundate, rounded or somewhat tapering at the base, acute at the apex or abnormally rounded, entire, thick, smooth, shining on both sides, mostly three-, rarely five-nerved from the base, only the midrib reaching the apex. The leaves when dried made a dark green powder having an acidulous and bitter taste.

A preliminary examination for alkaloid in the aqueous solution of an alcoholic extract gave abundant evidence of its presence by giving precipitates with tannin, potassio-mercuric iodide, and iodine and bromine solutions. The alkaloid did not answer to strychnine when the sulphuric acid and bichromate of potassium test was applied, but afforded the reaction of brucine by turning a vivid red colour with nitric acid. It was found that cold alcohol was insufficient of itself to dissolve out the whole of the alkaloid, for after percolating until all the chlorophyll and soluble substances had been removed the marc was still bitter. Alcohol dissolved out 0·315 per cent. of alkaloid calculated as brucine. Chloroform with 25 per cent. of alcohol, boiled with the leaves for one hour, the process adopted by Messrs. Dunstan and Short for extracting the seeds, proved to be very satisfactory in exhausting the alkaloid, as the resulting extract contained more of the base and the marc was free from bitterness.

Five grams of the powdered leaves were exhausted with boiling chloroform and alcohol for one hour, using a reflux condenser. The extract evaporated to dryness was heated with water acidulated with sulphuric acid, and when cold was filtered and the filter washed. The light coloured liquor was treated with freshly prepared Mayer's reagent (1 c.c. indicating 0·0197 gram. of anhydrous brucine) and required 0·9 c.c. for complete precipitation, equivalent to 0·354 per cent. of brucine.

The estimation was repeated, and exactly the same amount of Mayer's reagent was required to precipitate the alkaloid from the acid solution obtained from 5 grams of the leaves. The precipitates were collected on a filter, washed, dried and weighed together. Calculating from the formula of the brucine iodide with mercury iodide, $C_{23}H_{26}N_2O_4HI, HgI_2$, containing 40·37 per cent. of brucine, the united precipitates from the 10 grams of leaves showed the presence of 0·368 per cent. of alkaloid.

A larger quantity of the leaves was worked up for alkaloid, and the residue, purified by chloroform, was converted into acid sulphate, and its solution treated with ferrocyanide of potassium, as described in Messrs. Dunstan and Short's method for separating strychnine and brucine. The very slight precipitate that fell was not characteristic of strychnine ferrocyanide, and upon testing it further with sulphuric acid and potassium bichromate the violet colour was not developed. A neutral solution of the alkaloid was tested with potassium chromate, but no precipitate appeared until the liquor was concentrated, and the precipitate gave no colour reaction with the oxidizing mixture. Wynter Blyth considers potassium chromate a very delicate test for strychnine. On the other hand, the alkaloid obtained from the leaves responded to the more important reactions of brucine. The action of nitric acid was specially studied, and among the products were detected crystals of kakotelin, and the mother liquor contained oxalic acid.

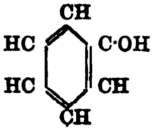
Other constituents of nux-vomica leaves are an acid resin soluble in spirit and aqueous alkalies, and dissolved by sulphuric acid with a green colour changing to reddish-brown, and a caoutchouc-like substance dissolved by benzol, but not by spirit or alkalies. An organic acid, probably the strychnic or igasuric acid of older writers, is associated with the alkaloid in both the alcoholic and aqueous extracts. It strikes a green colour with ferric chloride, and is removed from solution by neutral plumbic acetate. Crystals of a body which might be referred to loganin separated from the hot chloroform-alcohol extract, but I could not obtain much more than a trace of this body from the alcoholic extract after the removal of other substances by ether. The dried leaves afforded 11·86 per cent. of ash.

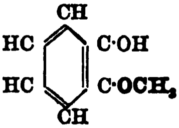
From these experiments it is evident that the alkaloid of nux-vomica leaves is brucine, and that no strychnine could be separated. The bark of nux-vomica has been analysed by Shenstone, Dragendorff and Greenish, and the alkaloid from this source was shown to be mainly brucine, with a very small proportion of strychnine mixed with it. As brucine has the same physiological effects as strychnine in inducing well-marked tetanic symptoms, the leaves of nux-vomica taken in sufficient quantity would produce poisonous results. Compared with the seeds, the leaves contain about one-tenth the amount of total alkaloid, but, notwithstanding the smaller proportion of brucine present, the leaves would be highly injurious as fodder, and precautions should be taken in keeping cattle from feeding upon them.

THE CHEMICAL RELATIONS OF MODERN SYNTHETIC REMEDIES.

At the general meeting of the German Apotheker-Verein in Rostock, in August last, a paper was read by Dr. Paul Fritsch, in which the chemical relations of modern synthetic remedies were reviewed and illustrated by means of graphic formulæ in a manner analogous to Mr. J. Hodgkin's treatment of the same subject before the British Pharmaceutical Conference at Leeds. Dr. Fritsch's communication, however, included references to a few synthetical antiseptics not mentioned by Mr. Hodgkin and a comparison of the chemical constitution of some natural alkaloids, from which the following selections have been made.

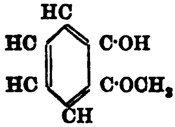
Although carbolic acid has long been valued as an antiseptic agent by surgeons and therapeutists, it has never been employed internally like the nearly-related compound, guaiacol or ortho-oxyanisol, the monomethyl ether of pyrocatechol.

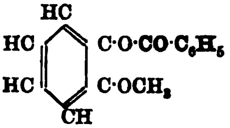

Carbolic acid.


Guaiacol.

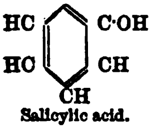
Guaiacol is the principal constituent of creasote, occurring to the extent of about 60 per cent. in this mixture of phenols and their derivatives obtained by the dry distillation of beech-wood.

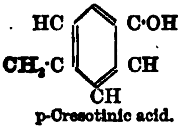
Since the introduction of guaiacol into the therapeutics of pulmonary consumption many attempts have been made to obtain it free from impurities, especially from the cresols or methylphenols, which give it an unpleasant tarry taste. No device has yet been discovered by which this purification can be satisfactorily accomplished, but recently a benzoyl derivative of guaiacol, which can be easily prepared in a pure state from creasote, has been introduced into commerce. From a contraction of the systematic name, benzoyl-ortho-oxyanisol, it has been called benzosol.

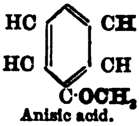

Ortho-oxyanisol or Guaiacol.


Benzosol.

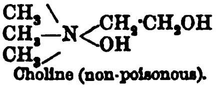
In certain instances paracresotinic acid, and more especially the sodium salt of anisic acid, have been recommended as substitutes for salicylic acid, since by their use the temperature of the body may be lowered without the appearance of the unpleasant symptoms that frequently accompany the use of salicylic acid.

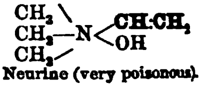

Salicylic acid.


p-Cresotinic acid.


Anisic acid.

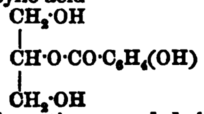
In connection with salol, Dr. Fritsch gave an interesting *résumé* of Professor Hueppe's investigations on the employment of this remedy in cases of cholera. It is well known that this malady is considered to be due to the poisonous effect of ptomaines and toxines, derived from the albuminoids of the human system by the activity of the cholera bacillus. The identity of these toxic principles has been established by artificial cultivation of the bacillus in different pabula and examination of the conversion products. In this way it has been found that the cholera bacillus produces the same ptomaines as the bacterium of putrefaction. For instance from the non-poisonous choline the extremely poisonous neurine is formed.


Choline (non-poisonous).


Neurine (very poisonous).

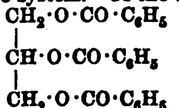
Further, cadaverine, identical with pentamethylenediamine, putrescine, $C_4H_{12}N_2$, and some specific organic bases containing oxygen, called toxines, have been isolated. Hueppe's researches have also proved that these toxines are elaborated most quickly and in the largest quantity in the intestines, from thence extending their poisoning influence to the blood and paralysing the muscles and nerves. But with the increasing physiological activity of the bacilli a corresponding increase of sensitiveness to outside influences, especially to the action of acids, has been observed, so that a trace of acid at this stage suffices to destroy them. Since salol passes through the stomach to a great extent undecomposed, and is first split up into its components, salicylic acid and phenol, in the intestines, its employment appears to be specially indicated in combating cholera. At any rate, its introduction into India as a specific antiseptic is said to have met with great success.

With the same end in view, Dr. Fritsch has himself recently introduced a number of esters of glycerine, the physiological action of which involves the same principle of saponification of the remedy within the intestines, and should therefore afford equally favourable results. In an attempt to prepare the monoglyceride of salicylic acid—



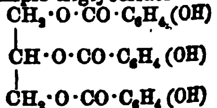
$$\begin{array}{l} CH_2{\cdot}OH \\ | \\ CH{\cdot}O{\cdot}CO{\cdot}C_6H_4(OH) \\ | \\ CH_2{\cdot}OH \end{array}$$

he found the information recorded in the literature of the subject to be incorrect, and the results of his experiments led him to a synthesis of a new class of bodies which he designates aromatic fats. Among the fatty oils and fats that serve as food to the human race, the triglycerides of palmitic, stearic and oleic acids occur most frequently. Berthelot, years ago, obtained these bodies and also the triglyceride of benzoic acid, tribenzoin, synthetically, by heating the corresponding acids with glycerine. By a method which is the subject of a patent, Dr. Fritsch has been able to prepare not only the triglyceride of benzoic acid, but also those of other aromatic acids, and even esters containing two or three different acid radicles in the molecule. Since these bodies have a chemical constitution analogous to that of some of the most important natural foods, it is suggested that they would afford an excellent means of introducing the respective acids into the system. Of the three simple triglycerides—



$$\begin{array}{l} CH_2{\cdot}O{\cdot}CO{\cdot}C_6H_5 \\ | \\ CH{\cdot}O{\cdot}CO{\cdot}C_6H_5 \\ | \\ CH_2{\cdot}O{\cdot}CO{\cdot}C_6H_5 \end{array}$$

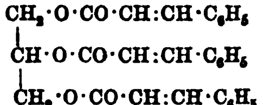
Tribenzoin.



$$\begin{array}{l} CH_2{\cdot}O{\cdot}CO{\cdot}C_6H_4(OH) \\ | \\ CH{\cdot}O{\cdot}CO{\cdot}C_6H_4(OH) \\ | \\ CH_2{\cdot}O{\cdot}CO{\cdot}C_6H_4(OH) \end{array}$$

Trisalicylin.

and



$$\begin{array}{l} CH_2{\cdot}O{\cdot}CO{\cdot}CH{:}CH{\cdot}C_6H_5 \\ | \\ CH{\cdot}O{\cdot}CO{\cdot}CH{:}CH{\cdot}C_6H_5 \\ | \\ CH_2{\cdot}O{\cdot}CO{\cdot}CH{:}CH{\cdot}C_6H_5 \end{array}$$

Tricinnamylin

the first two crystallize easily and well, whilst the tricinnamylin and the six mixed esters, with exception of disalicylbenzoin, form thick syrupy fluids. The trisalicylin, or salycerin, which contains 90 per cent. of salicylic acid, will possibly prove to be the most important of these bodies, but its physiological action and innocuousness to the human system have yet to be proved.

Favourable notices have appeared recently in medical papers concerning the employment of Peru balsam for the treatment of external tubercular processes, and since the genuine product contains about 60 per cent. of cinnamein, the benzylic ester of cinnamic acid, $C_6H_5\cdot CH:CH\cdot CO\cdot O\cdot CH_2\cdot C_6\cdot H_5$, it seems probable that this may be the therapeutically active constituent. If therefore the disinfecting property of Peru balsam be attributed to cinnamic acid, the aromatic fat, tricinnamylin, may be expected to have a similar value. Possibly still more favourable results may be obtained with mixed glycerine esters containing cinnamic and salicylic acid residues, such as

$$\left.\begin{array}{l} CH_2\cdot O\cdot CO\cdot CH:CH\cdot C_6H_5 \\ | \\ CH\cdot O\cdot CO\cdot C_6H_4\,(OH) \\ | \\ CH_2\cdot O\cdot CO\cdot CH:CH\cdot C_6H_5 \end{array}\right\}\text{Dicinnamylsalicylin.}$$

and

$$\left.\begin{array}{l} CH_2\cdot O\cdot CO\cdot C_6H_4\,(OH) \\ | \\ CH\cdot O\cdot CO\cdot CH:CH\cdot C_6H_5 \\ | \\ CH_2\cdot O\cdot CO\cdot C_6H_4\,(OH) \end{array}\right\}\text{Disalicylcinnamylin.}$$

SOME NOTES ON NATAL ALOES.*

BY J. MEDLEY WOOD.

As the Director of Kew Gardens, and also Mr. Holmes, of the Pharmaceutical Society's Museum, had expressed a wish for information, as to the plant from which Natal aloes had been made, and for any information I could obtain on the subject, I decided to relinquish the idea of proceeding to Drakensburg for my annual botanizing trip, and to visit the neighbourhood of Greytown instead. From this place some years ago the drug was exported in quantity, but at the present time its manufacture appears to be quite discontinued, and not a single person was engaged in it through the whole district, as far as I could learn. I was also informed before leaving Durban that the aloe plants would be in flower about the middle of April, later than which I could not defer my journey. This information, however, proved incorrect, as I could not find a single plant either in flower or bud, though I searched carefully, and residents in the neighbourhood informed me that the flowers would not appear before July. Mr. Newmarch, jun., who has been engaged in the manufacture of the drug, very kindly accompanied me to the "Thorns," and pointed out places where the manufacture had been carried on, the whole country, both on the level ground and far up the hill sides, being thickly covered with the plants, so thickly that making our way between them on horseback was often a matter of difficulty. The average height of the mature stem was 8 to 10 feet, but Mr. Newmarch informed me that they are frequently met with from 15 to 20 feet high. As to the species it is undoubtedly the one which has always been known to me as *A. ferox*, with perhaps a few of the variety *subferox*, and in the district which I visited it is quite certain that no other species has been used in the manufacture. Mr. Newmarch, jun., however, informed me that across the Mooi River, and in the direction of Weenen, another species is found in moderate quantity, and its leaves have been used, but whether alone or mixed with those of *A. ferox* I am unable to say; we were not, however, able to find even a single specimen of this plant, and the time at my disposal would not allow of my visiting the Weenen country on this occasion. The plant was described to me as being equal to *A. ferox* in size, the leaves light green or glaucous, prickly on the edge, but without any prickles on either surface, and the flowers red. I regret very much not having been able to meet with it. I forward by the kindness of Mr. Newmarch, senr., a small specimen of the drug, made about two years ago, from the plants which I saw, and which is certainly unmixed with the juice of any other species than the one known to me as *A. ferox*, the sample being taken from a full box opened by Mr. Newmarch for the purpose. Mr. Newmarch pointed out to me in his garden another species which he believed had been sometimes used, and which was said to yield a lighter coloured juice; but other persons said that they had never seen or heard of its being used, nor is it at all plentiful in the district where the drug is made, seeming to prefer the tops of the hills, while *A. ferox* is more plentiful in the valleys and along the hill sides. I send a photograph of a plant of this species taken in the Botanic Gardens, and plants or cuttings can be sent at any time if desired. I think, however, that its leaves have not been used, except perhaps accidentally. The process of manufacture as described to me by Mr. Newmarch, senr., is as follows:—Each workman is provided with a stout leather glove for the left hand, a cutlass or bill-hook, and a trough similar to a pig-trough, made of 6-inch board, with square ends so as to stand level, and having on each side a rail at a sufficient height from the top of the trough to support the ends of the leaves. As the leaves are cut the workman places them on each side of the trough, with the cut end downwards, and lays one row over the other, until the trough is full. He then fills in the same manner a second and a third trough, by which time the leaves in the first are sufficiently drained of their juice, and are taken off and thrown away, the juice in the trough being then emptied into a bucket. A good hand will collect about a bucketful of juice each day. I was also informed that those plants which were most covered with prickles were considered to be the best, as they were thought to yield more juice than the others. When sufficient juice is collected it is placed in an iron pot or boiler. Mr. Newmarch used an iron boiler, holding about 100 gallons, which rested upon brickwork, and was provided with a chain and lever, by means of which it could be quickly lifted from the fire and swung aside when the juice was sufficiently cooked. As soon as the fire is lighted the attendant commences to stir the juice, which at first adheres both to the stirring stick and to the sides of the pot, but after half an hour to an hour's boiling the juice becomes thicker, until when it leaves the sides of the pot quite clean it is considered to be sufficiently cooked, and is quickly lifted from the fire and at once poured into the box, where it is left to cool before being finally screwed down for export. Mr. Newmarch also informed me that much carelessness has been shown in the manufacture; some in consequence of not having sufficient hands employed, leaving the juice too long in the iron pots before boiling; some have boiled too much, and others too little, and he has seen boxes being carted away with the juice dripping through the joints of the boxes. He also informed me that the manufacture has been carried on at all seasons of the year, the yield of juice being greater during the summer months, but requiring more boiling. If it would be any advantage to you to have plants of the species alluded to here as *A. ferox*, from which the sample of the drug sent has been made, and which is undoubtedly identical with the plant growing in the Botanic Gardens here, and represented in *Gardeners' Chronicle*, vol. v., p. 113, fig. 14, I shall have much pleasure in obtaining for you, either small plants or a moderately sized trunk, whichever you may prefer, and I shall also try to obtain specimens of flowers for the Herbarium.

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* From the Kew *Bulletin*, August.

In conclusion I may say that I noticed at least two species of dwarf aloe, intermixed with the large plants of *A. ferox*. One of these is common all over the colony, the other I had not previously noticed, and I was unable to identify either. All accounts, however, agree that the leaves of these species are never taken, nor would it pay to do so, as they would require some searching for, while *A. ferox* abounds in every direction. Their leaves also are few, and comparatively small, and would not be worth the trouble of collecting.

CONSTITUENTS OF THE ROOT OF BRYONIA DIOICA.

A treatise on this subject has been published at Dorpat by A. Mankowsky. He states that of the two glucosides contained in *Bryonia alba*, bryonin and bryonidin, the former is entirely without action, while the latter is poisonous only in large doses. The substances hitherto known as bryonin, and regarded as the active agent of *radix bryoniæ*, are simply more or less purified extracts of the root, and probably contain both glucosides. The bryonin of Schwerdtfeger is a mixture of the two glucosides with other substances, while Walz's bryonin is probably a mixture of this glucoside with bryonidin in smaller quantities. Introduced into the stomach, bryonidin causes inflammation of the stomach and larger intestines; introduced into the veins, only slight inflammation of the latter. The pancreatic juice decomposes bryonidin and renders it inoperative. It has no effect on the peristaltic action of the intestines, nor on the activity of the heart, nor on the peripheral nerves; introduced into living organs it causes an enlargement of the vessels.

LYCOPODIUM OIL.

Herr A. Bukowski has published in the Proceedings of the University of Warsaw, an analysis of the oil extracted by ether from crushed fresh spores of *Lycopodium clavatum*. It is a neutral fatty oil resembling almond oil. The following substances were separated from it:—(1) a phytosterin or vegetable cholesterin; (2) a new fatty acid; (3) oleic acid; (4) a residue of solid fatty acids, consisting of a mixture of arachinic, stearic, and palmitinic acids; (5) glycerin. The phytosterin crystallizes in hexagonal plates or bundles of needles, with the empirical formula $C_{25}H_{42}O$, and the melting point 132–133° C. Lycopodic acid crystallizes in small doubly-refractive needles, or often in plates probably belonging to the monoclinic or triclinic system; it has the empirical formula $C_{18}H_{36}O_4$, and is isomeric with dioxystearic acid. The percentage composition of lycopodium oil is stated as follows:—

0·3	per cent.	phytosterin . .	$C_{25}H_{42}O$.
2·0	„	lycopodic acid .	$C_{18}H_{36}O_4$.
80·0	„	oleinic acid . .	$C_{18}H_{34}O_2$.
3·0	„	arachinic acid .	$C_{20}H_{40}O_2$.
	„	stearinic acid .	$C_{18}H_{36}O_2$.
	„	palmitinic acid .	$C_{16}H_{32}O_2$.
8·2	„	glycerin	
6·5	„	loss	

REVISED MEDICAL SCALES FOR MERCHANT SHIPS AND NORTH ATLANTIC STEAM SHIPS.

Revised Medical Scales intended to supersede those at present in force for Merchant Ships and for North Atlantic Steam Ships have recently been issued by the Marine Department of the Board of Trade. The new Scales will come into operation on January 1, 1891.

Medical Scale for Merchant Ships.

The principal alterations in this scale* relate to disinfectants, which will after the 1st of January next have to be supplied in the following quantities:—

Name.	Proportion for Ship carrying		
	10 hands and under.	11 to 20 inclusive.	21 and upwards.
*Carbolic acid, liquid .	½ gal.	1 gal.	2 gals.
Or crystal	4 lbs.	8 lbs.	16 gals.
Or Jeyes' Perfect Purifier (liquid) . . .	4 gals.	8 gals.	16 gals.
Or Sanitas Oil . . .	2 gals.	4 gals.	8 gals.
Or Tuson's Liquid Disinfectant . . .	1 gal.	2 gals.	4 gals.
Or Fletcher's Pino Phenol Purifier . .	4 gals.	8 gals.	16 gals.
Or Baird and Co.'s Liquid Neosote . .	1 gal.	2 gals.	4 gals.
Or Garroway and Co.'s Red Cross Disinfectant	1½ gals.	3 gals.	6 gals.
Or Penny's Disinfectant and Deodorizer	1½ gals.	3 gals.	6 gals.
*Chloride of zinc (Burnett's)	1 gal.	2 gals.	4 gals.
†Condy's Crimson Fluid	½ pint.	1 pint.	1 pint.
Red Cross Antiseptic Fluid	¼ pint.	½ pint.	½ pint.

In addition, ships carrying ten hands and under will have to be supplied with a graduated drop measure, and those carrying twenty-one hands and upwards will have to be supplied with three trusses instead of two.

Medical Scale for North Atlantic Ships.

In this scale‡ also the principal changes are in respect to the disinfectants, which will have to be supplied in the following quantities:—

Articles.	For 100 Passengers.	For 250 Passengers.	For 500 Passengers.	For 750 Passengers and upwards.
Disinfectants—				
§Carbolic acid powder, or ...	1 cwt.	2 cwt.	3 cwt.	4 cwt.
Jeyes' Sanitary powder	8 „	16 „	24 „	32 „
Commercial carbolic acid, or	1 gal.	2 gals.	3 gals.	4 gals.
Jeyes' liquid purifier	8 gals.	16 „	24 „	32 „
Or Tuson's liquid disinfectant	2 „	4 „	6 „	8 „
Or Fletcher's Pino Phenol purifier	8 „	16 „	24 „	32 „
Or Baird & Co's liquid Neosote	2 „	4 „	6 „	8 „
Or Garroway & Co.'s Red Cross disinfectant ...	3 „	6 „	9 „	12 „
Or Penny's Disinfectant and Deodorizer ...	3 „	6 „	9 „	12 „
Sulphur for fumigation ...	5 lbs.	10 lbs.	20 lbs.	30 lbs.

Oleum terebinthinæ is now marked with a * as indicating that it requires a red poison label.

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* Printed in the Society's Calendar for 1890, p. 310.

* As antiseptic and deodorizing agents for common use.

† For purifying drinking water when necessary.

‡ Printed in the Society's Calendar for 1890, p. 318.

§ A powder containing not less than 20 per cent. of pure carbolic or cresylic acid.

The Pharmaceutical Journal,

SATURDAY, DECEMBER 6, 1890.

THE COUNCIL MEETING.

The Council meeting last Wednesday was attended by nineteen members, and after the minutes of the previous meeting had been read and confirmed, the appointment of members of the Boards of Examiners for England and Wales and Scotland was proceeded with. Mr. Gale having intimated that he did not wish to be again nominated as an examiner, his place was filled by the appointment of Mr. W. M. Holmes. With this exception the constitution of the two Boards will remain the same as this year. The President in moving a vote of thanks to the members of the Boards for their services during the year, said that it was not a mere formality, for the Council and the Society were deeply indebted to the examiners for the discharge of the duties devolving upon them. The motion was seconded by the Vice-President, and carried unanimously. It was decided that during the ensuing year the Board of Examiners for England and Wales should meet in the months of February, April, June, July, October and December, and that the Board for Scotland should meet in January, April, July and October. On the motion of the President a resolution was passed, expressing regret at the retirement of Mr. Gale, as well as high appreciation of the services he has rendered for the last twenty-six years as a member of the Board of Examiners. Five persons were elected associates of the Society, and three local secretaries were appointed in addition to those already appointed at the previous meeting of Council. In moving the appointment of superintendents and deputy superintendents of written examinations, the President mentioned that a communication had been received from the executive of the North British Branch, suggesting the appointment of superintendents in Kirkwall and Lerwick, and that a petition had been received from Truro that it might be retained as a local centre. He suggested that both applications should be considered when making arrangements for next year. Mr. Evans raised the question whether any system of inspecting the superintendents could be devised, and the President thought the question might be considered by the Board of Examiners. It was incidentally mentioned that the new schedule for examinations would come into operation next October.

The report of the Finance Committee stated that four penalties had been recovered from one defendant, and that there had been a comparatively large outlay for an important prosecution in Scotland. A recommendation of a further payment on account of the new premises and alteration of the old premises was adopted. On the Benevolent Fund account there was a balance in hand of £936 0s. 2*d.*, which will be partly required to meet the annuities falling due in January. On the recommendation of the Benevolent Fund Committee two grants of ten pounds each and two of five pounds each were authorized, one of the latter being given from the Robbins' Fund to an annuitant whose husband had contributed the largest amount to the Benevolent Fund. The Vice-President called attention to the fact that the operation of the Fund seemed to contribute to longevity, and Mr. Atkins mentioned the importance of remembering the Benevolent Fund at this particular season. Though there was a good sum in hand, the Fund required further contributions, and though the applications had been below the average this year, that was not on account of any decrease in the need for assistance.

The report of the Library, etc., Committee stated that a draft scheme, prepared by Mr. Schacht, in reference to the subject of meetings at provincial centres had been discussed in accordance with the resolution of the Council, and adjourned for further consideration in consequence of the unavoidable absence of Mr. Schacht, but it was decided that the scheme proposed should be circulated to the members of the Council.

The President presented the report of the Pharmacopœia Committee, stating that its labours had been completed, and that the acknowledgment of its work was to be found in the reply recorded in the minutes of the General Medical Council, a copy of which, together with an advance copy of the additions, had been forwarded to each member of the Pharmaceutical Council and of its Pharmacopœia Committee. The report also recorded the Committee's appreciation of the indefatigable services of Professor Attfield as reporter. The President also presented a letter he had received from Dr. Quain stating, as Chairman of the Pharmacopœia Committee, that the communications of the Society's Committee were most welcome, and were warmly approved by the Medical Council, as expressed in the resolution respecting them, which appears on the above mentioned minutes of that body. The President remarked that though this report spoke for itself as to the satisfactory performance of the work that had been done, it would be a graceful thing to record appreciation of that fact by passing a cordial vote of thanks to the Committee. This was seconded by Mr. Hampson, who said the resolution of the General Medical Council was highly gratifying, as showing an advance in the relation between medicine and pharmacy that marked an epoch in the history of the Society, and gave promise of further beneficial development. On the motion of Mr. Harrison, seconded by Mr. Hills, a vote of thanks was passed to the members of the Pharmacopœia Committee, and on the motion of the President, seconded by the Vice-President, a vote of thanks was passed to Professor Attfield, for his valuable assistance as reporter and secretary to the Committee.

Several communications relating to the Pharmacy Bill were referred to the Parliamentary Committee, and the President reported that in his recent visits to various towns and cities where pharmaceutical affairs had been discussed he had met with the greatest courtesy, indicating the existence of a gratifying feeling of loyalty to the President of the only body that could represent the drug trade.

ADDITIONS TO THE BRITISH PHARMACOPŒIA.

By the permission of the General Medical Council an advance copy of "Additions made in 1890 to the British Pharmacopœia of 1885" has been forwarded to us by Professor Attfield, and we are thus enabled to place before our readers a list of the several articles that have been adopted by the General Medical Council on the recommendation of its Pharmacopœia Committee. Our readers will remember that the Council of the Pharmaceutical Society was requested by the General Medical Council to appoint a Committee of pharmacists to assist in defining and preparing the several additions to be made. This has been done, and the work required having been completed, the report of the Pharmacopœia Committee of the General Medical Council has recommended that the best thanks of the Medical Council be presented to the Council of the Pharmaceutical Society of Great Britain for the valuable assistance rendered. On the adoption of this report, at the meeting of the General Medical Council on November 29th last, it was moved by Dr. Quain, seconded by Dr. Bruce, and agreed to that the best thanks of the Council be given to the Council and Pharmacopœia Committee of the Pharmaceutical Society of Great Britain for the very valuable assistance rendered in the preparation of the Addendum, 1890, to the British Pharmacopœia, 1885, and that copies of the Addendum be presented by the Council to each member of the Council of the Pharmaceutical Society and of its Pharmacopœia Committee, together with a copy of the minutes of the Medical Council, containing the Report of the Pharmacopœia Committee of that Council. This resolution, appearing on the minutes of the General Medical Council, was referred to by the President of the Pharmaceutical Society, at the Council meeting last Wednesday, as furnishing very gratifying evidence of the appreciation with which the assistance of pharmacists had been received by the Medical Council. We may also mention that the report of the Pharmacopœia Committee of the Medical Council expresses satisfaction at the conjunction of medical and pharmaceutical work in the present extension of the Pharmacopœia, as being a combination that cannot but be productive of future as well as immediate benefit to medicine and to pharmacy. The report also accords to Professor Attfield, the reporter to the Medical Council on the Pharmacopœia, the credit of instigating and organizing this desirable union. It would be superfluous to add anything further in the way of comment upon the facts above recorded, than to say that they give evidence of the happy realization of a desire that has long been entertained by British pharmacists to occupy a position in connection with work so intimately concerning them, similar to that occupied by their brethren on the continent of Europe and in the United States. British pharmacists have also received from Professor Attfield, who paved the way for this desirable conjunction of pharmacy with medicine, another service for which they are deeply indebted to him.

Our available space this week does not admit of any critical review of the additions, and for the present we must merely give a list of the several articles they comprise:—Acetanilide; Castor Oil Mixture; Cocaine Hydrochlorate, Solution of; Eucalyptus Gum; Euonymus Bark and a Dry Extract; Effervescent Phosphate of Sodium; Effervescent Sulphate of Magnesium; Effervescent Sulphate of Sodium; Effervescent Tartarated Soda Powder (Seidlitz Powder); Gelatine; Gluside (Saccharin); Glycerine Suppositories; Hamamelis Bark and Tincture; Hamamelis Leaves, Liquid Extract and Ointment; Hemlock Ointment; Homatropine Hydrobromate; Hydrastis Rhizome, Liquid Extract and Tincture; Iron Pill (Blaud's Pill); Iron Subchloride, Syrup of; Menthol Plaster; Morphine Sulphate, Solution of; Oil of Cade; Paraldehyde; Phenacetin; Picrotoxin; Phenazone (Antipyrin); Sodium Benzoate; Sodium Nitrite; Stramonium Leaves; Strophanthus and Tincture; Sulphonal; Sulphur Lozenges; Trinitrin, Solution of; Vinegar of Ipecacuanha; Wool Fat and Hydrous Wool Fat. In the Appendix a Solution of Potassio-Cupric Tartrate (Fehling's solution) has been added.

On Wednesday evening next, December 10, an Evening Meeting of the Pharmaceutical Society will be held at 17, Bloomsbury Square, when a paper will be read on "The So-Called Eucalyptus Honey," by Dr. T. P. Anderson Stuart, Professor of Physiology in the University of Sydney. The chair will be taken at 8 o'clock, but the Theatre will be open an hour previously, to afford facilities for the inspection of specimens and apparatus exhibited.

* * *

In reply to a question addressed to the Chancellor of the Exchequer by Dr. Cameron, in the House of Commons on Monday, it was stated that the improper use of ether as an intoxicant in Ireland, to which attention had been directed by Mr. Ernest Hart, had received careful consideration by Her Majesty's Government. In accordance with a recommendation of the Kings and Queens College of Physicians in Dublin, an Order of the Lord Lieutenant in Council was passed last Saturday scheduling sulphuric ether as a poison, so that it can now be sold in Ireland only by duly registered chemists as a poison. This has been done in accordance with the provisions of the Sale of Poisons Act, Ireland; and it is hoped that the supply of ether as an intoxicant will thus be effectually stopped.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 3, 1890.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Evans, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Schacht, Southall, Storrar and Watt.

The minutes of the previous meeting were read and confirmed.

APPOINTMENT OF BOARDS OF EXAMINERS.

The Council went into Committee to consider the names of gentlemen to be appointed Examiners for the ensuing year. It was mentioned that Mr. Gale had intimated that he did not wish to be again nominated.

On resuming the following gentlemen were unanimously appointed the—

Board of Examiners for England and Wales.

Blunt, Thomas Porter, Wyle Cop, Shrewsbury.
Bowen, John William, 13, Curzon Street, Mayfair, W.
Corder, Octavius, 31, London Street, Norwich.
Davies, Robert Higgins, Apothecaries' Hall, E.C.
Druce, George Claridge, 118, High Street, Oxford.
Fletcher, John, 12, Montpellier Avenue, Cheltenham.
Gerrard, Alfred William, University College Hospital, W.C.
Greenish, Thomas Edward, 5, Bathurst Street, Sussex Square, W.
Holmes, Walter Murton, 7, Belgrave Mansions, Grosvenor Gardens, S.W.
Ransom, Francis, Bedford Road, Hitchin.
Saul, John Edward, 143, New Bond Street, W.
Symons, Wm. Henry, 130, Fellowes Road, South Hampstead, N.W.
Tanner, Alfred Edward, High Cross, Tottenham.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.

Board of Examiners for Scotland.

Clark, Wm. Inglis, 104, South Canongate, Edinburgh.
Dott, David Brown, 104, South Canongate, Edinburgh.
Gibson, Adam, Thistle Street Lane East, Edinburgh.
Gilmour, William, 11, Elm Row, Edinburgh.
Kinninmont, Alex., 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John B., 48, Frederick Street, Edinburgh.

The PRESIDENT then moved a vote of thanks to the members of the Boards of Examiners in England and Scotland for their services during the present year. He said that though this was a formal resolution it was not formal only, for the Council and the Society were deeply indebted to all these gentlemen for the zeal, ability and judgment with which they discharged the numerous duties that devolved upon them.

The VICE-PRESIDENT seconded the motion and thoroughly endorsed the remarks of the President.

The resolution was carried unanimously.

MEETING OF THE BOARDS OF EXAMINERS IN 1891.

It was also resolved that the Board of Examiners in England and Wales shall meet during 1891 in the months of February, April, June, July, October and December, and that the Board in Scotland shall meet in the months of January, April, July and October.

THE RETIREMENT OF MR. GALE.

The PRESIDENT moved—

"That this Council much regrets the retirement from the Board of Examiners of Mr. Samuel Gale, and desires to express its high appreciation of the valuable services he has rendered to the Society during twenty-six years. The Council begs to assure Mr. Gale that he carries with him in his retirement the best wishes of the Council and of his colleagues on the Board of Examiners."

The PRESIDENT said Mr. Gale was not only one of the early pupils in the Society's School, but he was demonstrator in practical chemistry to Professor Redwood for several years. His services to the Society, both as a member of the Board of Examiners and in other capacities, had been of that quiet, unobtrusive, but sterling character which it was very difficult to define. As an old colleague on the Board he might say that no one who had ever been on that Board had managed to secure for himself in a greater degree the personal respect, not only of his colleagues, but of the candidates also. It was only right, therefore, to express to Mr. Gale the high appreciation felt by the Council of his services, and to thank him most cordially. He felt that it was a loss to the Society that Mr. Gale should cease to be one of its acting officers. He did not know of anyone in London who in his own way had done more for the advancement of pharmacy and the progress of the Society. Mr. Gale was a prominent figure in cultivated and intellectual society in London, and in that society he was always received with the highest respect, a respect which was reflected on the Society, of which he was a member.

The VICE-PRESIDENT had much pleasure in seconding the motion. It had been his privilege and pleasure to know Mr. Gale for very many years, and he regretted very much that he had felt it necessary to retire from the position in which he had rendered such excellent service. His loss to the examination room would be very great, and would involve the breaking of one of those old links which had brought the Society down from the past to the present.

The vote was carried unanimously.

ELECTIONS.

ASSOCIATES.

The following, having passed the Minor examination and paid as Apprentices or Students their subscriptions for the current year, were elected "Associates" of the Society:—

Burton, Edmund	Totnes.
Knowles, Henry Percy	Birstall.
Richardson, Hubert N. B.	Leicester.
Smith, John James	Otley
Weall, George Alexander	Preston.

ADDITION TO THE REGISTER.

The Registrar reported that

John Cooke Hewlett, 40, Charlotte Street,
Great Eastern Street, London, E.C.,

having made a declaration that he was in business before the passing of the Pharmacy Act, 1868, and the declaration having been duly supported, his name had been placed on the Register.

LOCAL SECRETARIES.

The following gentlemen were appointed Local Secretaries for the ensuing year:—

Bromley	Baxter, Wm. W.
Jersey	Cole, Geo.
Rochdale	Taylor, Edward.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

The PRESIDENT, in moving the appointment of the gentlemen named in the subjoined list as superintendents of written examinations for the ensuing year said a communication had been received from the Executive of the North British Branch suggesting the desirability of appointing superintendents in Kirkwall and Lerwick in the same way as in Jersey and Guernsey. There was also a petition from Truro that that town might be retained as a local centre. He would suggest that both these applications should be considered in due course when making arrangements for next year. He thought it would be impracticable at present to make arrangements for examinations in Kirkwall and Lerwick, on account of the irregularity in the postal service during the winter. Possibly next year arrangements might be made to have an examination in the summer under certain special conditions. At present the papers had to be sent by and returned without delay, and where there was a sea voyage and rough weather, it was obvious that the present regulations would not apply.

Mr. **Evans** asked if it would be practicable to have any system of inspecting the superintendents of written examinations. He did not mean to insinuate anything, but he knew that in connection with the science and art classes there were travelling inspectors who looked in occasionally whenever they pleased at the examinations. He thought it would be quite as well if superintendents knew that the examination room might be visited at any time either by a member of the Council or someone specially appointed for the purpose.

The **President** said the suggestion might be considered by the Boards of Examiners. He was quite sure the Council would agree with Mr. Evans that it was of the highest importance that superintendents should perform their functions under the strictest sense of duty, and should not allow any sympathy with candidates to render them lax in carrying out the regulations. It should be generally known that whenever any copying was detected it was the invariable rule that every candidate involved was plucked, so that any punishment for laxity fell not on the superintendent but on the unfortunate candidates.

Mr. **Newsholme** asked whether the new schedule for examinations would come into operation next October.

The **President** replied in the affirmative.

The **Secretary** said the new schedules had been printed and were being circulated.

The **President** said it should be generally known that the new schedules would come into operation in October next.

The resolution was carried unanimously.

The following are the gentlemen who were appointed Superintendents and Deputy-Superintendents of written examinations for the ensuing year:—

Superintendents.

Aberdeen	Strachan, Alexander.
Aberystwith	Wynne, Edward Price.
Birmingham	Thompson, Charles.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Munday, John.
Carlisle	Pattinson, Michael Herd.
Carmarthen	Lloyd, Walter.
Carnarvon	Jones, John.
Cheltenham	Barron, William.
Darlington	Robinson, James.
Douglas, Isle of Man	Brearey, Arthur William.
Dundee	Hardie, James.
Edinburgh	Stephenson, John B.
Exeter	Lake, John Hinton.
Glasgow	Kinninmont, Alexander.
Guernsey	Nickolls, John Bate.
Hull	Bell, Charles Bains.
Inverness	Ogston, William.
Jersey	Cole, George.
Lancaster	Vince, James.
Leeds	Reynolds, Richard
Lincoln	Maltby, Joseph.
Liverpool	Parkinson, Richard.
London	Taylor, George Spratt.
Manchester	Benger, F. Baden.
Newcastle-on-Tyne	Martin, Nicholas Henry.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Parker, William Henry.
Oxford	Prior, George Thomas.
Penzance	Shakerley, Benjamin.
Peterborough	Heanley, Marshall.
Plymouth	Hunt, Freeman W.
Sheffield	Ward, William.
Shrewsbury	Cross, William Gowen.
Southampton	Dawson, Oliver Robert.
Worcester	Virgo, Charles.
York	Sowray, Joseph.

Deputy-Superintendents.

Aberdeen	Clark, James.
Aberystwith	Ellis, Robert.
Birmingham	Perry, George Edward.
Brighton	Savage, William Wallace.
Bristol	Pitman, John.
Cambridge	King, George.
Canterbury	Amos, Daniel.
Cardiff	Coleman, Alfred.
Carlisle	Hallaway, John.
Carmarthen	Williams, Joshua Edward.
Carnarvon	Jones, David.
Cheltenham	Fletcher, John.
Darlington	Hutchinson, Rev. E.
Douglas, Isle of Man	Radcliffe, John Collister.
Dundee	Hardie, James Miller.
Edinburgh	Ainslie, William.
Exeter	Harris, Henry William.
Glasgow	Davison, Thomas.
Guernsey	Carré, James Hilary.
Hull	Stoakes, Benjamin M.
Inverness	Bethune, William John.
Jersey	Baker, John Thomas.
Lancaster	Arkle, William.
Leeds	Branson, Fredk. Woodward.
Lincoln	Battle, John Scoley.
Liverpool	Hocken, Joshua.
London	Allen, Charles Bowen. Moon, Harry.
Manchester	Midgley, Charles.
Newcastle-on-Tyne	Spargo, Herbert.
Northampton	Mayger, William D.
Norwich	Corder, Octavius.
Nottingham	Patchitt, Edwin Cheshire.
Oxford	Thurland, Henry.
Penzance	Symons, Netherton H.
Peterborough	Saunders, James Edwin.
Plymouth	Sloggett, Thomas C.
Sheffield	Morrison, Charles Orr.
Shrewsbury	Blunt, Thomas Porter.
Southampton	Spearing, James.
Worcester	George, Henry.
York	Kendall, Edward Basnipp.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee was of the usual character and recommended sundry accounts for payment.

The **President** (as Chairman of the Committee), in moving the adoption of the Report, said there was nothing special to which he need call attention. Amongst the receipts was a sum of £20 5*s.* for four penalties paid by one defendant, the expense connected with which would appear later in the Solicitor's half-yearly account. On the Benevolent Fund account there had been an increase in the subscriptions received, due no doubt to the approaching election of annuitants. There was a balance in hand on this account of £936 0*s.* 2*d.*, which might seem somewhat large, but he hoped none would think the fund was getting so rich that further contributions were not needed. The fact was, it was necessary to keep a considerable sum in hand to need the annuities falling due in January before any of the new year's subscriptions came in. It would be observed that there had been a comparatively large outlay for a prosecution in Scotland, but the case was most important, and he could say from some experience that the amount paid was really very moderate considering the work done. The only other special item he need refer to was an authority to the Treasurer to pay a sum not exceeding £250 on the architect's certificates, on account of contracts for the new premises and alterations in the old premises.

Mr. Evans inquired if it was intended when the new buildings had been entirely completed to issue a complete statement showing the amount they had cost.

The President said this would probably appear in the auditor's report, but if it did not the materials for such a statement were certainly in the books, and if the information was not presented in a sufficiently clear form, he would see that it was prepared on receiving a further intimation from Mr. Evans.

The motion was then carried unanimously.

Report of the Benevolent Fund Committee.

The minutes of this Committee included a recommendation of the following grants:—

£10 to the widow (aged 42) of a member and subscriber to the Fund. Applicant has had four previous grants, amounting to £50; is in chronic ill-health, and unable to do anything. (London.)

£5 to a registered chemist and druggist (female), aged 64. Applicant has had fifteen previous grants, amounting to £120; her health is quite broken up. (Edinburgh.)

£10 to a former member and subscriber to the Fund, who had been in business for thirty-three years. (Bristol.)

The Committee recommended that the Robbins' Fund £5 be given to Mrs. Caroline C. Davies, an annuitant whose husband had contributed £13 13*s.* to the Fund. The amounts contributed by other annuitants or their husbands ranged from £9 9*s.* down to 10*s.* 6*d.*

The Vice-President (as Chairman of the Committee), in moving the adoption of the Report, remarked on the fact that all the grants made had been to persons who had previously been recipients, and that the history of the Fund seemed to indicate that its operation contributed to longevity. He invited as many members of the Council as could conveniently do so to attend the election of annuitants on the following day.

Mr. Atkins, in seconding the motion, desired to impress on all members and friends the importance at this Christmas time of remembering the Benevolent Fund in their gifts. It must not be supposed because there was a fairly good sum in hand, and the applications during the past year had been below the average, that the Fund did not need any further assistance. It was true that there had been a reduced number of applications of late, but he felt quite certain that it was not on account of any decrease in the wants of the members.

The motion was then put and carried unanimously.

Report of the Library, Museum, Laboratory and House Committee.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
October	Day . .	658	34	13	24
	Evening .	244	34	5	11

Circulation of books.	Town.	Country.	Total.	Carriage paid
October	137	120	257	£1 8 8

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

King's College, London, Calendar, 1890. From the College.

Owens College, Manchester, Calendar, 1890. From the College.

University College, Nottingham, Calendar, 1890. From the College.

Royal College of Surgeons of England, Calendar, 1890. From the College.

City of London College, Calendar, 1890. From the College.

Institution of Civil Engineers, List of Members, 1890. From the Institution.

Manchester Literary and Philosophical Society, Memoirs and Proceedings, 4th ser., vol. 3, 1890. From the Society.

Mathematical Questions with their Solutions, vol. 53. From Mr. W. J. C. Miller (Editor).

West (W.), Contributions to the Fresh Water Algæ of North Wales, 1890. From the Author.

Klemm (O.), Ueber den Fuselgehalt der Trinkbranntweine mit besonderer Berücksichtigung in Dorpa verkäuflicher Sorten, 1890. From Professor Dragendorff.

Kügler (K.), Ueber das Suberin, 1884.
Gilson (E.), La subérine, 1890. From Professor Flückiger.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Sutton, Volumetric Analysis, 6th ed., 1890.
Dittmar, Chemical Arithmetic.

For the Library in Edinburgh—

Life of Sir R. Christison.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
October	Morning	654	45	9	24
	Evening	87	15	1	6

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Twenty-two specimens of unnamed drugs from Madagascar, West Africa, South Africa and Ceylon, and a specimen of the leaves and bark of the so-called Coto tree of Venezuela.

Specimen of the leaves of the plant from the wood of which Arnaud first prepared ouabain.

Specimen of ouabain wood. From Professor T. R. Fraser.

Specimen of ergot *in situ*. From Mr. F. Bingham.

Specimen of the Natal aloes received from Mr. J. Medley Wood, and described in the Kew *Bulletin*. From the Director, Kew Gardens.

Specimen of fresh kola nuts. From Mr. T. Christy, F.L.S.

To the Herbarium—

Specimen of the *Strophanthus glaber*, Max., cultivated at Sydenham. From Mr. T. Christy, F.L.S.

The Committee had considered the subject of meetings at provincial centres, in accordance with the resolution passed at the last Council meeting, and a draft scheme prepared by Mr. Schacht had been discussed, but in the absence of Mr. Schacht the further consideration of the question had been adjourned. An estimate for printing the Register and Calendar had been submitted, and it was recommended that 1650 copies of the Register and 900 copies of the Calendar for 1891 be ordered.

The President (as Chairman of the Committee), in moving the adoption of the report and recommendations, said they were chiefly formal; the most important matter was the resolution passed at the last meeting, which had only been partly dealt with, owing to the unavoidable absence of Mr. Schacht, who had however sent in a scheme which it was hoped would be considered by all the members before the next meeting of the Committee.

Mr. Greenish seconded the motion.

Mr. Evans suggested the desirability of holding the meeting of this Committee on the third Wednesday in the month, instead of the second, as it would be much more likely to suit the convenience of country members.

The President said it was customary when anything special had to be considered to summon a special meeting. The Committee would consider the question at its next meeting.

Mr. Atkins pointed out that any day which was fixed would probably be inconvenient to some country members. He had taken some trouble to make arrangements for being free on the second Wednesday.

Mr. Newsholme suggested that the meeting of the Committee for considering this resolution should be held on the day preceding the next Council meeting.

Mr. Hampson thought it was high time that the Committee should inspect the whole of the new buildings, with a view to their entire completion as soon as possible.

Mr. Schacht asked whether the scheme that he had formulated could be circulated amongst the members, which the President said should be done.

The motion was then carried unanimously.

The Pharmacopœia Committee.

The President said he had to present the following short report from this Committee, which practically completed its labours that morning:—

"The Committee appointed by the Council to advise and assist the Pharmacopœia Committee of the General Medical Council as to the manner of preparing and defining the medicines and compounds named by the General Medical Council as additions in 1890 to the British Pharmacopœia, begs to report that it has completed its labours and forwarded its work to the Chairman of the Pharmacopœia Committee of the Medical Council.

"The acknowledgment of the Committee's work is to be found in the reply from the General Medical Council recorded in the minutes of that body of Saturday, November 29th, a copy of which, together with an early copy of the Addendum, has, by the courtesy of the General Medical Council, been forwarded to each member of the Council of the Pharmaceutical Society and of its Pharmacopœia Committee.

"In conclusion the Committee desires to record its cordial appreciation of the indefatigable services of Professor Attfield as reporter to this Committee. His knowledge and continuous assistance have been of the greatest value to every member of the Committee."

The President said he had also received the following communication from the Chairman of the Pharmacopœia Committee of the General Medical Council:—

"General Council of Medical Education and
Registration of the United Kingdom.
"299, Oxford Street, London, W.
"*November* 27, 1890.

"Dear Sir,—I beg to acknowledge the receipt of your letter of November 24, 1890, containing the names of the members of your Society who were appointed by your Council to advise and assist the Pharmacopœia Committee of the Medical Council as to the manner of preparing and defining the medicines and compounds which the Medical Council had named as additions in 1890 to the British Pharmacopœia of 1885, also containing the announcement of the completion of your Committee's labours, and accompanied by a complete set of definitions and processes considered and recommended by that Committee.

"Your communications were most welcome to the Pharmacopœia Committee of the Medical Council. They also were warmly approved by the Council, who passed the resolution respecting them which will appear in their minutes, a copy of which will be sent to each of your members.

"Yours faithfully,
"Richard Quain, M.D.,
"*Chairman of the Pharmacopœia Committee.*

"To the President of the Council of the
Pharmaceutical Society of Great Britain."

The President said he thought the report would be received with satisfaction. It spoke for itself, and there was really nothing to adopt. The powers of the Committee were to co-operate with the General Medical Council in doing certain work and that had been done. But at the same time it would be a graceful thing to record their appreciation of the work of the Committee by receiving the report and entering it on the minutes, and also by passing a cordial vote of thanks to the Committee. He moved that the report be received and entered on the minutes.

Mr. Hampson, in seconding the motion, said he was sure that the resolution of the General Medical Council which had been read would be gratifying to every member of the Council. The relation between medicine and pharmacy had certainly gained by this co-operation, and it marked an epoch in the history of the Society, and a very pleasurable one, to find that pharmacists had come into closer relations with the medical faculty in the preparation of the Pharmacopœia. He was quite sure that as time passed that relationship would become closer and stronger, and that the Pharmaceutical Society would eventually occupy its true position in this matter.

The motion having been carried—

Mr. Harrison moved—

> "That the best thanks of this Council are due and are hereby given to each member of the Pharmacopœia Committee for the assistance he has rendered on that Committee."

He thoroughly endorsed the remarks of the Treasurer. This was indeed an epoch in the history of pharmacy. It showed at once that the two bodies who were interested in the healing art were coming into closer relationship to each other, and emphasized the fact that those who were responsible for the preparation of the medicines of the Pharmacopœia, had at last been asked to have a voice in saying how those preparations should be made. Naturally they were the people who of all others ought to be consulted; they made a closer and more careful study of those preparations than any other branch of the profession, and it was only reasonable that they should be consulted in the preparation of that great work. He was quite sure that those who had been selected to act on this Committee had done their work well, and had proved themselves worthy of the Society.

Mr. HILLS seconded the motion, and did so with all the more pleasure because some years ago he was unsuccessful in getting the Council to see at that time that it was advisable to work in the way he then indicated. The outcome of the relationship which had been formed seemed most satisfactory.

Mr. SCHACHT said the motion did not need any support, but it was just as well perhaps to remind the Council who the members of the Committee were to whom its thanks were being awarded. It was not always that so strong a Committee could have been found to undertake the work as that composed of Messrs. Carteighe, Bottle, Inglis Clark, Ekin, Gale, H. G. Greenish, Martin, Martindale, and Umney.

The PRESIDENT said he cordially agreed with the motion, and thought all would feel that the recognition of the services of the Committee in the preface to the Addendum was not the least gratifying part of the arrangement. It showed a sympathetic feeling on the part of the Medical Council which they would all appreciate.

The motion was carried unanimously.

The PRESIDENT said he had one more resolution to propose in connection with this matter. Professor Attfield had been the reporter and secretary to their Committee as well as to the committee of the General Medical Council, and it was only due to him that the Council should award him a special vote of thanks. It was not necessary to say anything as to the capacity of Professor Attfield for this kind of work; he was an extremely good organizer, and capable of avoiding all matters which might easily lead to friction when working between two great bodies. They were very fortunate on both sides in having a gentleman who could do the work so satisfactorily. He would move—

> "That the best thanks of this Council are due and are hereby given to Professor Attfield for the valuable assistance he has rendered to the Pharmacopœia Committee of the Pharmaceutical Society."

The VICE-PRESIDENT, in seconding the motion, bore testimony to the admirable way in which Professor Attfield had carried out the work. He had placed the two committees on the best possible terms with each other, with the most happy results.

The motion was carried unanimously.

THE PHARMACY ACT AMENDMENT BILL.

The PRESIDENT reported the following communications which had been received on this subject:—

From Sheffield, a resolution of a public meeting in support of the Council, in carrying the Bill through Parliament.

From West Islington, a memorial to a similar effect.

From Bristol, a petition of pharmaceutical chemists and chemists and druggists, urging the addition of a clause to prevent evasion of the Act by limited companies registered after the passing of the Bill.

The President said it would probably be better to refer all these to the Parliamentary Committee, to be considered in due course.

Mr. HARRISON moved that this course be adopted, which was agreed to.

The PRESIDENT said he had recently attended meetings in certain town and cities to which he had been invited, where pharmaceutical affairs had been discussed, and he should like to say, in the presence of one of his hosts, that the courtesy with which he had been received had been of the very highest kind. He did not refer to this as a personal matter, but there had been on every occasion a feeling of loyalty to the president of the only body which could represent the drug trade, which was very gratifying.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor, stating the progress made with cases placed in his hands. One defendant had paid two penalties into court prior to the case coming on for hearing.

Two fresh cases of infringement of the Act were reported to the Council, and proceedings were recommended to be taken under the direction of the President.

The Council went into Committee to consider this report.

On resuming the report and recommendations of the Committee were unanimously adopted.

BENEVOLENT FUND GENERAL MEETING.

ELECTION OF ANNUITANTS.

A General Meeting of the Members and Associates of the Pharmaceutical Society and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Thursday, December 4, at 12 o'clock, for the election of SIX ANNUITANTS.

Mr. ALEXANDER BOTTLE, Vice-President, in the chair.

The notice convening the meeting was read by the Secretary.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the twenty-sixth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following result:—

Spendelow, Mary E.	6112
Skoulding, William	6082
Davis, Samuel F.	4421
Brown, Eliza	3856
Suggate, H. Ezra	2277
Hills, Henry	2244
Bensley, Harriett M.	1769
Rowan, Mary B.	1562

*4122 voting papers were received, of which number 76 were informal (45 unsigned and 31 incorrectly filled up), representing a total of 228 invalid votes and were disallowed.

EDWARD N. BUTT, *Chairman.*

EDWARD B. STAMP.
C. M. LUXMOORE.
H. BATE.
W. MURTON HOLMES.
W. PICKARD.
JOHN T. WALLIS.
HENRY LONG.
R. O. FITCH.
WALTER HILLS.
EDWARD M. BURDEN.
ALBERT PELLEW.

W. PRIOR ROBINSON.
JOHN W. T. MORRISON.
JOHN C. UMNEY.
W. F. J. SHEPHEARD.
JOHN GOODWIN.
ROBERT HAMPSON.
MAURICE HOWELL.
W. K. HOPKIN.
R. THOMAS.
J. ORD SMITH.

December 4, 1890.

The VICE-PRESIDENT then declared the following six duly elected Annuitants:—

Spendelow, Mary E.
Skoulding, William.
Davis, Samuel F.
Brown, Eliza.
Suggate, H. Ezra.
Hills, Henry.

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*5800 voting papers issued.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association, held at 103, Great Russell Street, on Thursday, November 6, Mr. W. Lloyd Williams, Vice-President, in the chair, a paper was read on—

The Chemistry of Organic Dyes.

BY F. W. PASSMORE, PH.D.

Certain chemical substances possess the property of more or less completely absorbing various components of white solar light, whilst the complementary constituents are reflected from or transmitted through the body; in other words, such bodies appear of a particular, more or less characteristic, colour. Individuals of this class are found amongst the so-called chemical elements, the colours of which moreover vary under different physical conditions. Some elements, for instance chromium, furnish compounds that invariably possess the property of colour; in the case of other elements the coloration of their compounds is somewhat exceptional and, when not occasioned by the entrance of a colour-giving element into the molecule, depends upon the chemical constitution of the compound.

In the latter category the coloured carbon compounds must be included. The greater number of organic compounds, which mostly contain hydrogen and oxygen and frequently nitrogen, as well as the indispensable carbon within the molecule, are colourless; but, on the other hand, carbon frequently forms with the same elements compounds that far excel those of other elements in the character and intensity of their colour. As such coloured carbon compounds in many instances do not differ in percentage composition from other bodies that are colourless, it may be safely inferred that this feature of coloration or non-coloration is intimately connected with the arrangement of the atoms within the molecule.

Coloured carbon compounds are met with in the life history of animals and plants, and these natural products constituted the sole dye materials of the ancients. Although such natural dyes were long the objects of detailed chemical research, their study contributed little towards the general knowledge of coloured carbon compounds, and it was only after the production of artifical dyes by synthetical methods that the constitution of a large number of the natural dyes was discovered.

Little is yet known concerning the fundamental cause of the coloration of carbon compounds, but sufficient information has been accumulated to allow some general conclusions to be drawn concerning the connection between colour and chemical structure. Reviewing the numerous organic compounds, it will be observed that the compounds of carbon with one element or with several elements of similar nature are invariably colourless. For instance, no coloured hydrocarbon is known, and the substitution products of the hydrocarbons by any one monovalent element are, with the exception of a few iodine derivatives, also colourless. Coloration is first occasioned by the entrance of certain compound—frequently polyvalent—radicles into the molecule, and the presence of several atoms of carbon in the molecule is also a necessary condition for the production of a true dye. Owing to the latter requirement nearly all the organic dyes belong to the aromatic series and are derivatives of benzene, naphthalene, anthracene or chinoline.

The radicles that are capable of the production of a coloured substitution product of a hydrocarbon also show a characteristic behaviour towards "nascent" hydrogen, in that coloured carbon compounds are converted by this reagent with more or less facility into colourless bodies. The reaction that occasions this change of optical behaviour is not, however, always the same. For instance, the nitro (NO_2) group is reduced to the amido (NH_2) group, which latter can be reconverted into the nitro group by oxidation. Compounds containing an azo ($-N=N-$) group in the molecule are frequently decomposed under the same conditions, the azo group being reduced to two amido groups; but intermediate products containing the hydrazo ($-HN-NH-$) group have also been isolated, and these bodies may be regarded as prototypes of a series of colourless substances termed leuco-bodies. A large number of dyes are converted by reduction into such leuco-bodies, which generally contain two more hydrogen atoms in the molecule than the dye, whilst the coloured products can be regenerated from them by oxidation.

A knowledge of these facts induced O. N. Witt,* in 1876, to formulate a theory concerning the nature of dyes, which is summarized in the following sentences. The coloration of a body is due to the presence within the molecule of a certain group, the colour-giving group or *chromophore*. By the introduction of the chromophore a more or less coloured body, the *chromogene*, obtains; this itself is no true dye, but is rendered such by the further introduction into the molecule of one or more radicles, by means of which the compound acquires salt-building (acidic or basic) properties. From this definition it will be seen that true dyes are bodies that, apart from their own coloration, are capable of imparting colour to other bodies. The dyeing of fabrics depends upon a peculiar relationship of the dye to fibres, especially animal fibres. If a skin of wool be dipped into a solution of a dye, the fibres become gradually dyed, whilst the solution, if not too concentrated, will finally lose its colour. The property of dyeing is possessed principally by bodies of more or less marked acid or basic character, and it is probable that this feature is due, in many instances at least, to the partly acid, partly basic properties of the fibres, which allow of reaction in the one case with an acid, in the other with a basic dye. Certain facts indeed suggest that the compound of the dye with the fibre is of the nature of a salt. Thus the free base rosaniline is colourless, but its salts are coloured. If a skein of wool or silk be brought into a warm colourless solution of the base, the fibres will be dyed as intensely red as if the corresponding quantity of hydrochloride or other salt of rosaniline had been employed. This phenomenon can be scarcely otherwise explained than by the assumption that the colourless base forms with the fibres a compound that conducts itself as a salt of rosaniline. Salts of dyes are on the other hand probably decomposed during the dyeing process, since solutions of very strong basic dyes in the form of their salts will not dye wool until the bath has been made slightly alkaline by addition of ammonia, nor are animal fibres attacked by some acid dyes in the form of their salts until the dye be set free by addition of a stronger acid to the solution. From a chemical standpoint it is more difficult to explain the tendency of some natural dyes, as curcumin and carthamin, as well as many azo dyes, to combine direct with plant fibres. The property of some basic dyes to dye upon precipitated sulphur or amorphous silicic acid is also worthy of notice, and finally may be mentioned the characteristic quality of the so called oxycellulose (plant fibres treated with chlorine, chromic acid, or similar oxidizing agents) of fixing basic dyes direct.

Before proceeding to the classification of the dyes, it will be well to consider the respective values of the radicles that act as chromophores. Only the nitro (NO_2) and nitroso (NO) groups are monovalent, and these alone are scarcely able to colour a hydrocarbon.

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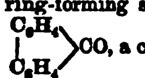
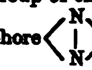
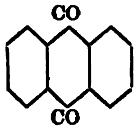
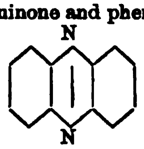
* *Berichte*, ix., 522.

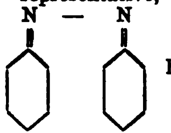
The same may also be said of polyvalent chromophores, if they are bound by only one valency to each of several hydrocarbon residues not in combination with each other. Thus, one of the most important and frequently occurring chromophores, the ketone group (CO), produces no coloration in simple ketones, like acetone $CH_3{\cdot}CO{\cdot}CH_3$, where the carbonyl group is the only connecting link between the two methyl groups; but in double ketones, like diacetyl, $CH_3{\cdot}CO{\cdot}CO{\cdot}CH_3$, or the quinones, as well as in the ring-forming simple ketones, like diphenyleneketone, 

CO, a coloured body obtains. The substitution of the divalent oxygen in the carbonyl group by other divalent radicles, as by sulphur ($C{=}S$), or by imide nitrogen ($=C=NH$), further increases the value of the group as a chromophore. Analogous to the double ketone group of the paraquinones is the characteristic chromophore 

of the azines, as is seen in comparing the formulæ of anthraquinone and phenazine.





Another of the important chromophores is the azo ($-N{=}N-$) group, though owing to the nature of some reduction products of azo-bodies it has been questioned whether the double linkage between the nitrogen atoms actually exists. Thus, to the simplest aromatic representative, azobenzol, the graphic formula 

has been ascribed, in preference to the simpler formula $C_6H_5{\cdot}N{=}N{\cdot}C_6H_5$. The point is important, since the new formula adds to the probability of the hypothesis that the coloration of carbon compounds is due to the presence of a heterogeneous ring in the molecule, though it must be admitted that the existence of such a ring in many coloured organic bodies cannot at present be understood.

The simpler chromophores produce yellow products, and the colours pass through red, blue and green to almost a black, by the introduction of stronger and more complex groups; but, above all, the position that the chromophore occupies in the molecule determines the character of the dye.

A further peculiarity of the chromophores is their tendency to lend acid or basic properties to the hydrocarbon; in other words, they are never completely neutral groups. The ketone and nitro groups have a strongly acid character, whilst chromophores containing nitrogen and no oxygen produce bases.

Besides the chromophores, there are a few acid radicles, like the sulpho ($SO_2{\cdot}OH$) and the carboxyl ($CO{\cdot}OH$) groups, that have no particular influence upon the colour of the body, but increase its value as a dye. These are termed "salt-builders," and must be carefully distinguished from the *auxochromes*, or auxiliary chromophores, that, like the hydroxyl (OH) and amido (NH_2) groups, add to the acid or basic properties of the chromogene and also considerably modify its colour. Further it must be remembered that the introduction of a basic auxochrome into the same molecule as an acid chromophore, or *vice versâ*, produces a feeble dye. These relations will, however, be discussed more fully under the quinones, in which group the respective values of the auxochromes have been more carefully determined.

From what has already been said it may be gathered that the true dyes are divisible into two large classes, basic and acid dyes, according to their behaviour towards fibres. Indifferent bodies can only serve as dyes when a soluble compound is precipitated upon the fibres by means of mordants, or salt-building properties are communicated to them by the introduction of a sulphonic acid group. Many basic and acid dyes are directly absorbed by animal fibres and may therefore be employed alone; plant fibres always require a mordant. For basic dyes tannic acid is generally employed, as it forms insoluble tannates, and the further addition of antimony salts increases the stability of the dye against soaps. Acid dyes form insoluble lakes with metallic oxides like alumina and ferric oxide, that differ in colour from the original dye and vary according to the nature of the metal. This property is especially utilized in the dyeing of cotton fabrics, but the chemistry of this part of the subject is still in its infancy.

A chemical classification of the organic dyes offers many difficulties. The system, adopted in many textbooks, of grouping under the heads of the respective hydrocarbons is distinctly artificial, since the members of well characterized groups are separated and dyes of completely different constitution grouped together. Perhaps the best method is to classify according to the chromophore contained in the molecule. The following groups then result:—

I. Nitro-compounds.
II. Azo- compounds.
III. Ketone compounds.
IV. Triphenylmethane derivatives.
V. Quinone imides.
VI. Indulines and nigrosines.
VII. Phtaleines.
VIII. Indigo compounds.
IX. Quinoline and acridine derivatives.
X. Oxyquinones and quinone-oximes.
XI. Azine compounds.
XII. Natural dyes of unknown composition.

The first three groups contain normal or chain chromophores, the second three ring chromophores in the para-position, and the following five ring chromophores in the ortho-position. A group including the natural dyes of unknown composition remains, although it must not be assumed that the constitution of every member of the previous groups has been definitely determined.

The raw material for the manufacture of the synthetic dyes is furnished at present by the gas manufacturer and consists of the tar obtained in the dry distillation of coal. From this benzene and its homologues, toluene and xylene, as well as naphthalene and anthracene, are separated. Benzene, toluene, xylene and naphthalene are converted by nitrification and then reduction into the corresponding amido bodies, aniline, toluidines, xylidines, and naphthylamines, and from the latter the naphthols are obtained by the action of nitrous acid.

I. Nitro-Compounds.

All nitro derivatives of aromatic amines and phenols possess the character of dyes, especially those of the latter, since both the chromophore NO_2 and the auxochrome OH are of acid character. The dye character is especially marked in their salts, but the introduction of an alkyl residue into the molecule destroys it. Of the nitro-phenols those having the nitro and hydroxyl groups in the ortho-position are the strongest coloured, suggesting that there may be a loose connection between the two, producing a heterogeneous ring. The nitro compounds are made by the direct action of nitric acid upon the phenols and amines, whereby nucleus hydrogen atoms are removed and nitro groups substituted; or upon the corresponding sulphonic acids or mono-bromine derivatives, in which case the sulphur or halogen group is attacked. Since the introduction of the azo-dyes, the importance of the members of this group has declined, but the following still find application:—

Trinitrophenol, or *Picric acid*, $C_6H_2(NO_2)_3OH$. Used in silk-dyeing for the production of a peculiar yellow shade in green and red dyes. A reduction product, the picraminic acid, $C_6H_2(NO_2)_2NH_2 \cdot OH$, is also employed.

Binitrocresol, $C_6H_2 \cdot CH_3 \cdot (NO_2)_2OH$. The sodium salt is an orange-yellow dye, brought into commerce under the name of *Victoria orange*.

Binitro-a-naphthol, $C_{10}H_5(NO_2)_2OH$—*Naphthol* or *Martius yellow*—produces a beautiful golden yellow upon wool and silk, and on account of its not unpleasant taste is used for the coloration of confectionery. The sulphonic acid (*Naphthol yellow S*) is characterized by greater stability.

Tetranitro-a-naphthol, $C_{10}H_3(NO_2)_4 \cdot OH$, is such an exceptionally beautiful yellow dye that it has acquired the name of *Heliochrysin*, or *Sun gold*, but it is somewhat unstable towards light.

Tetranitrodiphenol $(NO_2)_2OH \cdot C_6H_2 \cdot C_6H_2(NO_2)_2OH$.—The ammonium salt is used in the paper factory under the name of *Palatinate orange*.

Isopurpuric acid, $C_8H_5N_5O_6$, the product of the action of potassium cyanide upon picric acid, produces a reddish-brown hue on silk and wool. Its ammonia salt is the well-known *Grenat*.

Aurantia (hexanitrodiphenylamine) and *Salicylic yellow* (nitrobromsalicylic acid) are also included in this group.

(*To be continued.*)

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

A meeting of the section was held on Monday, December 1, Mr. T. Tyrer in the chair.

Mr. Worth read a paper by Mr. W. Webster, on "The Electrical Treatment of Sewage." The process has been developed since its original appearance before the public, and is now conducted by passing the sewage to be treated through a channel containing a large number of cast iron plates, connected in parallel circuit and supplied with current at a pressure of about 1·8 volts. A hypochlorite of iron appears to be formed at the anode, while ferrous hydrate and carbonate are among the products of the reaction, and act as precipitants, the organic matter subsiding and allowing a very fair effluent to be run off without further treatment than mere settling. For obtaining a perfectly clear effluent filtration must be resorted to. One great feature of the process is the permanent character of the effluent, no tendency to undergo putrefactive change being observed even under conditions favourable thereto. Complete sterilization is not effected nor claimed, but it was pointed out that it is neither practicable by any process, nor even desirable if it could be attained. The multiplication of micro-organisms is so rapid and the presence of those, other than pathogenic, so entirely unobjectionable, that no special efforts need be made for their destruction. The general efficiency of the process was practically admitted at the meeting, and the question of chief importance is its cost, to decide which experiments are now being conducted at Salford.

The discussion which followed mainly bore on this point, and was of engineering rather than pharmaceutical interest.

NORTH AND NORTH-WESTERN CHEMISTS' ASSOCIATION.

On Thursday evening, Nov. 27, a well attended meeting of the newly-formed North and North-Western Chemists' Association was held at the Railway Hotel, West Hampstead. After the usual preliminary business, the President, Mr. H. Hyne, delivered the following—

PRESIDENTIAL ADDRESS.

Gentlemen,—To-night we enter on the first meeting of our Association since its formation and since you did me the great honour of electing me as your President, which important post I will do my best to fill, so as to give you no cause to regret so doing.

I feel certain that an Association such as the North and North-western Chemists' Association is urgently needed to bring chemists into touch with one another, and to create that brotherly feeling which will make them look forward to our monthly meetings with the greatest enjoyment.

I can assure you I have desired to bring chemists together in this neighbourhood ever since I came into it, and have made several attempts for that end, but without success until now, when I am delighted to feel that my efforts have begun to bear fruit, and I can assure you I will spare no trouble or time if you will only give me your united support, which I feel sure by your presence here to-night you are all prepared to do.

I feel that chemists are at last waking up to the fact that it is through want of unity that their profession has sunk in the eyes of the public into the deplorable condition it has.

Through the want of unity men get isolated from their brethren, and think of nothing but themselves and of making as much money as they can, though it be at the cost of a brother pharmacist; they also forget that they belong to a Society at all, except when they want something to abuse, and then the Pharmaceutical Society, with its energetic Council, comes in for a full share of that commodity. Now, gentlemen, such a state of things should not be allowed to exist, and I am sure if we throw ourselves heartily into this Association we shall then be in a healthier state every way, both with our neighbours and also with the Pharmaceutical Society.

I would here like to mention our most worthy President, Mr. Carteighe, and to say how deeply grateful we ought to feel to him for his untiring efforts on our behalf and for the valuable time that he has given up to our cause with which he is so closely united; also for his great anxiety that none of us should remain in the dark regarding the draft Pharmacy Bill, and the great pains he has taken in explaining the different clauses and in answering any questions that he might be asked on the subject.

I am sure we ought also as a body to realize that this Bill contains a great deal that will as time proceeds help to considerably raise our profession, and that it will really do more than what appears on the surface. We must also take into account that it is very easy to say what you want, but quite another thing to get a member of Parliament to think the same way, and therefore, considering the many obstacles that are placed in the way of chemists getting legislation at all, because of the plea that they only want it for their own ends and not for the benefit of the public, we ought to consider this a very good Bill, and I trust before the meeting separates we shall show that we are all willing to give it our united support. Then, again, we must also realize that the members of the Council which has framed this Bill are all men in business, and as much if not more affected by the stores than we are, and therefore if they could with safety to the Bill made it fuller you may rest assured that they would have done so. While on this matter of stores, I should like to say that if every chemist were true to his calling and held himself in the position which the parent Society intended him to take and has done its best to place him in, we need never have feared them, but it is the sad case of a house divided against itself.

Then I can never understand why so many of our fraternity do not go in for the Major examination after passing the Minor. The chief plea they make for not doing so being, first, that they are not thought any more of by the general public, and, secondly, that it will not bring them in any more grist to the mill. Now, for my own part, I think that everyone who enters a profession or calling of any kind ought to do so for the love of it, and if he did that he would never rest content until he had reached the highest point attainable. Again, as the law stands at present, he loses a great many benefits which he would otherwise have a right to enjoy, namely, being exempt from juries, which I feel in itself must be a great boon, or otherwise the trade at large would not want to get it granted to all chemists. He would also be eligible for the Council of the Society, and thereby would be able to help to remedy some of those evils which he is always talking about as existing at 17, Bloomsbury Square, and would naturally take a greater interest in things in general and do everything in his power to get others to do the same.

We ought to read our journal, and also attend as many as possible of the meetings which are held during the session, and thereby keep ourselves well posted with all our Council are doing, and by that means be in a position to help them by different suggestions from time to time.

Unity is strength, gentlemen, and what we want is that chemists, instead of being like a lot of chemical atoms, ready to explode if they by any chance come together, should stand shoulder to shoulder with their brother pharmacists and let their voice be heard, and that an unanimous one.

I sincerely trust that the North and North-Western Chemists' Association will be the means of helping to bring that unity about, and therefore if only on that ground would strongly advise all chemists who have not joined our ranks to do so without delay.

Then I think further that chemists do not take enough relaxation, but stand behind their counters from morning till night, and growl as if some one else were to blame for their doing so, not realizing that it is the want of unity that prevents them having that recreation which they both require and ought to have.

By working together you get to place reliance on your neighbours as regarding all promises made and all questions regarding trade of whatever kind, and then you gradually begin to think that after all your hours of business are unnecessarily long, and come to an amicable arrangement to close at an early hour, and thereby you are enabled to enjoy life, which before was only a drudgery. I am perfectly certain that if chemists would only work to help one another instead of working for the public alone, and making themselves slaves to them, to the great disadvantage often of their neighbour, they would find life sweeter, and also that after all a chemist's calling is not so despicable as they had for such a long time thought it.

I feel we are greatly indebted to Mr. Long for the untiring efforts he has made amongst the chemists of the Western district to get them to see the desirability of forming an association, and I sincerely trust that chemists all over London and in the provinces will all be filled with the same desire for unity, and by degrees we shall form quite a freemasonry of the trade at large and we shall then feel that wherever we are our brethren will always have a friendly feeling towards us.

I am sure that if this Association, and all kindred associations, only do a little to the breaking down of the barrier which unfortunately exists between chemists generally and the Pharmaceutical Society, and by their united effort bring all of them to see that it is to their interest to become members, they will have accomplished a great task. But I trust that we shall not only be able to do that, but much more, and I think that if each member of the profession will only exert himself and make it a personal matter that the chemist of the present and of the future will be much happier and better men than their predecessors.

In the discussion that followed Mr. Bell and Mr. Parkes questioned the value of the Major qualification, whilst Messrs. Chapman, Pettinger, and Holding more or less considered its attainment desirable. Some of the speakers also referred to the difficulties that stand in the way of any general arrangement for early closing. Eventually a resolution was passed to the effect that the chemists and druggists present pledged themselves to support the Council of the Pharmaceutical Society in its endeavours to promote legislation, and heartily approved the draft Pharmacy Bill.

Provincial Transactions.

MEETING OF CHEMISTS AND DRUGGISTS AT LEEDS.

THE DRAFT PHARMACY ACT AMENDMENT BILL.

For the purpose of discussing the various clauses of the proposed Pharmacy Act Amendment Bill a meeting of about ninety chemists and druggists of the West Riding was held in the Philosophical Hall, Leeds, on the afternoon of November 27. The chair was taken by Mr. George Ward, President of the Leeds Chemists' Association, who was supported by Mr. Richard Reynolds, and other local chemists, Messrs. Bradwall, Ellinor, Fox, Furness, Learoyd, Morrison, Newsholme, Preston, Turner, Ward, and Watts, from Sheffield; and Messrs. Jackson and Remmington, from Bradford.

The Chairman said the special object of the meeting was to consider the Pharmacy Act Amendment Bill approved of by the Council of the Pharmaceutical Society, which it was intended to introduce into Parliament during the coming session. He would not detain them by any remarks upon the Bill, because the President of the Society had come to address them. Mr. Carteighe was so well known from his work in connection with the Society that he (the speaker) was sure they would feel delighted to listen to his lucid explanation of the Bill. He hoped there would be some persons in the meeting who would be able to produce fair criticism upon the Bill. What the Council of the Society wanted, more particularly, was to get something like the public opinion of the trade or profession. He then asked Mr. Carteighe to address the meeting.

Mr. Carteighe said he would assume a certain amount of knowledge of the Bill in the meeting, and he would like, before he referred to it, to remind them of the subject they had to consider. He did not come to the meeting to submit to them on behalf of the Council of the Pharmaceutical Society a Bill which would meet all the views of the drug trade. He was there representing a body of men who were elected to do work in connection with the draft measure, which would be beneficial to the Society and to the whole trade and that could not otherwise be done. When that body sat down to consider, it did what any prudent man would do, and calculated the forces with which such a measure would probably be opposed. The Council of the Society was not a law making body. It had not any more influence in Parliament than that of being a corporate body having certain privileges conferred upon it by statute. Therefore it had to deal with the subject of prospective results, and consider how far it could attain some alterations of legislation.

The Pharmaceutical Society was not a trade association in the strict sense of the word. It might become one in the sense of being powerful for both attack and defence if the members of the trade were determined to change the law. While on the one hand it represented the public on the other hand it represented roughly one-third of the trade, and it was not in a position to go to the House of Commons and say it represented the whole of the trade. The Bill submitted was a Bill that dealt with practically four subjects: Education and examination; the dispensing of medicines; consolidation of the Pharmaceutical Society, and lastly the clause with regard to the serving on juries. They would perhaps ask why this Bill was being submitted. It was because it would not be introduced unless it was a reasonable one and had the support of the trade. They must understand that if there was anything omitted from the Bill it was not because the Society did not want it, but because the Society was not strong enough to submit everything. The Society from its birth to the present moment had ever shown assistance and given welcome to every man in the trade. The first clause of the Bill referred to the examinations and educational curriculum. Practically at the present time the Society was simply an examining body. A candidate was examined in six subjects at one sitting, and the examiners had to decide upon the qualifications of the candidate without any previous knowledge of what he had done. In the interests of future candidates it was desirable that such a state of things should not continue. The examinations should be divided, at least, into three parts, and the Council proposed that if this Bill passed it should prepare bye-laws by which they would be increased to three, a Preliminary, an intermediate, and a final. This education was necessary, in the future especially, as a chemist required more education than school board children, who were also taught the science. If the Bill was passed he assured them that the drug trade would be greatly benefited. With regard to the consolidation clause they might think the Society did not need it. He could inform them that the Society could do very well without it, but if secured it would only be for the benefit of the trade. In conclusion the speaker briefly referred to the clauses dealing with the dispensing of prescriptions and the exemption of chemists and druggists from service on juries.

The Chairman said that it would be desirable to have a resolution proposed and seconded, in order to offer opportunity for discussion and free expression of opinion on the Bill, and he called upon Mr. Richard Reynolds to move a resolution.

Mr. Richard Reynolds (Leeds) in referring to the differences of opinion in regard to the draft Bill, said that although it dealt with matters of importance to the trade, some thought it did not go far enough. But in any case the Bill was entitled to respectful consideration, because the members of the Council of the Pharmaceutical Society represented various phases of opinion, and included among their number many of the most active and trusted leaders in the past. In reference to educational matters he thought it only reasonable that a measure passed more than twenty years ago should stand in need of improvement, and in support of this view he referred to the great change that had been effected in Mr. Forster's Act since it was passed. It was to the interest of chemists that their education should be thorough, and when they were assured that mere examination was an imperfect test of thoroughness, this matter became one of great importance in regard to the future interests of the body. Mr. Reynolds proceeded to enlarge upon this subject by reference to educational progress in Germany, when—

Mr. Furness, of Sheffield, rose to ask whether the discussion was to be confined to the Pharmacy Bill or extended to general education,

Mr. Reynolds, continuing, said that if chemistry were thoroughly taught they might be educating students for other occupations than pharmacy, and he mentioned the names of Scheele, Liebig and Dumas as illustrating this fact, but he felt sure education was the soundest basis on which the Pharmaceutical Society could rest. In reference to the provision for the extension of the Society, he thought it impossible otherwise for the trade to exercise its full influence. It was therefore most important that all who had passed the legal qualifying examination should have the opportunity of becoming members of the Society. It needed no argument to show that the compounding of medicine should be exclusively confined to those who hold the necessary qualification. A recent decision having put exemption from jury service on a new footing, it might reasonably be expected that this privilege would be secured. The disastrous effect of the judgment of the House of Lords in regard to company trading had given rise to many difficulties, but he believed they had a right to claim that the Companies Act should not be used to enable offenders under the Pharmacy Act to obtain exemption. He thought the Council should endeavour to obtain a penal provision that an offender under the Pharmacy Act should not carry on the business of a chemist and druggist by forming a company. In conclusion Mr. Reynolds moved that:

> "This meeting records its satisfaction that the Council of the Pharmaceutical Society is taking steps to promote further legislation in the interests of pharmacy; and after careful consideration of the draft Pharmacy Act Amendment Bill approves the same."

Mr. Newsholme (Sheffield) in seconding the motion said that being a member of the Law and Parliamentary Committee of the Council he could say that for the last three years much time had been devoted to discussing the details of the Bill, and he believed it was calculated to have a good effect on their business. For nearly twenty-five years the President had devoted himself to furthering the interests of chemists throughout the country, and he had benefited them in many respects, whether members of the Pharmaceutical Society or not. The Sheffield chemists were thoroughly agreed that education was necessary for chemists, and they insisted on the adoption of a curriculum. He thought chemists could not fail to perceive how they would be benefited by the compounding clause. On the subject of company trading he did not wish to say much. He held that the real remedy for the evil influence of companies was loyalty to their colleagues in business and to the Pharmaceutical Society. Therefore he urged non-members to join the Society and thus secure the Bill a chance of being passed.

Mr. Ward (Sheffield) said that the Sheffield chemists had pledged themselves to support the Bill, but at the meeting held to consider it there had been differences of opinion. The proposal to admit associates to the position of members was, he thought, a gracious act on the part of the Pharmaceutical Society. The continuance of a deceased chemist's business by his widow should, he thought, be limited to three years, but he failed to see what connection this provision for widows could have with company trading.

Mr. Chadwick (Leeds) moved an amendment that the Bill be "dropped" and a new one drafted. He did not think it was a Bill that would enhance the chemist's business, and it would be a restriction upon them. He spoke in strong terms of the drug companies.

Mr. Day (Dewsbury) seconded the amendment. The present Bill, he said, would benefit chemists very little, and he asked the President what they were going to do with men who had been managing businesses for twenty or thirty years. These men could not afford to go up to London to pass their examinations, and the money they had was enough for them to start an illegitimate business on.

Mr. Maud (Pontefract) thought the Bill only wanted one slight amendment and then it was all right. He called it a Bill for increasing the income and power of the Society. He contended that the Bill, as it was, was unworkable. He would not support the amendment, but was entirely opposed to the Bill.

Mr. Dunn (Shipley) having made a few remarks anent the recovery penalties,—

Mr. Branson (Leeds) said that with regard to Leeds, Bradford and Sheffield, the educational requirements of the Bill had been met during the past few years.

Mr. F. Reynolds (Harrogate) raised various objections.

Mr. Bradwall (President of the Sheffield Association) expressed the opinion that in drafting the Bill the Council of the Pharmaceutical Society had the interests of chemists and druggists in view. He spoke of cases where men had, at an advanced period of life, decided to become chemists and druggists, and had managed to get through the examination. That, he thought, was contrary to the interests of the body, and was probably one of the evils against which the establishment of a curriculum was directed.

Mr. Carteighe, in replying, repudiated the assertion that the Bill was framed in order to put money into the hands of the Society. As a matter of fact the re-examinations of plucked candidates were a source of loss to the Society. But the suggestion that the Bill was intended as a means of increasing the fees was unfounded, for there was no need for such a step, the Society having at present power to increase its fees without applying to Parliament. The Society would not gain by the passing of this Bill; on the contrary it proposed to do everything in its power for establishing proper schools of instruction throughout the country, to save students the expense of going to London. It was the trade that would be benefited, and with regard to Clause 7 it was clear that the management of branch shops by unregistered persons might be effectually dealt with by it. A registered person must take an active part in the sale of poison. If the qualification were not to be a real one, there need not be any whatever. The dealing with company trading had become a very difficult matter since the House of Lords decided that because qualified men were employed the safety of the public was provided for. In view of such difficulty the members of Council had to agree among themselves as to the best form of Bill to be submitted to Parliament, and it would be impossible to get a member of Parliament even to introduce a Bill embodying an attempt to suppress company trading; the utmost that could be done was for those who were in favour of such an attempt to raise that proposition when the Bill reached the committee stage, and the Council would not oppose it. As a matter of fact, however, chemists had less to fear from the competition of companies than they had from members of their own body.

At the conclusion of Mr. Carteighe's reply, Mr. Dunn rose, and said that it seemed to him so many difficulties had been removed by Mr. Carteighe's explanations that the putting of Mr. Chadwick's amendment would not be necessary. The Chairman, however, ruled that the amendment must be put as proposed.

Mr. Chadwick's amendment was then put to the meeting and lost, scarcely a single person voting for it.

Mr. Saml. Taylor (Leeds) moved the second amendment as follows:—"That this meeting, whilst thanking the President of the Pharmaceutical Society for his very able address, desires to record its opinion that the draft Pharmacy Amendment Bill will not be acceptable to the trade generally; neither will it meet the ends of justice unless it contains a clause stopping the sale of drugs and poisons and the dispensing of medical prescriptions by unqualified proprietors, and unless that portion of the clause from 'and shall unlawfully' to 'all such qualified persons,' inclusive, be expunged."

Mr. Maud (Pontefract) seconded the motion, which was, however, lost by a large majority.

The Chairman said that the Council of the Pharmaceutical Society had a very delicate task to perform. It had to hold the balance between the interests of the public and those of the trade. If it could show that protection of the public against accidental poisoning was to be secured by means to some extent improving the position of chemists that was the utmost that could be hoped for, and it would be useless to go to Parliament asking for trade protection.

The original motion was then put to the meeting and carried with only nine dissentients.

A vote of thanks to the President of the Pharmaceutical Society and to the Chairman closed the meeting.

After the Conference there was a dinner at the Queen's Hotel, the chair being taken by Mr. George Ward, who was supported by the President of the Pharmaceutical Society, Mr. Bradwall, President of the Sheffield Pharmaceutical Association, and a number of the leading chemists of Yorkshire. After the usual loyal toasts, Mr. Samuel Taylor (Leeds) proposed the "Pharmaceutical Society," and Mr. Carteighe in replying said that he saw with much pleasure the establishment of associations in provincial towns affiliated to and if necessary subsidized by the Pharmaceutical Society as centres of educational work. The tendency was one he highly approved of. "The Leeds and Sheffield Chemists' Associations" were proposed by Mr. Jackson (Bradford) and responded to by the Chairman, Mr. R. Reynolds and Mr. T. H. Bradwall. Some other toasts were proposed and responded to, and Messrs. Fox and Watts (Sheffield) gave several recitations in the course of the evening.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the second session of this Association was held in Lockhart's Café, St. Nicholas Square, on Wednesday evening, 3rd Dec., at a quarter past eight o'clock. Mr. F. Park, President, in the chair. Notwithstanding the disagreeable state of the weather there was a very good attendance. The usual preliminary business having been transacted, the President called upon Mr. Wm. G. Robertson, pharmaceutical chemist, to read a paper on:—"Some of the Uses of Colour in Flowers."

The author commenced by commenting on the antipathy shown by many pharmaceutical students towards the subject of botany and advocated strongly practical study of the subject as at once giving a more thorough grasp of the science to students and making it a most attractive and fascinating study. He approved of the extended curriculum proposals as being an encouragement to *really* study botany instead of gaining merely the flimsy superficial knowledge of flowers which was, in the examination room, more common than it ought to be. Continuing, the author described the various uses of flowers, quite apart from the delight they afforded man, which, he said, was quite a secondary consideration indeed. The colour of flowers was a remarkable instance of the economy of energy which is observable in all the works of nature. The most gay blossoms depending principally upon insects and birds for fertilization, while dull coloured flowers and grasses, etc., are fertilized by the wind, or other natural cause, so that the colour of a flower was really a most important factor in the reproduction of species. The absence of certain insects from the vicinity of large manufacturing centres accounted for the total extinction of various plants which formerly had flourished in the district; orchids, notably, became extinct in places which had been drained, the fertilization being dependent on insects which frequented moist and marshy places only. In concluding, Mr. Robertson expressed regret at being unable (through lack of time) to do more than touch on the fringe of his subject, but hoped to treat it more fully at a future meeting. A number of excellent pen and ink drawings of the interior organs of flowers mentioned in the course of the paper, were shown by the author. The most lively interest was evinced by the meeting, and the discussion which followed was taken part in by Messrs. Park, Peter Bell and Merson.

A hearty vote of thanks to Mr. Robertson closed the proceedings.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the thirteenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, November 19, at 9.15 p.m., Mr. Donald McEwan, President, in the chair.

The minutes of last meeting having been read and approved, the following communications were read:—

SPIRITUS AMMONIÆ AROMATICUS.

BY J. H. HOSEASON.

Having doubts as to the genuineness of some samples of the above article I procured a number from wholesale and retail chemists, and also from some drug stores with a view to determine how far my doubts might be well founded. This preparation has, as you are aware, been the subject of several prosecutions. If the official process is followed in its manufacture it necessitates the use of a still, and consequently most retail chemists have to trust to the integrity of the wholesale makers unless precautions are taken to estimate each sample when received into stock.

It has been suggested that distillation is unnecessary. This, I am informed by a gentleman having practical knowledge of the subject, is perfectly true, provided the spirit used in its manufacture has not been stored in a wooden cask. If a spirit so stored be used the resulting spirit. ammon. aromat. acquires a light brown tint in a short time. This coloration is attributed to extractive matter derived from the wooden cask, which forms a coloured compound when acted on by the ammonia. If very pure spirit is used there is no difference between the distilled and the undistilled article.

The B.P. process of estimation was employed with the exception that the precipitated barium carbonate was collected on a filter, washed, dried, gently ignited and weighed, and the quantity of neutral ammonium carbonate calculated from the weight of barium carbonate obtained.

	Sp. gr. at 60° F.	Total ammonia per cent.	Neutral carb. ammon. grains per ounce.
B.P. standard	·896	100	12·5
1 . .	·892	96·6	10·5
2 . .	·895	98·9	12·0
3 . .	·896	93·2	9·5
4 . .	·891	99·2	12·0
5 . .	·893	97·8	11·0
6 . .	·896	98·2	11·0
7 . .	·894	97·8	10·0
8 . .	·896	102·1	12·0
9 . .	·902	99·2	10·5
10 . .	·896	98·0	13·0

It will be observed that the specific gravity and also the total ammonia of the samples is fairly well up to the standard. The greatest variation is in the amount of carbonate. The worst sample is No. 3, but it is noteworthy that it shows the correct specific gravity. It is a store sample. No. 10, the only one containing the official quantity of ammonium carbonate, is an undistilled sample that is slightly coloured.

THE PRESERVATION OF DILUTE HYDROCYANIC ACID.

BY J. H. HOSEASON.

The first part of the paper consisted of a critical review of the work done by Procter, Shenstone, Siebold, Williams, Rimmington and Squire. The author then continued—My experiments on this subject are as follows:—I prepared a strong solution of the acid, which on estimation was found to contain 4·3 per cent. of real HCN. This was divided into five equal parts, which were each diluted to make two volumes with distilled water and the preserving agents, thus:—

Sample A was preserved with 50 per cent. simple syrup.

Sample B was preserved with 10 per cent. glucose syrup.

Sample C was preserved with 20 per cent. glucose syrup.

Sample D was preserved with 20 per cent. glycerine.

Sample E had no preservative added.

The samples were kept in well corked, white glass bottles, exposed to light and at a temperature of 46° to 50° F. Sample C turned bluish-green in colour three days after it was made, the same sample of glucose being used as in sample B, which remains colourless. In sample E a slight black deposit may be noticed. Each bottle was opened three times daily for thirty seconds, the bottle being inclined as in the act of pouring out. The samples were prepared and estimated on October 15, and then weekly till November 12. The sixth estimations were made after allowing the bottles to remain uncorked for one hour, and the seventh after six hours exposure.

Sample.	A. HCN p.c.	B. HCN p.c.	C. HCN p.c.	D. HCN p.c.	E. HCN p.c.
Oct. 15 .	2·15	2·15	2·15	2·15	2·15
Oct. 22 .	1·75	2·06	2·07	2·11	2·07
Oct. 29 .	1·66	1·99	2·00	2·08	2·03
Nov. 5 .	1·64	1·92	1·93	2·04	2·00
Nov. 12 .	1·52	1·90	1·89	2·01	2·00
Exposed—					
1 hour . .	1·50	1·87	1·87	1·93	1·91
6 hours .	0·86	1·71	1·77	1·80	1·70

The rapid loss in sample A is unaccountable. It was noted that the presence of such organic substances as the preservatives employed prevented a very definite end reaction with the nitrate of silver solution, an apparently permanent precipitate being observed, which in a few minutes had disappeared. This, if overlooked, would tend to lessen the apparent percentage of HCN in such a sample. The samples were kept in well corked white glass bottles. A good cork is better than a glass stopper. It also appears that practically there is nothing better than an aqueous solution of HCN, and that if carefully prepared and stored it keeps well.

NOTE ON A SAMPLE OF BISMUTHI SUBCARBONAS.

BY J. H. HOSEASON.

Recently I had handed to me a sample of subcarbonate of bismuth which had been used in a prescription containing also calcined magnesia. It was observed that a strong odour of ammonia was given off from the mixed powder. On examination I found that the bismuth subcarbonate contained between 2 and 3 per cent. of ammonia, and also gave very distinct evidence of the presence of nitric acid. It seems evident that the presence of these impurities was due to imperfect washing of the product in the process of manufacture.

REPORT ON COMMERCIAL FERRI PHOSPHAS.

BY J. LOTHIAN AND J. H. HOSEASON.

The authors reported that they had examined twelve commercial samples of ferrous phosphate. The average percentage of $Fe_3 2PO_4$ in the twelve samples was 26·39, or rather more than 6 per cent. below the official standard. The poorest sample contained only 9·84 per cent., and the best 44·75 per cent. The latter and another containing 34 per cent. were the only two which reached the official percentage. The results emphasized the necessity for every pharmacist estimating this and similar chemicals occasionally, so as to keep them up to the B.P. requirements. It was their opinion that the method of precipitation had a good deal to do with the prevention of oxidation. Those samples which were bulky and greenish in colour showed a lower proportion of ferrous salt than those which were denser and of a more slate-blue colour. They therefore recommended the employment of hot concentrated solutions so as to have the precipitate as dense as possible.

NOTE ON A DEPOSIT IN TINCTURA QUININÆ AMMONIATA.

BY JOHN LOTHIAN.

In making ammoniated tincture of quinine I had observed that, although quite clear when prepared, on standing a few days it deposited a brownish-white flocculent substance. I was satisfied that the quinine salt was the cause of this deposit, because a mixture of ammonia and proof spirit, without quinine, showed none. This mixture gave, however, a distinct yellow coloration which has been attributed to a resinous compound formed by the action of the ammonia on aldehyde present in the spirit.

To ascertain the nature of the deposit I collected that which had been thrown down from one pint of the tincture, washed it with a mixture of ammonia, spirit and water, and finally with a little pure ether to thoroughly free it from quinine. When the deposit was now examined under the microscope it appeared amorphous, but on being moistened with absolute alcohol or chloroform acicular crystals soon made their appearance.

I now treated the deposit, which had been freed from quinine, with boiling alcohol. This on evaporation left a crystalline residue which proved to be an alkaloid. It was dissolved in a few drops of acetic acid. It gave a precipitate with potassium sulphocyanide, which on being examined under the microscope proved to be cinchonidine thiocyanate. The presence of cinchonidine was confirmed by the ammonia and ether test. It is clear, therefore, that the cinchonidine originally present in the quinine is thrown out of solution when the tincture stands. It does not constitute the whole of the deposit, a brownish substance being left, the nature of which I have not exactly determined.

I now examined the quinine sulphate from which the tincture had been prepared and found it to have the following composition:—

Quinine sulphate	84·5
Cinchonidine sulphate	2·5
Water	13·0
	100·0

It is therefore a very good sample, as the B.P. says quinine sulphate should not contain much more than 5 per cent. of alkaloids other than quinine. Considering that the B.P. standard admits a quinine sulphate containing about 5 per cent. of cinchonidine sulphate, I think the directions for preparing the tincture might be advantageously amended by adding the words, "Allow to stand four days and filter from any deposit." As has been frequently pointed out the use of heat is unnecessary.

I also prepared the tincture from quinine sulphate which had been repeatedly recrystallized. The tincture thus prepared showed a slight deposit, but not to the same extent as with the original sample.

The reading of the papers was followed by a very interesting discussion, taken part in by Messrs. Bennet, Cowie, Findlay, Gillies, Hill, Hoseason, Lothian, MacAlley, McEwan and Macpherson, and on the motion of the Chairman a cordial vote of thanks was awarded to the authors.

ABERDEEN CHEMISTS AND DRUGGISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

Under the auspices of this Association a concert was given in the Silver Street Hall, on the evening of Friday, the 28th November.

The Hall, seated for 400, was crowded, several of the masters having accepted invitations to be present.

Mr. G. Cowie, President, occupied the chair, and was accompanied to the platform by Dr. Presslie and Mr. Mortimer.

The Chairman, having tendered to all present a hearty welcome, referred to the growing strength of the Association, and remarked that the interest taken in its work and welfare was not confined to its own membership, as was manifested by such a large and representative gathering. A long programme of songs, etc., was then gone through. Worthy of special notice was the representation of a dramatic sketch, entitled "A Storm in a Mortar," or a day with a pharmaceutical family in the year 1900, composed by Mr. MacWilliam, Vice-President.

At the close, Dr. Presslie, in proposing a vote of thanks to the Chairman, briefly alluded to the position of the younger members of the trade as compared with that of twenty years ago.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At the meeting of this Association held on Thursday evening, 20th ult., Mr. George Little, Vice President, in the chair, Mr. Robert M. Lindsay, Honorary Secretary, read a highly interesting paper on "Pharmacy as it is." The history of pharmacy was first briefly reviewed, after which Mr. Lindsay traced some recent progress which had been made. Referring to the subject of new remedies, he pointed out that the apparent superiority of the Germans in the production of such was due to the excellent pharmaceutical and general curricula which were enforced in that country, and which might with advantage be imitated in this. He advocated higher education as a remedy for many of the evils which at present exist in the craft. The Pharmacy Acts Amendment Bill was also briefly reviewed.

In the course of a few practical pharmacy notes, Mr. Lindsay exhibited and explained an apparatus for the manufacture of lime water. It was shown that it could be made from a glycerine tin by inserting a tap a few inches from the bottom, the space below being reserved for the lime. A glass gauge inserted in the side showed at a glance the amount of liquid contained in the vessel.

Mr. Lindsay also presented a number of interesting specimens of iron ores to the Association.

Some discussion followed the reading of the paper, in which Messrs. McDonald, Forsyth, Edwards, Mair and others took part, and Mr. Lindsay was awarded the thanks of the meeting for his paper and specimens.

Reviews.

I. TABELLARISCHE AUSZÜGE AUS DEM ARZNEIBUCH FÜR DAS DEUTSCHE REICHE dritte Ausgabe (Pharmacopœia Germanica editio tertia), zum Gebrauche für Apotheker, Apotheken-Revisoren, Aerzte, etc. Zusammengesteilt von THEODOR PUSCH.*

II. DEFEKTUR-TASCHENBUCH enthaltend eine kurze Zusammenstellung aller in dem Arzneibuch für das Deutsche Reich (Pharmacopœia Germanica editio tertia) gegebenen Vorschriften für die Darstellung chemischer sowie pharmaceutischer Praparate und Reagentien, bearbeitet von THEODOR PUSCH.*

III. ZUSAMMENSTELLUNG DER WICHTIGSTEN VERÄNDERUNGEN in dem am 1 Januar 1891 in Kraft-tretenden Arzneibuch für das Deutsche Reich dritte Ausgabe gegenüber der Pharmacopœia Germanica editio altera.†

These three tiny pamphlets have been issued with the object of familiarizing the minds of medical men, pharmacists, and others concerned, with the changes in the official materia medica consequent upon the coming into force of the new German Pharmacopœia at the beginning of next year.

The first two are issued from the office of the German Pharmaceutical Association. In No. I the principal features of the new medicine book are arranged in a tabular form. First come complete and separate lists of the chemical preparations, drugs, pharmaceutical preparations and reagents and volumetric solutions. These are followed by tables of maximum doses, specific gravities, melting-points, boiling-points and solubilities; lists of potent medicines that are to be kept "very carefully," "carefully," or sheltered from light; lists of the extracts grouped according to their consistency; lists of minimum quantities of active principles in drugs and preparations, etc., etc.

No. II. contains in thirty-two small pages the essential parts of the official directions for making all the chemical and pharmaceutical preparations as well as the reagents. This is made possible by a free use of abbreviations and a condensation as far as practicable of the general instructions.

No. III. is a collection of the most important changes in the new German Arzneibuch as compared with that which it is to displace, and is intended especially for the information of medical practitioners as to the new medicinal substances and preparations introduced into the Pharmacopœia and the changes in the doses of the older ones. This pamphlet is a reprint of an article that has appeared in the *Pharmaceutische Centralhalle*.

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[*] Berlin: Verlag des Deutschen Apotheker-Verein, 1890.

[†] Dresden: Expedition der Pharmaceutischen Centralhaller, 1890. 10 Pfenniger.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PHARMACY ACT AMENDMENT BILL.

Sir,—There must necessarily be a variety of opinions on any one subject, and this Act is no exception; and perhaps a little more than usual, because so many interests are involved. But I hope "Quiscus's" opinion is not that of the larger number of pharmaceutical chemists, because the views expressed on clause 6 are illiberal and are those which would not be calculated to produce good feeling, which is so much desired between Major and Minor men. Of course it is only natural that having passed a higher examination more advantages are wished for. But it is the fault of the original Act, not of the present Minor men; the Government saying then that the Minor examination was sufficiently a test of fitness to sell and dispense poison, so that is the legal qualification, leaving anybody who has money or time to obtain a higher qualification which gives them a distinct title. But surely "associates in business," who pay the same subscription and who are increasing in number, will practically in a few years will be the majority of the Pharmaceutical Society, and if so, is it right that a minority should govern the majority? Would the Council be the representatives of the Society, and in what other elective society do the minority govern the majority? It is quite a new idea to me that Minor men are a class more likely to wrangle and do more business in the stomach line than our brothers, the pharmaceutical chemists. Such remarks I consider perfectly absurd, and I am afraid a council composed of such men as "Quiscus" would soon reduce the Society till it consisted of a very select number of pharmaceutical chemists, but practically powerless. But I am glad to see the pharmaceutical chemists, of whom the Council consists, are of a more liberal stamp; and they wish to consolidate to one real electorate, which I hope they will be able to carry out. At the same time, I think if a clause were added saying that the title of "chemist and druggist" was a personal one, we should have a splendid Bill, which I think all chemists would support with all their might, and I think we would have all probability of getting just claims, though we must not expect too much protection in these days of free trade. But the man who has the best personal qualifications is the man in the future who will hold his own against simply trade competition.

FRED. G. WALTON.

THE MILK OF SULPHUR CASES.

Sir,—There seems to me one point that has escaped notice in the Kensington case—that is the heavy fines inflicted. I take it the magistrate was guided by Mr. Cassel's statement that the preparation was injurious to health. I would like to ask on what authority such a statement was made? Fifty years ago, where I was apprenticed, we sold large quantities every year of milk of sulphur. I never heard of a customer being injured by it. Again he said, "applied externally it would irritate the skin, being gritty." I have just examined an ancient parcel; it is really smoother than sulph. præcip. The magistrate was also told if milk of sulphur is asked for sulph. præcip. or sulph. sublim. (!) should be supplied. I ask on whose or what authority? Not the B.P. At page 463 Pereira says not a word about its being "injurious," but "I was informed by an extensive manufacturer that he prepares both kinds, the pure (sulph. præcip.) and the adulterated (lac sulph.), and that the firm of Messrs. Barry is almost the only one which buys the pure kind." I feel it was a monstrous and cruel thing to fine a man £5 and costs, besides injuring his business. My old friend Dean I remember once saying "Druggists were like a flock of sheep," and if Mr. Long's efforts result in their standing together by meeting and looking after their trade interests such a case as this would not again occur.

AN OLD DRUGGIST.

F. Gilbert.—It is not necessary to pass any particular examination to attain the qualification.

A. P. S.—The question should be addressed to an authority on therapeutics.

Islington.—The "compound sulphur lozenge," as ordered by Dr. A. B. Garrod (*Lancet*, 1889, i., 665), "contains in each five grains of the milk of sulphur and one of cream of tartar. . . . There are usually about twenty to the ounce avoirdupois."

Erratum.—On p. 479, col. 1, lines 13 and 14, in Mr. Hill's note on "Salicylic Acid," *for* "I am quite sure that it was clearly determined that this body was cresotic acid," *read* "I am *not* quite sure," etc.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Harvey, Seccombe, Blount, Brunker, Brown, Collingwood, Matthews, Gilbert, Clarke, Hagon, Ajax, Justice and Reason.

ON THE SO-CALLED "EUCALYPTUS HONEY."[*]

BY T. P. ANDERSON STUART, M.D.

Professor of Physiology, Dean of the Faculty of Medicine, University of Sydney, N.S.W.

A letter from a friend in Paris dated April, 1889, informed me that for some time a product known as "eucalyptus honey" had been imported from Sydney into France. The letter stated the following:—"The honey is found everywhere in New South Wales co-extensively with eucalyptus trees, and is gathered by small black wild bees; hives containing 6000 kilos. are by no means rare. It is easily bought in large quantities in Sydney, all the more since it is not fit for use at table, and it is used in Paris for medicinal purposes."

The writer was perfectly sincere, for he sent me money to buy a large quantity for him, also analyses and samples, and said that in 1887 6000–7000 kilos. of this honey arrived in Marseilles from Sydney. Later letters from the same source in Paris showed that doubts had been raised as to the genuineness of the honey. Some thought it was not honey, but a sort of manna or exudation from the leaf gathered therefrom by an "insect without sting," of which nothing was known in Paris; others thought it was simply a "confiture" from the fruit of some sort of eucalyptus; while others—who came nearer the truth—suspected that to the honey of the native (Australian) bee a certain quantity of eucalyptus leaf oil had been added.

On making inquiries in commercial circles I found who had shipped the before mentioned honey. I was at the same time informed that the honey is "ordinary bush honey, but gathered where the eucalyptus tree abounds. It can be supplied at about 3½*d.* per pound. On arrival in France it is subjected to some treatment which is patented, and it is made up into a preparation used for injections, etc." "During last year 7 tons of it were shipped."

There were sent to me from Paris, at the same time as the letters, in all three samples of the so-called eucalyptus honey. On uncorking these samples one was at once struck by the extreme fragrance of the contents, the odour being in no wise distinguishable from that of the ordinary eucalyptus oil in common use; that is, the oil obtained from leaves of various sorts of eucalypts. I think it is not unlikely that one of these samples formed the subject of the following extracts from *The Australasian Journal of Pharmacy*, Melbourne, February 20, 1889:—"Eucalyptus Honey.—This is the latest Australian fraud. We have examined a sample of this mysterious product and have no hesitation in declaring that it is a mechanical mixture of leaf eucalyptus oil with ordinary honey. A pamphlet entitled 'Note sur Miel Eucalypté Naturel Sécrété par les Abeilles noires Sauvages de Tasmanie (Australasie)' has been issued by Dr. C. Thomas-Caraman. This note was read before the Académie de Médecine on January 25, 1887, and included an account of some experiments on man and lower animals." The *Australian Journal of Pharmacy* (Appendix) concludes as follows:—"It is impossible to say what is the exact nature of the substance as originally discovered, but from the sample produced in Sydney, and reputed to be the above, there can be no doubt as to its origin and as to the process of manufacture. We fear the learned doctor has been the victim of a practical joke." In Christy's 'New Commercial Plants and Drugs,' No. 11, 1889, an account of eucalyptus honey is given which seems to be mainly, if not entirely, derived from the note of Thomas-Caraman.

The pamphlet reads as follows:—

"*Natural Eucalyptus Honey.*—Secreted by the wild, black, Tasmanian bees in enormous hives, constructed by themselves, on the summits of giant Eucalyptus trees. By Dr. Ch. Thomas-Caraman, Physician to the Thermal Establishment of Forges-les-Eaux, Normandy, France. Note read at the Academy of Medicine, Paris, January 25, 1887.

"*Translated from the French by T. B. Melhuish.*

"HISTORY OF THE DISCOVERY.

"On the 25th day of May, 1884, Mr. E. Guilmeth, French explorer, distinguished naturalist, and also doctor (*in partibus*), pursuing his travels in the centre of Australasia, arrived in a vast and magnificent glade, traversed by a shallow stream, carpeted with a thick sward, and surrounded by eucalypti to the height of 80 to 120 metres.

"He halted on the borders of the stream, and after having restored his forces, proceeded to examine the splendid panorama, a veritable majestic circus, to the interior of which fate had conducted him. By the aid of his telescope he soon perceived, at a height of about 80 metres, in the fork of two large branches, an odd shaped hut, squat or thickset and rounded into a dome, the exterior part, of a dark dull colour, reminding one somewhat of the mud coverings in our own country parts. It was 3 o'clock in the afternoon, the thermometer registering 18° in the shade, and the blue sky glistened above the sylvan nobles.

"This massive wart, this amazing growth, interested the traveller greatly (Mr. Guilmeth believed that he had discovered a monster gall). He continued his examination from different points of view without being able to solve the mystery. To climb a tree of such a height was an impossibility. He waited patiently, putting down his telescope at intervals, and bending his neck tired by prolonged extension. His perseverance was rewarded.

"About half-past four, in fact, he heard a continuous murmuring, a distant humming, and then perceived a myriad of black insects, smaller than our bees, buzzing around an opening in the hut. No doubt for our naturalist; there was an immense hive of a species of black bee unknown to him. He now remembered that he had sometimes seen his Australians, when sick, sweetening their beverages with a sort of honey which had not attracted his particular attention. This discovery, of which he could not as yet calculate the importance, excited the enthusiasm of Mr. Guilmeth to such a degree that he determined without delay to possess himself of one of those hives.

"To order his Canaques to ascend and expose them to the mortal stings of this terrible legion would be madness. He, therefore, called on his two carpenters, who accompanied him on his journeys of discovery; and having thoroughly greased their saws, they commenced the cutting down of the selected eucalyptus.

"A strange incident occurred during the progress of the work; spy bees sent out from the colony above came to within a distance of five metres of the workmen, made their inspection, disappeared on the wing and were replaced by others. This continued to the finish.

"The work of cutting down was only completed on the following day. The tree had a diameter of seven metres. Mr. Guilmeth saw some so large that the circumference was such that forty Canaques, holding hands, could scarcely embrace the trunk; that is, supposing each man to cover one metre and a half (the Canaques being but small men), 20 metres diameter.

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[*] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, December 10.

"At last, after a thousand precautions, the progressive sawing, aided by the chopping of the axe on the different sections, being terminated, the whole caravan hauled on long ropes tied to the tree at a height of 25 metres, and the giant losing its equilibrium on its severed trunk, fell with a sudden crash on the turf, shaking the ground at a distance of several hundred metres.

"Now commenced the rage of the bees, a deafening buzzing and humming, and a violent desire of the expelled to defend the home which they had constructed in common.

"Mr. Guilmeth, who watched the scene from a distance, now collected a squad of Canaques, and they with face and hands protected with cotton-stuffs, advanced to the attack of the hive, whilst beating on a kind of tambourine of the country. Before long the queen bee was seen to fly away, followed by nearly all her subjects; and two hours after the fall of the tree, one was master of the place.

"Mr. Guilmeth could now taste the honey, and he found it so charged with all the active principles of the eucalyptus (essences and others), of which he knew the remarkable therapeutical properties, that, having gathered the spoil, he determined to retrace his steps and to send us a certain quantity of the honey.

"In three days, on the spot, they built with planks cut from the eucalyptus, a series of small cases to carry the honey. Mr. Guilmeth gathered 3500 kilograms and the hive still weighed 1000 kilograms; that is to say, the whole weighed 4500 kilograms.

"Since that time Mr. Guilmeth has levelled eucalypti with hives weighing 6000 kilos, and giving 5000 kilos of pure honey.

"THE BLACK BEE—THE HONEY—ANALYSIS, COMPOSITION.

"THE BEE.—We have been unable to find any information whatever in dictionary, treatise, or monograph, concerning this insect. We are much pleased, therefore, to be able to present to the members of the Academy two black specimens of these marvellous workers. Until more amply informed we propose to name this insect 'Apis nigra mellifica.' This bee is black, smaller, and its tongue or trunk is, or appears to be, much more developed than that of our own specimens of France or Algeria.

"Mr. Guilmeth has essayed, without success, to domesticate these insects in Tasmania.

"It has also been tried to settle bees in Algeria in the neighbourhood of eucalyptus plantations, hoping, by such means, to obtain a particular kind of honey. It is a well-known fact that the Narbonne honey owes its special perfume to the rosemary of the surrounding hills and slopes, that of Mount Hymettus to the labiates which cover that mountain. The domestic bees, condemned to live on the flowers and leaves of the eucalyptus, slowly died off; and it was found necessary to entirely renew the flora, provisionally destroyed, to nourish the new swarms.

"The glass with two compartments separated by a black metallic disc encloses, in the one side, an entire bee which was found in the honey forwarded to us; on the other side, the remains of cell, hive, and a very tiny young bee.

"The habits of our little winged negresses are, according to Mr. Guilmeth, nearly the same as those of their civilized comrades.

"THE HONEY.—Passed through a medium strainer, at a temperature of 20 deg., it presents the aspect of a liquid pretty transparent, syrupy, thick, homogeneous, and of a deep orange colour. Its odour, *sui generis*, immediately discloses its nature and special composition. If allowed to use the expression, it smells of eucalyptus *a plein nez*. It is very soluble in water, milk, and natural wines; much less so in alcohol. Its fermentation is very difficult, on account of the great proportion of sugar (levulose) contained in it, viz., 612 in 1000. In spite of the most attentive precautions in maintaining an even temperature of 25 degrees, we were, quite recently, unable to provoke fermentation to any great extent.

"ANALYSIS, COMPOSITION.—Since the end of 1884 several comparative analyses have been made. We mention only the last, which is the most complete, and permits us to form an exact idea of the immense therapeutic value of this remarkable natural product.

"The following analysis has been made by Mr. C. Hérisson, former student of the Museum of Natural History (Laboratory, Fremy), Assayer at the Mint and Director of the Laboratory of the Chevrier Pharmacy:—

Deviation of polarized light . . .	22·00°
Density	1·44
Honey, 1 kilogram	
Sugar (levulose in major proportion)	611·6
Ash	1·8
Water	215·6
Active Principles { Eucalyptol, Eucalyptene Terpene, Cymol, Colouring, fragrant, and resinous matter }	171·00
Total . . .	1000·00

"*A priori*, that which strikes one most is the enormous amount of absolutely pure reducing sugar, and especially that of the active principles.

"In 1870, after the remarkable work of Dr. Gimbert on the *Eucalyptus Globulus*, eucalyptol came most prominently into notice—a product relatively dear and scarce. It passes over first in the distillation of the flowers or leaves, but it was soon recognized that with it are hydrocarbons in large quantities of inappreciable therapeutical use, one of which possesses most singular properties vaguely described in former works. Thus Mr. Hérisson, in following out the different phases of analysis, having approached the apparatus, was seized with continual and violent sneezing. Now we can breathe with impunity the eucalyptol proper without experiencing this effect.

"The eucalyptol of the honey, as the members of the Academy may perceive by the sample presented, which comes from a previous analysis, forms a white liquid, slightly coloured amber and nearly opaque. The whole of the other active principles consist of a greyish brown mass, opaque, and of a special odour differing from that of eucalyptol. It contains eucalyptene, terpene, cymol, etc.

"It has been attempted to reconstruct the eucalyptus honey by mixing as intimately as possible in a suitable apparatus, all the proportions indicated by analysis of Narbonne honey, and the active principles recently extracted from natural eucalyptus honey, but the results have been a failure. In spite of the utmost precautions it was impossible to obtain a homogeneous product. The active principles remain in suspension, the honey soon returns to its former state, all that is volatile evaporates, and the rest collects in the mass in separate small quantities.

"The above *brochure*, read before that august body the Faculty of Medicine at Paris, was kindly lent to me by a friend. The honey being a product of this country, interested me from the fact that, up to the present, I have not succeeded in hearing of or gathering any particulars of this wonderful preparation; nor have I succeeded in gathering any particulars concerning the travels of that intrepid explorer, Mr. Guilmeth, and his immense hives containing, according to his own words, as much as 10,000 lbs. weight of honey each. Any information on this subject I should like to see ventilated in the columns of the *Pharmaceutical Journal*, as I think it would be of general interest to pharmacists to know something more about this preparation, which exists in our midst as it were (if it exists at all).—T. B. Melhuish, 134, William Street, Sydney, N.S.W." (The translation appeared in the *Australian Journal of Pharmacy*.)

Experiments carried out on animals showed surprising diminution of the rapidity of the heart's beat, lowered temperature, a slight tendency to sleep—the effect lasting some twenty-four hours. In a healthy man a good spoonful causes an agreeable sense of warmth, and then when the active principles are excreted by the lungs the voice is clearer and the breath perfumed—one feels as if the lungs were more elastic, more supple. Four spoonfuls per day during one week made him better able to meet sustained muscular effort; the urine was increased and had an odour as of cassia—urea was increased "(orange deposit on the walls of the vessel)." How this indicates urea I am at a loss to know.

Physiological Properties and Therapeutical Application.—As a food it may replace cod liver oil; anticatarrhal in bronchial affections, a cardiac sedative, febrifuge, antiseptic, antiblenorrhagic, so may replace copaiba and sandal oil, "than which it acts more energetically."

Conclusions.—We may thus conclude that eucalyptus honey is destined to play a great *rôle* in the treatment of affections of the larynx, bronchi, and lungs, heart, and in scrofulous affections, miasmatic and typhoid fevers, whooping cough, influenza, renal, venid and vaginal affections. Finally, in replacing the disagreeable cod liver oil, it brings happiness to patients. End of the pamphlet.

Now when I read this pamphlet, I instinctively felt that it was contrary to my experience, and some persons who ought to know all about this honey if it existed used very strong language indeed. Amongst others I asked Mr. Fred Wright, Chemist to the establishment of Elliot Bros., wholesale druggists in Sydney, who knew nothing about the existence of such a honey as "eucalyptus honey" beyond what he had learned from various European and American prints. Mr. Wright then sent out 200 circulars to druggists throughout Australia and received eighty replies, saying that they did not know of any such honey as he described. Upon submitting to Mr. Wright the sample which had been sent to me from Paris, he too at once saw that it was the leaf oil that was present in the honey, and upon examination he found that it was ordinary honey to which the ordinary eucalyptus oil obtained from the leaf of certain eucalypts had been added.

Upon consulting Mr. J. H. Maiden, Curator of the Technological Museum in Sydney, he immediately said that he knew of the matter, and was afterwards good enough to send to me some notes. (Appendix.) Upon examining a specimen in the Museum of the honey from the hive of the native bee it was found free from the odour of the leaf eucalyptus oil, and, indeed, had very little odour of any sort.

I also saw Mr. Hamlet, Government Analyst in Sydney, and he was good enough to analyse some honey, and these are the results which he has kindly given to me (Appendix).

It might be said that all these authorities knew only about Australia, whereas it was in Tasmania that Guilmeth found his great hive, that of which Caraman wrote. Not that I would attach very much importance to such an objection, because in certain regions of both countries eucalypts abound. Further, the description of the little black bee given by Guilmeth clearly corresponds to one of our Australian native species. Thus given the bee and the eucalypts, I should imagine that the same sort of honey should be gathered in both countries. Still, to meet the possible objection, in my holiday this summer I visited Tasmania, and travelled in many parts of the island. I inquired of Mr. Morton, Curator of the Museum in Hobart, and he did not know of the existence of these great hives or of the honey smelling of the eucalyptus leaf when bruised—the leaf oil. Then I made inquiries in various parts and of many different persons, and did not hear anything to lead me to the belief or knowledge that there was any "eucalyptus honey."

Then again in the pharmaceutical press of Australia the existence of the honey is doubted and denied. No evidence, so far as I am aware, has been adduced proving its existence, and this, I think, may be taken as proof that it does not exist, and if it does at all it certainly does not exist in the huge quantities which I ascertained to have been shipped from Sydney.

In speaking of "eucalyptus honey" it is necessary to be somewhat more precise, for two kinds of honey might come under that heading. First, there is honey gathered by the imported Liberian and Italian bees from the eucalyptus blossoms, and then second, there is the honey gathered from the eucalyptus blossoms by the indigenous bee.

The honey gathered by the imported bee is a common article of commerce in Sydney, but it has no odour of bruised eucalyptus leaf, and it does not contain any of the leaf oil and is commonly used at table. Evidently this is not the honey in question.

In the course of my inquiries I found out who had shipped the honey from Sydney, and so I proceeded to the district in which the shipper lived and procured a native (indigenous) bee hive, which I brought with me to Sydney. Arrived in Sydney I put it out in my garden and soon saw the bees at work. Some of these very bees I show you now. I then split the log in which the hive was. One portion is now in the Australian Museum, Sydney, another portion is now in my laboratory, and another portion I show you now. I gathered the little honey that I found in the hive, and I show you now a portion of that honey filtered through paper under a bell-jar. It will thus, I think, be seen that I am in a position to give peculiarly authentic information as to the eucalyptus honey of which we have heard so much.

First as to the bee itself. Caraman says that he was "unable to find any information whatever in dictionary, treatise, or monograph concerning this insect. We are much pleased, therefore, to be able to present to the members of the Academy two black specimens of these marvellous workers. Until more amply informed we propose to name this insect 'Apis mellifica nigra.'" What nonsense this is!

Mr. Harold J. Hockings, of Brisbane, Queensland, in a paper "Notes on Two Australian Species of Trigona," read on August 1, 1883, and published in the Transactions of the Entomological Society, of London, gives a detailed and valuable description of two varieties of these indigenous bees, and he gives an admirable account of all their habits; and to his paper I am indebted for much of my information about these bees. He says the first of the varieties he describes may be identical with *Trigona carbonaria*, Smith. The second differs very little from the first, and he believes there are several other varieties in Queensland and in the Southern Colonies, some of which differ but little from the two which he describes. On inquiry I find from Mr. Olliffe, Entomologist at the Australian Museum, Sydney, that the "native bee" is *Trigona carbonaria*, Smith. This is the species I got, and show you now.

Both varieties build their nests in hollow trees. Mr. Guilmeth said he discovered "a massive wart," an "amazing growth," believed he had discovered a "monster gall," in the fork of two large branches "an odd-shaped hut, squat or thick set and rounded into a dome; the exterior of a dark, dull colour, reminding one somewhat of the mud coverings in our own country parts" (in France). I have never been able to find anyone who had seen such hives, though many have seen what I have seen, viz., a white ant nest of some 2 feet diameter or more. I have seen such nests, answering more or less to the description of the hive; but of course with such a nest there are none of the bees which Guilmeth describes so entertainingly.

The common variety (*T. carbonaria*, Smith), called by the Queensland natives "Karbi," gathers but little honey, which is stored in pots made of wax so indistinguishable from the pots containing pollen that to get the honey from the comb the latter has to be squeezed *en masse* so that it gets a sour taste that it has not when pure. From four to five pounds would be a fair yield from one of these hives, and they are not much valued even by the natives. In the hive of the other variety described by Hockings, he says, "As much as fifty pounds of honey may sometimes be obtained from a nest of these bees, which is an amazing quantity, considering the size of the insect." Guilmeth, however, says he has got from one hive 5000 kilograms or 11,000 pounds of his eucalyptus honey.

I am told that these truly indigenous bees are becoming so scarce that their hives are now curiosities. The reason given for this is that the imported bees are now very numerous and rob the native bees of their stores of honey. This they are well able to do on account of their greater size and their possession of stings. Indeed, it would seem that the reason why the native bees, stingless as they are, have been able to survive till now is that they had no serious rivals in the shape of stinged bees and wasps. Another reason for their scarcity may be the extensive killing of the timber by the practice of "ringbarking," though this may not have so great an influence as one might suppose, since the felling of the trees is followed by the springing up of wild flowers, clover, and other honey-yielding plants from which the native bees take their honey apparently as easily as from the eucalyptus flowers. This, in fact, is of importance to this question, for both the imported and the native bees take their honey from where they can get it, so that the contents of the hives of both kinds may be of very mixed origin. Sometimes, however, a honey obtained from only or mainly eucalyptus flowers may be obtained, as when in some particular district some particular species of eucalyptus tree is the only plant in bloom at the particular time. Then even the honey has no smell as of the bruised leaf—why should it? The odour of any eucalyptus flowers that I have met was always very different indeed from that of their bruised leaves. The flowers of Australia are upon the whole small—this may account for the small size of the bee that frequents them.

Even the resin which is used by the bees, as I am told, to stop the fissures in the hollow log where the hive is, does not smell of the bruised leaf. Why should it? The leaf is the only part of the tree that has the odour of the bruised leaf, so that only products of the leaf should smell of it, and the honey comes from the flower and the resin exudes from the stem.

No one cultivates the native bee—partly because themselves so small, their wants are small; thus their store of honey is small, and so they are not worth the trouble when one can so easily get the more productive imported bee. Then this honey is thin, and with a not very pleasant acid taste. Then, again, I am told they are not so easy to manipulate as the imported bees, and they are very fickle, often take it into their heads to go away and leave their hive.

Thus, taking into account the small quantity and poor quality of the honey they make, their increasing scarcity, and the little likelihood of their ever being cultivated, it is little likely that the honey either is or ever can be an article of commerce. That seven tons of their honey was shipped from Sydney last year is too absurd altogether. That the samples of "eucalyptus honey" sent to me from Paris were ever gathered by bees I do not believe. That natural honey ever has the odour of the bruised eucalyptus leaf, *i.e.*, the well-known eucalyptus odour I do not believe; but I do believe that somebody somewhere has mixed eucalyptus leaf oil with common honey and has called it "eucalyptus honey."

APPENDIX.

I.—Note on Eucalyptus Honey.

BY J. H. MAIDEN,

Curator of the Technological Museum, Sydney.

In the colonies eucalyptus trees are very abundant, and they are often hollow. The circumstance of the native bees making their hives in trees of this genus is quite accidental.

A sample of honey of the native bee in the Technological Museum, the origin of which is open to no doubt, possesses no smell of eucalyptus oil. I have communicated with correspondents in all parts of the colonies, and have spoken to dozens of people on the subject. Their replies are usually to the effect that the honey never smells of essential oil, though a few state that occasionally a trace can be detected. I have never heard of or seen a sample of authenticated honey from the native bee approaching in any degree the intensity of odour possessed by the sample under consideration. Here is a specimen communication from a farmer in New South Wales:—"Now I myself have taken a great many out of the gum trees, and have eaten their honey, but I do not remember ever any of it tasting in that way, and also have asked several of my friends now what was their opinion on this matter, and they are all the same as myself. I also say that the main flowers they make this honey from are wild flowers, clover, etc., though, of course, they also go to the gum tree, and in fact to every kind of tree, flower, etc., in the country, and I also say that the storing in the gum tree has nothing to do with the bitterness, for I have found as many of them in other trees as I have in the gum, and all honey tastes the same."

The honey sometimes remains in the hollow of a tree for three years, and during that time it can readily be understood that a stray leaf may get into it and flavour it. But the essential oil thus imparted can never amount to more than a trace.

In some parts of the Colonies honey of the native bees forms an important portion of the food of the aboriginals, and in outlying places white men are frequently glad to vary their diet with it. The method the blacks adopt is ingenious. The sight of one of these little bees on the wing puts them on the alert. With no small skill they catch one of these insects without injuring it, then cement the pappus of a composite plant or a fragment of feather to the bee by means of a little of the juice of a euphorbiaceous plant. This serves as an indicator, and the captive is set free. It flies to the hive in a bee-line. The black fellow fixes his eye on the insect, and over all obstacles in his way he runs, but never loses sight of the bee. The earnest gaze of the black fellow, his obliviousness to everything but the bee, the dangers and difficulties he just avoids, make the chase interesting and amusing by turns. The bee having conducted his pursuer to the hive, the blackfellow either fells the tree straightway or marks it.

The hive of the native bee is small, rarely exceeding one foot cube. The honey is particularly fluid, and evinces little or no tendency to crystallize.

The present sample readily crystallizes, and its physical properties differ in no way from the honey of the European bee. On digestion with petroleum spirit it yields about 15 per cent. of eucalyptus oil, and it is therefore an artificial compound of those two substances, and is not what it professes to be, viz., the honey of an indigenous Australian bee.

II.

Eucalyptus Honey.—This is the latest Australian fraud. The preparation is said to be the natural product of the eucalyptus tree as gathered by the wild bees of Australia, and is reputed to be of great medicinal value. We have examined a sample of this mysterious product, and have no hesitation in declaring that it is a mechanical mixture of leaf eucalyptus oil with ordinary honey. A pamphlet, entitled "Note sur le Meil Eucalypté, Naturel Sécrété par les Abeilles Noires Sauvages de Tasmanie," has been issued by Dr. C. Thomas-Caraman, and the experiments of this physician were communicated to the Académie de Médicine on the 25th of January, 1887. The pamphlet begins with the history of the discovery, which is said to have been made in the year 1884. It is impossible to say what is the exact nature of the substance as originally discovered, but from the sample produced in Sydney, and reputed to be the above, there can be no doubt as to its origin and as to the process of its manufacture. We fear the learned doctor has been the victim of a practical joke.

III.

"Government Laboratory.
"Sydney, *August* 4, 1890.

"My Dear Sir,—With regard to the question of eucalyptol in Australian honey, I have been fortunate in obtaining two samples of honey to work upon, the history of which may be vouched for, inasmuch as the specimens came direct to me without passing through the hands of anyone engaged in trade and the origin very well authenticated.

"One is from the dense bush beyond Gosford, where the bees have nothing but eucalypts and the usual wild flowers, the former being probably the chief source of the honey.

"The other specimen is from a small settlement right in the heart of the scrub of the Richmond River in the north.

"In neither of these samples, nor in any of the previous ones that I examined, is there a trace of eucalyptol to be found; neither by fractional extraction with ether, nor by distillation can I find the smallest ground for the statement that our honey contains any eucalyptol.

"I keep bees myself, and am a member of the Hunter River Bee Keepers' Association, and have during my experience analysed very many samples of Australian honey, but have never found any of the compounds you mention,

"Believe me to be, Sir,
"Yours faithfully,
"William M. Hamlet.
"*Government Analyst.*"

"Professor Anderson Stuart."

"Sydney, *August* 13, 1890.

"Dear Sir,—Herewith I send you my analysis of the honey, which you may use as you like, but you will allow me to read the paper, if necessary, before the Beekeepers' Association of New South Wales. I send you herewith the sample from Richmond River, together with a portion of one of the distillates.

"Yours faithfully,
"William M. Hamlet.

"Professor Anderson Stuart."

"*Analysis of a Sample of Honey obtained through the kindness of Mr. Angus Mackay, F.C.S., Instructor in Agriculture and Bee-Keeping, Sydney Technological College.*

"The honey was contained in the comb in a small section, removed from the hive and conveyed to the Government Laboratory direct, never having been out of Mr. Mackay's sight during the transmission of the sample.

"There were no signs whatever of tampering to the sample, the comb being perfectly intact, the cells being quite sealed from contact with the air.

"The faces of the cells having been sliced off, the honey was allowed to drain into a dish and portions taken for analysis, as follows:—

"Ten grams were taken for the preliminary examination.

"Two litres of a ten per cent. solution of the honey was made with distilled water for polariscopic observations.

"Two separate portions weighing between 5 and 6 grams were taken and dried for a week in a water oven at constant temperature.

"*Preliminary Examination.*

1. "A few cubic centimetres boiled with Fehling's solution at once reduced the usual red copper oxide.
2. "Pure alcohol gave no precipitate.
3. "No precipitate was obtained on treatment respectively with lead acetate and barium chloride.

4. "The solution readily fermented on addition of a little yeast at 75° F.

5. "A small portion of the honey on examination under the microscope, using a $\frac{1}{4}$-in. obj., showed pollen grains, probably of wattle flowers.

6. "A trace of tannin was discovered.

7. "On digesting for several days with pure alcohol traces of a glucoside having a slightly bitter taste was discernible.

8. "About twenty grams of the honey was dissolved in pure water and placed in a new clean fractionating apparatus, and distilled off at a temperature slightly above 212° F., and the distillate was found to be absolutely free from eucalyptol, or any semblance of eucalyptic compound. Oxidation of the distillates failed to give any dipentenyl oxide reaction, Weber's reaction for cineol giving entirely negative results. Finally, the ash was found to contain phosphates.

"Analysis of the honey gave the following figures:—

Water	13·63
Lœvulose Dextrose	78·98
Cane sugar	none
Wax, pollen, and organic matter	2·15
Ash	·31
Undetermined	4·93
	100·00

"Another sample of honey from the Blue Mountains (locality not specified, but most likely near Glenbrook) was examined for eucalyptol with entirely negative results.

"A third sample was sent to me from the Richmond River, where nothing but eucalyptus trees are available for the bees. This was found to be devoid of all eucalyptus odour, and on distillation and extraction with ether no eucalyptus compound was discovered.

"Some of the honey from my own bees (two hives) was found to be similarly devoid of eucalyptol, and these bees depend chiefly on the native flowers and gum trees.

"From these results and from my past experience of honey obtained from different parts of the Colony, I am of opinion that the existence of eucalyptol in Australian honey is a pure fiction, and quite unknown to the bee masters of New South Wales.

"WILLIAM M. HAMLET, F.I.C., F.C.S.
"*Government Analyst for N.S.W., Member of the "Hunter River Bee Keepers' Association.*"

[*The discussion on this paper is printed on p.* 522.]

RECENT DONATIONS TO THE MUSEUM.*

BY E. M. HOLMES, F.L.S., CURATOR.

JAVA.

Some months since, at the time that Professor Dunstan was investigating some of the wood believed to be the product of *Celtis reticulosa*, a specimen of which had been handed to him from the Hanbury collection, I wrote to the Director of the Java Botanic Garden to inquire, 1st, if several other trees which were known to the Malays by the same or a similar name had the same peculiar fœcal odour or were likely to contain the same principle, skatole; 2nd, if it would be possible to send for the Society's Herbarium specimens in fruit of the plants yielding the various false cubebs that have entered into commerce; 3rd, if anything was known of the trees producing the Penang and Palembang benzoins of commerce, which differ in physical characters and odour, and are probably obtained from different species of *Styrax*; 4th, if the method of preparing the beautiful bright red dragon's blood in sticks from Pontianak was known. Some of the last named product was exhibited at the Paris Exhibition in 1878, and was considered by an artist to whom I showed it to be of sufficient value as a colour for inquiry to be made, if it could be regularly obtained in commerce. In reply to these inquiries I received, a few weeks ago, the following specimens and the accompanying letter from Dr. M. Treub, the Director of the Government Botanic Gardens in Java.

"Dear Sir,—I have the pleasure to inform you the despatch of a wooden case containing the following objects for your Museum:—

"1. Several pounds of ki-taai or kayoe taai from Java. [Preanger Regencies]. (A beautiful drawing of the *Celtis reticulosa* accompanied this specimen.)

"2. Dried herbarium specimens of *Cubeba mollissima*, *C. canina*, and *C. officinalis*, with dried fruits and fruits from the latter in spirit.

"2. Benzoin [Palembang] as sold at Java.

"4. A piece of the wood of *Styrax Benzoin*, with the benzoin on the surface of the bark and a dried specimen of the plant.

"5. Dragon's blood from Borneo.

"(*a*) Djernang-koekoe, 3 pipes of dragon's blood with a fruit.

"(*b*) Djernang-mandai, 8 fruits in a little box.

"(*c*) Djernang beroewang, 3 fruits.

"(*d*) Three cakes of dragon's blood wrapped in leaves.

"(*e*) Two flat cakes of the same not wrapped in leaves.

"(*f*) A small piece of dragon's blood said to be quite pure. [In a box].

"(*g*) Dragon's blood from Sumatra.

"The ki-taai or kayoe taai had been found to be the wood of *Celtis reticulosa.*

"Dr. Gustroff, who made a study on the subject, informs me that all the other plants said to yield skatole [*Premna corymbosa*, *Premna foetida*, *Saprosma arboreum*] do not contain it. They are only called ki-taai [stinkwood] by the Javanese because they all smell very bad.

"As to the origin of the false cubebs sent to me, I am sorry to say that they are not known to me except the 'keboe-cubebs,' which seems to be the fruit of *Cubeba mollissima*, Miq. [Miquel commentatio de vero pipere cubebe. Leiden, 1838—1839]. I believe the others are not from here.

"From the benzoin enclosed in the case together with the dried specimen of the plant yielding it, you will see that there is no difference as to the botanical origin between the Palembang and Penang varieties. The enclosed benzoin is sold at Java and is the true Palembang. Perhaps the Palembang benzoin in your Museum is old. If fresh it has the same colour as the Penang, and not that translucent appearance of the specimens you send me. It has quite the same colour and pale spots as your Penang. The piece of wood comes from Palembang.

"About the dragon's blood from Borneo I got the following information from the Resident of Pontianak.

"1. The cakes about three inches wide, a quarter of an inch thick and three inches long are not known at Pontianak. The Resident believes it is made at Singapore, and that from dragon's blood coming from Pontianak.

"2. The dragon's blood is brought in commerce in three forms:—

"(*a*) in flat cakes from very different dimensions.

"(*b*) in small cakes from about three or seven inches long and one inch wide.

"(*c*) in long pipes.

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, December 10.

"The Resident had the kindness to send me the fruits of the trees from which it is obtained, and these being of different size, it is evident that there are at least three species of calamus which can be said to be the mother-plants of the dragon's-blood.

"The smallest fruits give the most dragon's blood. This is said to be beautiful red of colour, but the tree is rare and the blood high in price.

"It only comes in very small quantities in commerce under the name of Djernang Mundai. The pipes inclosed in the case are from the fruits of greatest size. This is called Djernang Koekoe.

"The third variety in flat cakes from three by one inches is the Djernang Beroewang.

"The fruits are of moderate size. For obtaining the powder the ripe fruits are shaken in a basket (as enclosed in the case). Mixed with water the powder is pressed in moulds and then melted.

"To give it more weight it is nearly always mixed with the milky juice of *Garcinia parvifolia*, Miq.

"The Resident believes that all the cakes and pipes are so prepared except the specimen 1 *c*. which is said to be quite pure. I am indebted to Dr. W. Burck, Assistant-director and keeper of the Buitenzorg Herbarium and Museum for the information contained in this letter.

"I remain, dear Sir, yours faithfully, TREUB.
"Director of the Government Botanic Gardens."

CUBEBS.

The specimens and information sent by Dr. Treub indicate that the keboe cubebs presented to the Museum some months ago is the fruit of the *Pothomorphe* [*cubeba*] *mollissima*, but that the large blackish cubebs with long stalks and the false cubebs generally referred to *Piper crassipes* are probably not exported from Java but from elsewhere.

BENZOIN.

The specimen of Palembang benzoin sent by Dr. Treub is scarcely a typical sample of the product as met with under that name in the London market. It has lost the opalescent translucency on the outer surface, but has the same lustrous fracture as Palembang benzoin, although darker in colour, as if it had been kept and exposed to the light for some time. It contains two or three white angular tears like those of Siamese benzoin, but the latter do not show any evidence of exposure to light.

The interesting point about Palembang benzoin is that whilst it has the same odour as ordinary "Sumatra" benzoin, it is more translucent and appears to contain a considerable amount of moisture, freshly broken specimens readily becoming mouldy when placed in a closed glass vessel. So far as I have been able to learn only one species of benzoin tree is commonly known at Palembang, and that, judging from specimens presented to the Society's Herbarium by Mr. R. Jamie in 1883 is undoubtedly *Styrax Benzoin*, Dry., as well as from the specimens from Java sent by Dr. Treub, since they have the globular fruits characteristic of that species. If the Palembang and Sumatra benzoins of commerce are derived from the same tree there is probably some difference in the mode of preparation; the Palembang variety may perhaps be melted into blocks in hot water, and the Sumatra by artificial heat, and this might account for the moisture present in the former and the larger percentage of benzoic acid that it generally affords, but I have not been able to learn any facts tending to confirm this suggestion. The specimen of benzoin sent by Dr. Treub has the same odour as the Palembang and the ordinary Sumatra benzoin.

The odour of the Penang benzoin is so characteristic and so strongly resembles storax, that I cannot doubt it is produced by a different species. It is pointed out in the 'Pharmacographia' that *Storax subdenticulatum*, Miq., occurs in W. Sumatra, and therefore in the province in which Penang is situated, and that this tree bears the same native name, "kajoe kemingan," as *S. Benzoin*, as if it yielded a benzoin. There is also a fragmentary specimen of another species from Penang in the Society's Herbarium, viz., *S. Porterianum*, but I have no evidence to offer that either of them yield Penang benzoin. The subject needs further investigation, and I hope that Mr. H. M. Ridley of the Singapore Botanic Gardens, with whom I have also been in correspondence on the subject, may be able ultimately to clear up the matter.

Attached to the Java specimen are some very curious galls of a cornucopia shape, developed at the expense of the flowers. These galls are produced in Java in such numbers that the production of fruit is much lessened thereby, and consequently the spreading of the tree is considerably diminished. The insect producing the galls has been quite recently described as a new species of aphis by Dr. A. Tschirch (*Ber. der deutsch. Bot. Ges.*, 1890, p. 48), under the name of *Astegopteryx styracophila*, Tschirch. The interesting account he gives of these galls is accompanied by illustrations, both of the insect and of the structure of the galls (taf. iv.).

The specimen of the stem in section showing the gum resin exuding, does not bear evidence of the application of heat, although it has been stated that it is formed under the stimulant action of applied heat, benzoic acid not existing naturally in the bark. Neither in this specimen nor in that of the Siam benzoin tree, presented by Mr. Jamie seven years ago, is there any evidence of treatment beyond the application of an axe or adze to gash the bark.

I may here take the opportunity of pointing out that the Siam benzoin, which has a distinct vanilla odour, is also the product of a different species of styrax. The leaves, examined in section by Mr. Shenstone, of Colchester, some years ago, showed sufficient difference from those of *S. Benzoin* to indicate that they probably belong to a different species, whilst the drawing by Dr. Pierre in the Herbarium of this Society of the ovary of a species of *Styrax* from Luang Prabang in the Laos States, where the Siam benzoin is produced, shows an oval or elliptical outline, that of *S. Benzoin* being spherical.

DRAGON'S BLOOD.

Respecting the dragon's blood the information sent by Dr. Treub is both new and interesting. The dragon's blood of the best kind is evidently the produce of a species of calamus, different from that affording the inferior qualities. It may be hoped that the information thus obtained may lead to the cultivation of this rare species, and the production on a larger scale of so beautiful a product in a perfectly pure state. The species of calamus yielding the resin appear to be imperfectly known. The colour of the specimens in flat cakes, three inches long, one inch wide, and about a quarter of an inch thick, is brighter than in any of the other commercial forms of the article.

The Pharmaceutical Journal.

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THE DRAFT PHARMACY BILL.

CONSIDERABLE opportunity has now been afforded for the general consideration of the draft Pharmacy Bill that has been prepared by the Council of the Pharmaceutical Society, and judging from the proceedings at the meetings which have been held for its explanation and discussion, it may be inferred that there is throughout the country a prevailing approval of the proposed measure, as well as an absence of any reasonable opposition to its several provisions. At the utmost there have only been certain objections raised, mainly on the ground that the provisions of the Bill do not go so far as some would desire they should. But at the same time it cannot be overlooked that some of the speakers at the meetings just referred to have manifested a disposition to indulge in that kind of reproach of the Pharmaceutical Society which is too familiar. Such reproaches are evidence of a disregard of what is possible under existing conditions, and of the fact that the Society has never yet been placed by the trade in such a generally representative position as would enable it to act efficiently for the protection of those who carry on the business of chemists and druggists. It is complained that the Society does nothing for the interests of the trade, and that it has not exercised its powers in that direction so fully as might have been done. If it be admitted for the sake of argument that there is some ground for such a complaint, it must also be urged that the chief reason of any failure is due to the abstention of a large proportion of the trade from any support of the Society and from any participation in its work. Of the several objects for the attainment of which the Society was formed, viz, the advancement of chemistry and pharmacy, the promotion of a uniform system of pharmaceutical education, protection of the trade and benevolence, it is only in regard to the last-mentioned that the Society has been perfectly free to act. In regard to that object it has gone to the utmost possible extent in the consideration of the entire trade. But the attempts which have been made by the Society through its Council in the direction of its other objects, have hitherto been more or less obstructed. A section of the trade has steadily resisted all attempts to establish an improved system of education, and the full protection of the trade interests of the class, which could only be hoped for as a result of the associated efforts of all engaged in the business, has not been achieved, because the essential condition for its realization has not been furnished by those most concerned. In the advancement of chemistry and pharmacy the Society has received but little encouragement, and though it has nevertheless made some progress in that direction, with material advantage to the entire body, it has been in spite of the disheartening cry that scientific research is of no service, and that the circulation of a scientific journal is of no use to members of the drug trade.

It is probable that an explanation of much of the antagonism to the Society, and to its efforts for the advancement of pharmacy, may be found in the very diverse and indefinite nature of the business of the chemist and druggist as carried on in various localities. The time is past when the chemist was looked upon as the keeper of a shop which resembled the doctor's shop in having coloured bottles in the window, but was more popular as a source of supply of small ware physic and of the miscellaneous articles known as druggists' sundries. At that time pharmacy in the true sense had scarcely any existence in this country, or at most held its own in a few places, and it was not until the passing of the Pharmacy Act, 1868, that it became recognized as a calling for the exercise of which competent practical knowledge was essential. That recognition, however, was but partial; it did not go beyond the restriction of the sale of certain poisonous articles, and enforcing registration of chemists under certain conditions as evidence of the competent knowledge requisite for the safety of the public. In many instances the chemist's business is still of a very mixed nature, having little to do with true pharmacy. But the recognition of the exceptional nature of the chemist and druggist's business, partial though it was, might have been and should have been made the basis for organized action on the part of chemists and druggists for the protection of their interests. Opportunity was afforded for that by the Pharmaceutical Society, which threw open its portals to all members of the trade and invited them to join in the endeavour to raise the status of pharmacy which had been voluntarily undertaken as the Society's special function. There is the best authority for the statement that chemists and druggists generally have neglected to take advantage of the opportunity provided by the Legislature and by the Pharmaceutical Society for promoting their trade interests, and when the consequences of their neglect have become positively prejudicial they have blamed the Society for not doing what could only have been done through their adoption of the

Society as their representative, and as the medium through which endeavours to protect trade interests could alone be effectual.

There is reason for believing that there is now a growing appreciation of the mistakes to which we have referred, and it may be hoped that there may be a sufficiently prevalent feeling of this kind to be focussed in a united attempt to improve the present position as far as may be practicable. Notwithstanding the damage that has been inflicted by stores and company trading, the interpretation of the law in regard to them presents the encouraging feature that such trading must, so far as restrictions exist, be conducted by registered men. That is a distinct advantage, and it appears unreasonable to object to an extension of that principle to dispensing, which would debar grocers and companies from continuing to do what is now complained of. But if a restriction of dispensing is to be effectual in that way, to the advantage of persons who are qualified by registration, the restriction must naturally apply in a general manner. The registered chemist and druggist must not look upon it as an additional disability that if he employs an apprentice or an unregistered assistant in dispensing, he must employ him under his own immediate personal supervision. On the contrary he should regard that necessity as the means by which his own interest and that of his fellow chemists is to be protected, and he should for that reason strenuously endeavour to enforce the observance of this principle. It is only, as it appears to us, by the co-operation of chemists in this direction that any basis can be obtained for the Pharmaceutical Society to take action for the protection of their interests, and we trust this view of the matter will not be overlooked now that there is an opportunity of some good being done. With a devoted and energetic President of the Society there is now a possibility of securing the passing of the proposed Bill. With the united support of the trade that possibility might be realized, and we trust that by seeking to grasp at a shadow the substantial gain may not be lost. In regard to the educational provisions of the Bill, which appear to be thought by some to exceed the requirements of certain forms of a chemist's business, it must also be remembered that it is only in the attitude of an educational body that the Society can approach Parliament with any claims for restrictions of trade. Mere examination, without the necessity for thorough systematic training, has been found to be an imperfect test of knowledge on the part of those seeking admission to the register of qualified persons. Any means therefore by which the test of qualification can be rendered more effectual must operate as a protection to those already registered. That consideration should outweigh all others and secure the united support of the trade to this part of the Bill.

PRESENTATION TO MR. SAMUEL GALE.

The proceedings in the Examination Hall at Bloomsbury Square were on Thursday afternoon varied by a very interesting ceremony, connected with the retirement of Mr. Samuel Gale from the Board of Examiners. At the close of the day's examinations a resolution was moved by Mr. Octavius Corder, expressing the desire of the Board to place on record its high appreciation of the services rendered by Mr. Samuel Gale as an examiner during a period extending over twenty-six years, as well as in the cause of the Pharmaceutical Society and pharmaceutical education. Mr. G. S. Taylor seconded the motion, and in putting it from the chair the Vice-President bore testimony to the good terms which Mr. Gale had always maintained with his colleagues on the Board, who, he said, parted with him with regret and with wishes for his happiness, and the hope that in his retirement he would still continue his interest in the Society.

The President of the Pharmaceutical Society then rose and said that when the intention of Mr. Gale to retire from the Board became known, a few of his friends felt that they would like to present to him and Mrs. Gale some tangible evidence of their respect, which might be associated with the fact that on Sunday next Mr. and Mrs. Gale would celebrate the twenty-fifth anniversary of their wedding. Mr. Gale had been one of the earliest pupils in the Society's School; he had been a Demonstrator in the School Laboratory before many of his fellow-examiners had entered pharmacy; and during his connection with the historic house with which he had been so long associated, he had demonstrated that a pharmacist was also an educated man and a gentleman. In the name of the subscribers the President then asked Mr. Gale to accept a pair of silver candelabra and a silver salver. The salver bore the words "Samuel Gale. December 14, 1890," and surrounding them, in an oval, "Presented, with other plate, by his colleagues on the Board of Examiners of the Pharmaceutical Society of Great Britain." Mr. Gale having in a few effective words expressed his surprise and thanks, the proceedings terminated.

It is understood that the privilege of subscribing towards the cost of the testimonial was limited strictly to Mr. Gale's colleagues on the Board, but there will be many pharmacists throughout the country who will be heartily in sympathy with the feeling that prompted this manifestation of esteem and regard.

It would appear that notwithstanding all that has been said or written by way of warning there are still chemists and druggists who are ignorant of, or chose to ignore, the provisions of the Weights and Measures Act of 1878. Last week no less than four chemists were brought before the St. Pancras Bench on charges of having in their possession for purposes of trade unstamped and unjust weights and scales, three of them being fined and one escaping with a caution. It may also be mentioned that in reply to question in the House of Commons on Tuesday, Sir Michael Hicks-Beach said the Government had no power to delay the time for the coming into force of the Act of 1889, relating to the verification and stamping of weighing instruments, beyond the 1st of January next. He also expressed the opinion that unless an inspector considered an instrument to be incorrect, and refused to stamp it on that account, there was no necessity for the interference of a manufacturer to adjust it, but, with reasonable conduct on the part of the local authorities and the traders, he did not see why any difficulty should arise.

* * *

Among the "papers" presented to Parliament recently was a copy of an Order in Council, dated November 22, approving a new denomination of standard measure of "three imperial gallons."

* * *

We are informed that the official publication of the new Addendum to the British Pharmacopœia will take place on Monday next, the 15th inst., after which date copies, price one shilling each, will be obtainable from the publishers, Spottiswoode and Co., Gracechurch Street, E.C.

* * *

At a meeting of the Kensington Vestry on Wednesday a resolution was passed, "That with a view to guiding the Vestry as to prosecutions in cases of the addition of boracic acid to food and drink, the opinion of two medical men of eminence in conjunction with the public analyst of the Vestry be taken as to the amount which is injurious to health in milk, cream and butter, and to report generally upon the subject of the addition of boracic acid to articles of food and drink, with power to request the Pharmaceutical Society of Great Britain to undertake in its Scientific Research Laboratory any chemical investigation that may be necessary."

* * *

Mr. Clarke, the Society's Local Secretary at Altrincham, has written to suggest that Local Secretaries should, in the name of the chemists of different towns, ask the opinion of members of Parliament as to the proposal that the title of chemist and druggist under the Pharmacy Act shall apply only to the person or persons who are *bonâ fide* owners of a business, pay and superintend the assistants, and are responsible to the public for the proper performance of their duties and receive all the profits arising out of such business, and should ask whether they would vote for the introduction of such a clause in the Pharmacy Bill.

* * *

A legacy to the Benevolent Fund of fifty guineas, free of duty, has been received this week from the executors of the late Mr. George Young Sharpe, of Notting Hill, a Life Member of the Pharmaceutical Society.

* * *

We are informed that the Khedive of Egypt has recently conferred the title of Bey upon Mr. Montague Bateman, pharmaceutical chemist, of Constantinople. Last year this gentleman received from the Sultan the star of the Order of the Medjidie, third class (Commander).

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We are compelled, by the press of matter this week, to postpone the publication of several communications.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, December 10.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An Evening Meeting was held on Wednesday last at the Society's House, 17, Bloomsbury Square. The chair was taken at eight o'clock by the President, who requested Mr. Holmes, in the absence of the author, to read a paper on—

THE SO-CALLED EUCALYPTUS HONEY.

BY PROFESSOR T. P. ANDERSON STUART, M.D.

The paper, which will be found at p. 513, gave rise to the following discussion:—

The PRESIDENT said that the author of the paper appeared to have arrived at the conclusion that "eucalyptus honey" was a manufactured product. It was rather important that those persons who introduced the preparation to the notice of such an august body as the Academy of Medicine in Paris should have made themselves quite sure of the origin of the article before asking that experiments might be made with it. Judging from the paper it would seem that on the other side of the water a substance was being used as eucalyptus honey which was not of definite composition, even if it was not a purely factitious compound.

Mr. BLOOMFIELD said that about three years ago he visited the colonies, and, while there, he visited Mr. Coleman, who was the largest bee farmer in any of the colonies, and resided about 25 miles from Adelaide. Mr. Coleman told him that he had about fifteen tons of pale honey and about three tons of dark honey like the specimen which had been placed on the table. He had not the slightest doubt that the honey which he saw had been produced by the bee. The reputation of the Colemans would be a guarantee of that fact. The bee farm was in a mountain range where there were dense woods of different kinds of gum trees. He could not say from memory what species it was which yielded the bulk of the honey, but Mr. Coleman told him that one of the gums flowered every alternate year, and when it flowered he obtained twice as much honey as in the intermediate years. He tasted both the honey in the comb and the extracted honey and found that the taste was the same in both. This seemed an important fact, because although eucalyptol might be put into the extracted honey it could not be put into the honey which was in the comb. The bees which Mr. Coleman had were chiefly Ligurian, but there were also some other varieties. The bee which had been exhibited to the meeting was quite different from anything which Mr. Coleman had; and the bee which had been described in the quotations contained in the paper was also different from any at Mr. Coleman's. The honey which had been shown was what was called "wild honey." It was of a very dark colour and was found more largely in Tasmania than elsewhere. He thought that the seven tons of honey referred to in the paper as having been shipped at Sidney must have been such honey as that produced by Mr. Coleman, and perhaps such as Dr. Stuart himself produced, and not the black wild honey. In South Australia there were various honeys which had different tastes. The honey was named according to the source from which it came. On the plains they had what was called the "clover honey." This was similar in taste to that to which they were accustomed in England. It was very different from the heather or Scotch honey. Mr. Joiner, a man of the highest standing, the Secretary of the Bee Keepers' Association in Adelaide, knew Mr.

Coleman well, and he kept a large number of bees himself, and Mr. Joiner was quite sure that the honey which he and Mr. Coleman produced did really contain eucalyptus. This honey was so much appreciated in Mr. Joiner's own home that his family got through about a cwt. of it during the winter. If Dr. Stuart lived in the bush in Sydney, where gum trees abounded, he would probably find some trace of eucalyptol in the honey; but if the honey which he had observed was obtained in the plains he would not have been likely to find the taste of eucalyptus.

Mr. **Christy** (representative of Mr. Coleman in England) said that he had received from Mr. Coleman a letter with a declaration which he sent over to him when he found that people were stating that the Australian honey was mixed. Perhaps the letter was too long to be read. The declaration contained the names of various authorities in Adelaide, which was a long way from Sydney, with regard to their examination of Mr. Coleman's property. (The speaker handed the statement to the President.)

The **President**, after perusing the paper, said that the statement was certainly a very strong one. It was substantially a declaration that what Mr. Coleman sold was an absolutely pure, natural product, without any admixture whatever, and that there was no doubt that in that condition it was sent to this country.

Mr. **Christy** said that the packages remained unopened from the time that they left Mr. Coleman's estate to their arrival in London. He had never heard of Mr. Coleman shipping any honey to Paris.

The **President** said that the specimen referred to in the extract from the French paper might not have come from Mr. Coleman at all. He did not think that Professor Stuart mentioned Mr. Coleman.

Mr. **Christy** said that Professor Stuart did not seem to have found out Mr. Coleman, although, as Mr. Bloomfield had told them, he was the largest bee master in Australia. The whole statement had been published in the *Chemist and Druggist*, and also in the *British and Colonial Druggist*. Of course it was very difficult to say how the different honeys acted, but it was known that the bees gathered the eucalyptus honey in a peculiar way from the flowers. For his own part he firmly believed that certain of the properties contained in the honey could be transmitted through the honey as medicine and in other ways.

Professor **Attfield** said that he failed to see any contradiction between what had been stated by Professor Stuart and what had been stated by Mr. Bloomfield and Mr. Christy. It was perfectly obvious that there was a false eucalyptus honey and a true one, and that in the main, though not entirely, the false one was that which had been alluded to by Professor Stuart. The Guilmeth honey which had been analysed by Mr. Hérisson was, no doubt, the false honey, which contained a quantity of added eucalyptol oil. He (Professor Attfield) had seen a specimen of that honey some years ago, and there was no doubt that it smelt strongly of eucalyptus oil. He had smelt the samples now on the table, but he did not find that any one of them had the odour of eucalyptus oil. In September last year he had the good fortune of analysing a sample of the genuine eucalyptus honey, as it might be called—the honey which had been referred to by Mr. Bloomfield and which had been analysed by Mr. Hamlet. The latter found no eucalyptol in the honey. His (Dr. Attfield's) own analysis very much confirmed that of Mr. Hamlet. Speaking from memory, this genuine honey contained about 20 per cent. of water and 80 per cent. of solid matter, consisting almost wholly of honey sugar with minute amounts of waxy and mineral matter. The bulk of the sugar was ordinary lævulose or inverted sugar. There was also some glucose present. He had about half an ounce of this honey left and it had been exposed in a bottle for more than a year and it was still fluid. It contained pollen grains, but no sulphates and no artificial glucose as determined by Sieben's method. Therefore this was a sample of genuine honey, *quâ* honey, and he took it to be eucalyptus honey, for Mr. Bloomfield had just explained to him that what he meant by "eucalyptus" in honey was honey gathered, perhaps not wholly from eucalyptus trees, but in a district where eucalyptus abounded, and the honey of which had an odour which was suggestive of eucalyptus flowers. No doubt in that sense the honey did contain what was obscurely termed *eucalyptus*, but he was sure that it contained no eucalyptol or oil of eucalyptus leaves. All the honeys now exhibited, having a similar odour to his own, must be free from eucalyptol, and much more would it be true of them that they did not contain 17 per cent., which was the quantity no doubt present in the Guilmeth sample analysed by Mr. Hérisson. He presumed that genuine eucalyptus honey might be solid or liquid according to the proportion of crystallizable glucose and uncrystallizable sugar which it contained. That was a matter of accident. Among the samples on the table there were some solid and some fluid, but he saw no reason why both forms should not be perfectly genuine, that is gathered from eucalyptus flowers but free from added eucalyptus leaf oil. Some chemists had suspected and, he might say, had known previously that the honey to which Professor Stuart had mainly alluded was false honey; but still the Professor had not been altogether slaying the slain, for he had definitely proved the honey to be false, and the thanks of the Society were due to him for his paper. The paper had a considerable pharmaceutical interest although, unlike most of the papers read to them it came not so much from the botanical side, or the chemical side, or the physiological side, or the pharmacological side, but from what, after all, was a very useful side, namely, the moral side of pharmacy.

The **President** said that it was perfectly obvious that the honey referred to was a factitious product. Probably Mr. Bloomfield knew that English people who were accustomed to extremely good honey at home went into the Alps and elsewhere and got a factitious compound.

Mr. **Helbing** said that he was very glad to hear what Professor Attfield had said. It was endorsed by other statements. The question whether the honey which had been described was genuine eucalyptus honey or not had been most thoroughly investigated in America, or at least by an American house, who had specially sent some persons over to Australia for the purpose. In the investigation, published in *The Druggists' Bulletin*, it was stated that they had obtained honey which without doubt had been produced by bees which visited eucalyptus trees. On examination of this true eucalyptus honey it was found that its composition was nearly exactly that which Dr. Attfield had stated, namely, 82 per cent. of grape sugar, 17·4 per cent. of water and 0·2 of inorganic salts; and there was no trace of eucalyptus oil or resin or anything of the kind. The investigators said that the taste of this honey was very bad, and also that it had a very acrid and bad smell. There was no doubt that it did not contain any eucalyptol.

Mr. **Mason** said that there was no doubt that a person who had had much experience with honey could tell the source from which it had come. In this way Irish honey and Chilian honey could be recognized. With regard to odour, Californian honey contained the odour of the orange blossom. He had himself found honey with the odour of the peach blossom. In clover honey there was little or no odour.

The **President** said that the argument of the paper quoted was that the bee helped to transmit something from the tree to the honey. The point was an important one. Professor Attfield had raised the question of general absorption. The point was whether the flavour had been absorbed after the honey had been produced.

Professor **Attfield**: The question is,—Does the original nectar of the eucalyptus flower, which is doubtless, as usual, a solution of cane sugar, absorb from the flower some of its characteristic odours? I take it that it does, because all of us who are accustomed to honey and have a moderately good nose and palate can tell whence the honey comes—whether it is lime-flower honey, or heather honey, or clover honey, and so on. This honey certainly has its own special odour and flavour, and Mr. Bloomfield says that all honey collected near eucalyptus trees has the same odour and flavour.

Mr. **Christy** said that it would be very interesting to hear from Professor Attfield whether he thought that any of the properties of the eucalyptus tree could be transmitted through the bee into the honey.

Mr. **MacEwan** said that he thought that the *bona fides* of Mr. Coleman had been sufficiently established, but it appeared that the question was as to the therapeutic value of what was known in the market as eucalyptus honey. He understood that the statements made were that the therapeutic value of the honey was connected with its nectar. Consequently eucalyptus honey did not possess the therapeutic properties which had been alleged; that was what Professor Stuart had demonstrated conclusively.

Professor **Attfield** said that he thought it was obvious that what he had ventured to term the genuine eucalyptus honey had not the properties of the false eucalyptus honey, which, without doubt, contained 17 per cent. or so of eucalyptus oil. Then arose the question whether eucalyptus honey had any particular physiological qualities. He was afraid that they did not possess sufficient data to enable them to answer that question. Had genuine eucalyptus honey any particular properties over and above the ordinary English or European honey? They had yet to obtain good sound evidence on that point.

Mr. **Christy** said that Mr. Coleman had informed him in a letter that he generally used the dark honey to feed his bees upon, in the intermediate year in which the eucalyptus did not flower.

Mr. **Holmes** inquired whether Mr. Christy could tell them what the dark honey was.

Mr. **Christy** said he would read what Mr. Coleman said about it. "The dark honey is gathered from the blossoms and leaves of the manna gum. In a letter dated the 7th you expressed a wish to have a sample of this honey. You will note that it is gathered both from the leaves and twigs and blossoms at the time when the trees are in blossom. The sweet juice exudes from the leaves and twigs, and it is gathered by the bees at the same time that they are gathering honey from the flowers of the trees. Both are stored in the same comb, though usually in separate cells, so that I often observe some cells in a comb filled with dark manna juice while others are filled with honey. The comb is all emptied at once, so that the two become mixed in the extractor. The sample contains from 20 to 25 per cent. of the manna. I can sometimes obtain, at the right season, a small sample of the manna. This I hope to do shortly for you. I imagine that the sample sent would be very nearly identical with the honey which you mention that you have heard of."

Mr. **Holmes**, replying on behalf of Professor Stuart, pointed out that the object of the paper was apparently to show, first, that a honey sold in France and elsewhere under the name of eucalyptus honey, and containing a considerable proportion of leaf oil, was obviously a manufactured article and not a natural product; second, that this honey had been stated to be the produce of a small stingless Tasmanian bee; third, that no honey so flavoured, produced by a small black bee either in Australia or Tasmania, could be heard of, and that the honey produced by the stingless bees even in the neighbourhood of eucalyptus wood had no odour of the leaf. These points seemed to be proved. That there existed an Australian honey produced by imported Ligurian or other bees, and flavoured by the flowers of eucalyptus trees or other plants, there seemed to be no question, but this was not the article condemned by Professor Stuart.

The **President**, in expressing the thanks of the Society to Professor Stuart, said the Professor had been originally a chemist and druggist, and it was pleasant to find that on the other side of the world he had taken some interest in the Pharmaceutical Society.

The **Curator** then read a note on some "Recent Donations to the Museum," which is printed at p. 518. He also directed attention to some other specimens on the table, concerning which he said, the specimen of seeds of *Strophanthus hispidus*, var. *Kombé*, presented by Professor Fraser, were of considerable value as a reference sample of the article that should be used in medicine, as they were a portion of the very seed upon which his therapeutical results were based. The evidence at present to hand tended to show that there was more than one kind of green hairy seed in commerce, since some of these produced a smooth leaved plant with a corky stem, and others a hairy leaved one. Amongst the specimens presented by Dr. Theodor Schuckart, of Goerlitz, was a specimen of bark and leaves of a tree called "coto" in Venezuela. These had been examined in Berlin and found to be those of *Drimys Winteri*, var., *granatensis*, and a statement had been published in a German journal to the effect that this tree was the source of coto bark. But this so-called coto bark came from Venezuela, and was quite a different drug to the coto and paracoto barks of commerce, although it had like them a hot or pungent taste. The true coto bark came from the same districts as the coquetta bark, and the paracoto from the banks of the Mapiri river. The structure of this bark was quite different from that of *Drimys granatensis*, and if a guess might be hazarded, was probably lauraceous rather than magnoliaceous. The name coto was also applied to a rubiaceous tree in Brazil, *Paliourea densiflora*. Indeed, the native name of a drug in South America was not the slightest guide to its botanical source, except in the particular district where it was used. In another province the same name was frequently applied to a totally different plant. On the table was also placed for comparison a sample of the smooth strophanthus seed and of the plant raised from it at Sydenham by Mr. T. Christy. The latter differed from any strophanthus known to him (the Curator) in the very patent lateral veins of the leaves, and might possibly belong to another genus altogether. Mr. Holmes also mentioned that commercial specimens of ortho-, meta- and para-cresotic acid had been presented to the Museum by Mr. H. Helbing.

General Medical Council.

THE MEDICAL COUNCIL AND THE ADDITIONS TO THE PHARMACOPŒIA.

The pressure upon our space last week curtailed to some extent the references to the proceedings in connection with the adoption by the General Medical Council of the report of its Pharmacopœia Committee. But the report itself, and the incidents accompanying its endorsement, contained so full and generous an acknowledgment of the services rendered by pharmacists in the preparation of the 'Additions' as to mark a distinct improvement in the relations between medicine and pharmacy, and to make it desirable to place a fuller account of the proceedings on record.

At the meeting of the General Medical Council on Saturday, November 30, Dr. Quain presented the following—

Report of the Pharmacopœia Committee.

"The Committee have to report that a list of the thirty-seven proposed additions to the 'Pharmacopœia,' recommended by the Committee, and approved by the Council, was sent in accordance with the direction of the Council to the Pharmaceutical Society of Great Britain, and also to the Pharmaceutical Society of Ireland, with a letter to each Society inviting their assistance in defining and preparing the several additions. The Committee have, in reply, received from the British Pharmaceutical Society a complete set of recommendations respecting every article of the proposed Addendum, together with four subsidiary articles (namely, Wool Fat, Fehling's Solution, Gelatine, and the Bark as well as Leaf of Witch Hazel) rendered necessary for the production of certain of the thirty-seven primary additions. This Society has also forwarded a report of the proceedings of a special Committee appointed by their Council to deal with the proposed additions in the manner desired by the Medical Council.

"The Committee recommends that the best thanks of the Medical Council be presented to the Council of the Pharmaceutical Society of Great Britain for the valuable assistance rendered.

"The Committee view with satisfaction this conjunction of medical and pharmaceutical work in the production of the present extension of the Pharmacopœia, a combination that cannot but be productive of future, as well as immediate, benefit both to medicine and to pharmacy. To the annual reporter on the Pharmacopœia to the Medical Council, Professor Attfield, must be accorded the credit of initiating and organizing this desirable union.

"The Committee recommends the further addition to the Articles already approved in the *Addendum*, of the following three substances:—Acetanilidum, Phenacetinum, and Pulvis Sodæ Tartaratæ Effervescens, as well as the above-mentioned four subsidiary articles.

"The Committee submits to the Council a copy of the *Addendum* ready for press as soon as it has been approved by the Council. The Committee recommends that 5,000 copies of the *Addendum* be printed, and that the price of each copy be one shilling.

"The Committee cannot conclude their report on the completion of the *Addendum to the Pharmacopœia* without offering their testimony to the care, skill, and tact with which the editor of the work, Professor Attfield, F.R.S., has performed his manifold duties.

"RICHARD QUAIN, M.D.

"*November* 25, 1890. "*Chairman.*"

On the motion of Dr. Quain, seconded by Mr. Brudenell Carter, the report was adopted.

A vote of thanks was then accorded to the Chairman of the Pharmacopœia Committee (Dr. Quain) for his valuable services in connection with the preparation of the Addendum to the British Pharmacopœia.

It was next moved by Dr. Quain,—

> "That the best thanks of this Council be given to the Council and Pharmacopœia-Committee of the Pharmaceutical Society of Great Britain for the very valuable assistance rendered by them in the preparation of the *Addendum*, 1890, *to the British Pharmacopœia*, 1885; and that copies of the *Addendum* be presented by the Council to each member of the Council of the Pharmaceutical Society, and of its Pharmacopœia Committee, together with a copy of the *Minutes* of the Council containing the *Report* of the Pharmacopœia Committee of this Council."

Dr. Quain said that he had been already rewarded for any services he had himself rendered in respect to the Addendum by the thanks of the Council, but he wished to point out that the labour of his colleagues on the Committee and himself would have been in vain if it had not been for the assistance of the Pharmaceutical Society. The resolution he had proposed would be, in his opinion, the least compliment that could be paid to the Council of the Society, which had devoted great time, skill and patience to the work. He thought as a result very few corrections would be required in the work after it had been issued.

The motion was seconded by Dr. Mitchell Bruce and agreed to.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The weekly meeting of the Council was held on Wednesday, the 3rd instant, at No. 11, Harcourt Street, Dublin, at 3 o'clock, the President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells, Dr. Burnes, Messrs. Hayes, Beggs, Merrin, Grindley, Professor Tichborne and Robinson.

A report from the Law Committee was read and adopted.

A report from the Pharmacy Act Amendment Committee was also read and adopted. From this report it appeared that applications from the following gentlemen to be registered as chemists and druggists had been accepted by the Council:—Wm. B. Black, Ballycastle; Henry Bell, 62, Quay, Waterford; Daniel Brogan, Castlepollard; George P. Beater, 17, Lower Sackville Street, Dublin; Samuel Clotworthy, 15, Bridge Street, Belfast; James Clarke, Shercock; Wm. Frederick Coall, 40, Mary Street, Dublin; Robert C. Dorman, 2, Adelaide Villas, St. Luke's, Cork; Thomas Fagan, Athboy; Marian J. Flanagan, Granard; Wm. H. Harman, 5, Vincent Place, Cork; Joseph Holton, Nenagh; Sir Jas. Horner Haslett, 18, North St., Belfast; Fred. A. Harpur, Ballinasloe; W. J. Hamilton, Gortin, Co. Tyrone; Jas. Hanson, Capel St., Dublin; Fergus Kilkelly, Ballinrobe; Wm. Tedlie Moore, Letterkenny; Thos. McKim, Drumkeeran; John McLoughlin, Carrigallen; Wm. J. McNeight, The Linen Hall, Dublin; James Pelan, 22, Main St., Gorey; Thos. W. Reynolds, Scotch St., Dungannon; James B. Scott, 29, South Main St., Bandon.

The President read a draft of regulations for the examination for the licence to act as registered druggist for approval by the Council previous to its being forwarded to the Privy Council for sanction by that body.

On the motion of Mr. Hayes seconded by Dr. Burnes the draft was approved of.

Several letters were read from the Privy Council. One of November 15 transmitted a copy of an order of the Council approving of the examiners whom the Council had appointed to conduct the examinations of the Pharmaceutical Society.

Another letter of November 22 asked whether the Council had fixed the dates for the holding of the examinations for men who had been in business as druggists prior to the passing of the Pharmacy Amendment Act, 1890. The power of appointing the examiners to conduct these examinations, which are under the 7th section of that Act, and of fixing the fees to be paid, is vested in the Lord Lieutenant and Privy

Council, and they have appointed the following examiners, viz., Ninian Falkner, M.B., Dublin, David J. McKinney, M.D., Belfast, and E. W. Allsom, L.P.S.I., Cork, to conduct the examinations in those cities respectively, and they have fixed the fees to be paid by each applicant at half a guinea to the examiner and £2 to the Pharmaceutical Society.

On the motion of Professor Tichborne, seconded by Mr. Merrin, it was ordered that the examinations under section 7 of the Acts of 1890 shall be held on the second Wednesdays in January, April and July; and in Belfast and Cork in the following weeks, if at least twelve candidates shall apply from each of these places.

Copies were received of Amended Regulations under the Pharmacy Acts, which had been approved of by the Lord Lieutenant and Privy Council, and published in the *Dublin Gazette*. One of these provided that rejected candidates may come up for re-examination on paying the Examiners' fees in both the Preliminary and the Pharmaceutical examinations.

A letter from Sir William Kaye stated that the Lord Lieutenant and Privy Council had no jurisdiction as regarded the matter of the establishment of the Society's Chemical School.

Professor Tichborne: That is the conclusion at which the President and the Vice-President arrived at long ago. Nevertheless, the Privy Council recognizes the School in one of its orders.

A report of the House and General Purposes Committee recommended the following regulations for the management of the Society's School of Chemistry and Practical Pharmacy for adoption by the Council:—

1. That the School be conducted by a committee of members of the Pharmaceutical Society of Ireland, being members of the Council, to be elected annually by the Council at the first meeting of the Council after the annual meeting.
2. That the Treasurer be elected from the School Committee.
3. That the said Treasurer shall submit a statement of the accounts of the School to the Auditors of the Pharmaceutical Society in time for the annual meeting.
4. That the Treasurer be entitled to settle with the professors at such times as may be convenient.
5. The Registrar of the Pharmaceutical Society to act as Registrar of the School.
6. That no pupil be allowed to attend the classes until he has paid at least one half of the fees, the remainder to be paid prior to the issue of his certificate of attendance.
7. That the certificates be signed by the professors and by the Registrar of the Pharmaceutical Society.
8. That a roll-call of attendance be duly kept by the professors.
9. That certificates be printed for giving to candidates who have attended the classes, stating the number of hours of practical work, and the extent of the course.

On the motion of Mr. Hayes, seconded by Mr. Grindley, the foregoing recommendations were adopted.

A letter was received from the Board of Inland Revenue stating that in the opinion of that Board the statutory declarations required to be made by candidates for registration as registered chemists and druggists are not statutory declarations, within the meaning of the statute, and therefore not liable to any charge for stamp duty.

Letters were received from Dr. Cosgrave, Dr. Falkner, and Dr. Montgomery thanking the Council for having appointed them examiners.

A letter was read from Mr. A. H. Gray, who had passed the examination for the licence, asking for his marks. Mr. Gray also asked to be elected a member of the Society, having paid his subscription.

An order was made that the marks should be given to all candidates applying for them whether they had passed or not; and

On the motion of the Vice-President, seconded by Dr. Burnes, Mr. Gray was admitted a member of the Society.

A letter was read from Mr. Andrew McNaught resigning his seat on the Council.

Dr. Burnes: I propose that he be asked to reconsider his determination.

The President: I told Mr. Ferrall to write to him to that effect.

Mr. Ferrall said he did so, and had received a letter from Mr. McNaught in reply, saying that he was unable to attend the meetings of the Council, and that as the object for which he joined it had been effected, there was no longer any necessity for his continuing to be a member.

Mr. Beggs: I move that his resignation be accepted with regret.

The Vice-President, in seconding the motion, said they owed a great deal to Mr. McNaught. He worked very hard for them in Belfast, and afterwards went to London about the questions connected with the Bill; and when they had prosecutions in Belfast, he did what very few persons would be inclined to do, he went into the witness box and proved their cases for them. He (the Vice-President) was very sorry that he would not reconsider his determination to resign.

The motion was agreed to.

On the motion of Mr. Hayes, seconded by the Vice-President, Mr. William McNeight was elected an associate-druggist.

A letter was read from Mr. Ernest Pooley, a student in the Society's school, asking leave to present himself at the January licence examination. He stated that he had passed the Preliminary examination in Arts of the Faculty of Physicians and Surgeons in Glasgow, in October, 1889; and the Preliminary examination of the Apothecaries' Society of London in December, 1889.

The Registrar was directed to reply, stating that existing regulations did not admit of Mr. Pooley's request being complied with.

On the motion of Professor Tichborne, seconded by Mr. Grindley, the following gentlemen were elected members of the Society:—Mr. Patrick J. Fielding, 80, Patrick Street, Cork; Mr. Frank Harley, 6, Bridge St., Bandon; Mr. James P. Millwood, 2, Bond St., Queenstown; Mr. John S. Shortt, 5, Wellington Terrace, Cork; Mr. John J. Walsh, 122, Sundayswell Road, Cork, and Mr. John H. Boardman, 71, Lower Georges St., Kingstown.

Orders having been made for the payment of some accounts,

The Council adjourned.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, Nov. 20, Mr. J. C. Umney, Vice-President, in the chair.

A paper was read by Mr. W. Wilson on "Lac Sulphuris and Sulphur Præcipitatum." The first portion of the paper was historical in character, enumerating the various methods which had been employed for the preparation of this substance. These methods differed a good deal from time to time, the Pharmacopœia Londinensis of 1721 ordering it to be made by boiling sulphur with either quick-lime or salts of tartar and precipitating the solution with spirits of vitriol; obviously the product would contain large amounts of calcium sulphate, or none at all, according as lime or salts of tartar was employed. Besides methods more or less resembling that adopted at present, one ordered by the Pharmacopœia of 1788 deserves mention; this consisted in boiling sulphurated potash with water and precipitating with dilute sulphuric acid. A comparison between the results obtained by different processes was then instituted, with the conclusion that a product prepared by only partially precipitating the alkaline solution of sulphur with hydrochloric acid, leaving it still alkaline, was preferable to the official product, being finer and more uniform, more easily assimilated, and always perfectly free from traces of arsenic, which would remain in the alkaline liquor. The comparative merits of lac sulphuris and official precipitated sulphur were also discussed, the author maintaining that the former possessed several advantages over the latter, chiefly of a physical nature. As varying amounts of calcium sulphate are stated to be present in milk of sulphur the author analysed three specimens, finding 56·9, 57·9, and 50·3 per cent. of $CaSO_4 2H_2O$ respectively.

The paper was followed by a discussion, in which the Chairman, Messrs. Garnett, Browne, White and the Secretary took part.

Mr. A. J. Simons, Reporter on Inorganic Chemistry, then read a paper on the Chemistry of Photography, which gave rise to a discussion in which the Chairman, Secretary, Messrs. Browne, Sturch, Garnett, Davies, Patchitt, White and Dunning joined.

The Secretary announced that the following members had been appointed as a Committee of Reporters on Science: Pharmacy, Mr. F. A. Hocking; Botany, Mr. H. H. Sturch, Materia Medica, Mr. H. W. K. Pears; Physics, Mr. P. J. Robbins; Organic Chemistry, Mr. C. E. Boucher; Inorganic Chemistry, Mr. A. J. Simons; Analytical Chemistry, Mr. W. F. J. Shepheard.

The meeting then adjourned.

Provincial Transactions.

MEETING OF CHEMISTS AND DRUGGISTS AT CARDIFF.

The Draft Pharmacy Act Amendment Bill.

On Thursday, December 4, at the Cardiff Town Hall, the chemists and druggists of South Wales and Monmouthshire, to the number of about forty, assembled to meet Mr. Carteighe, President of the Pharmaceutical Society, and hear an explanation from that gentleman as to the new Pharmacy Bill. Mr. J. Munday (Cardiff) presided, being supported by Mr. Carteighe, Mr. A. Coleman (Cardiff), Mr. W. Smythe (Merthyr), Councillor Gwilym Evans (Llanelly), Mr. M. M. Grose, Alderman Yorath (Cardiff), Mr. Harris, Mr. Hogan (Cardiff), etc.

The visitors having been received in the ante-room of the General Assembly Room,—

The Chairman opened the formal proceedings by expressing gratification at seeing such a number present. He asked them to give Mr. Carteighe a right hearty welcome.

Mr. Carteighe, who was warmly received, said the object of his visit was not so much to address the gathering, although that would be necessary in order that there should be an understanding of each other, but rather that he might confer with the chemists of South Wales as to the possibilities for obtaining future concessions from Parliament. It was, of course, obvious to all that they had many grievances to contend with, but he thought for their purposes that day it would be wise if they confined themselves to the constructive part of the subject, to consider what they proposed to go for rather than tell each other, what they so well knew, the burdens they had to bear, and at the outset he must take the attendance in such large numbers as an honour and a compliment. It showed that though some criticized the Pharmaceutical Society, at all events they were prepared to pay the Society a considerable amount of respect, as was shown by their attendance to meet the President of that body. At the suggestion of the Chairman he proposed to deal with the draft Bill, but not at too great a length. He hoped his position would not be misunderstood. He was not there to ask the meeting to swallow the Bill because he told them it was a good one. He simply intended to explain it, and the difficulties which surrounded the attempting of other things which were equally desirable; he wanted them to understand as well as he did himself the issue that was actually before them. He should not be at all angry if they did not approve of the Bill. There must be great differences of opinion amongst them, but what he wanted was that that meeting and other large meetings of the kind should tell him, as President of the Pharmaceutical Society, what they thought of their efforts to obtain some sort of legislation, and whether those efforts were not desirable. If the verdict was against the Bill, as well as the verdict of other large meetings, a great deal of trouble might be saved. The possibility of coming into contact with any large number of the trade in different parts of the country was one not given to most men, and it was only because he happened to be a little younger than the average President, and to be blessed with very good health, that he had been asked to remain an elected president for several successive years, and had taken upon himself to accept invitations throughout the country. He was not in the position of a candidate for Parliament. He did not attend that meeting to "butter," though he was thoroughly sympathetic, and they could believe him when he said that the difficulties that were between them and himself as President of the Pharmaceutical Society formed a question of degree rather than of kind. They wanted to approach a Parliament which in the first instance was what was called essentially a "free trade" Parliament. In order to do that they must have some common ground of union. The average member of Parliament would tell them that if their application for privileges was to be regarded they must be moderate, and in return for privileges conferred they must be able to show that they had done in the past good service to the public, and that they were willing in the future to do even better service. Some might think the question of the public was a bugbear. It might be or it might not be. All he knew was that the first thing a member of Parliament said to him (the speaker) when he appeared in the lobby of the House was, "But will this affect the public at large?" He was told by M.P.'s that he must know that it was no use going to Parliament and asking that Bills should be taken up which were intended to benefit any section of the community unless it could be shown that concurrently a definite good was given to the public. That was not a principle of his making. It existed. Grocers were voters, hucksters were voters. Many of them were more active politicians than chemists were, and while there were in the drug trade a number of most distinguished men, not only distinguished chemists, druggists and pharmaceutists, but good and able politicians, they had nothing like the same proportion as other trades. They were placed at a disadvantage in this respect. They were also placed at a disadvantage in that they were not united in the strict sense of the term; and if the efforts he had been making during the last few months to bring about the object they had in view should tend to bring about a better understanding between those who belonged to the Pharmaceutical Society and those who did not he should consider that his labour had not been in vain even if all decided that the Bill was one upon which they could not concur. The Bill began in the first place with education and examination. The proposition was that there should be a certain course of prescribed study in three of the subjects before examination, instead of that irregular course of study which was now carried on, and which some thought was to the detriment of an individual, even when he had passed. One of the clauses referred to the division of the examination, which, as some present knew, it was proposed to divide in this way. He was anxious they should understand this, because many of his friends thought they were going to make the whole thing very much stiffer. On the contrary, he hoped it would make the proposed course continuous and easy for the candidate. Then they wanted power to make bye-laws. The clauses simply gave power to make bye-laws for examination, and these were already drafted. They were to the effect that candidates for the Preliminary examination should be encouraged—so far as they could, compelled—to pass as early as possible during apprenticeship; before if they could. They held it was for the trade interest that incompetent men should be turned out at the very start. This could not be done by imposing a penalty upon master or pupil. That was against ordinary English common law. But they could make a bye-law that a man should not go up for his qualifying examination until three years after he had passed his Preliminary. Therefore, if a man passed his Preliminary at twenty-one, he could not go up before he was twenty-four. It was, they held, a serious drawback that nearly all apprentices should adopt a plan, which was this. There was a tendency to do very little during apprenticeship, to put off the examination until they went up to London or some large town, and go through a short course of training. To him (the speaker) it seemed that both masters and apprentices were interested in the pupil keeping interested in his work during the period of apprenticeship. The proposition was that part of the Minor should be passed by a written examination in the pupil's own district, at centres even more numerous than the present Preliminary examination centres, and that this should count in the qualifying examination. There would then be something to encourage the apprentice to continue his work, and it would mean that he would have passed in two of the subjects before he came to the final practical one. It was not proposed to insist upon a curriculum during any particular portion of these years. The pupil could do his botany at one time, chemistry at another, and materia medica at another. The desire was to encourage and promote the apprentice taking all the courses gradually. Botany could be taken one year, chemistry the next, and materia medica the next, or both together according to the position in which he was placed. A boy could then pass his intermediate examination at eighteen or nineteen, in writing, practically without leaving the town where he was apprenticed, and when he came up to present himself before the Boards of Examiners he would not only pass well but be a better competitor in the race of life than the man who left all thought of training until a few months before his examination. And it did seem to him desirable, in view of getting the right kind of apprentices, parents should be told what apprentices would have to do in order to qualify, and the question of ways and means would then be considered. On the one hand the master must be remunerated for his work; on the other the parent must feel that the youth has a chance of being able to do what he intends. It might be asked what was the good of all this? The good was broadly this. It was found from statistics that the number of men who came up for examination and who never got through was a steadily increasing residuum. What became of these men? They had spent their money and they had to get a living. That living was got in an irregular sort of way, something which might be described as an indirect form of piracy, by which legitimately qualified men suffered. He submitted then that the form of education he sketched out was not only good for the apprentice, but good for the master. He did not wish to say much of the next clause, but it was broadly this. It had been stated that the Pharmaceutical Society was illiberal, that it did not hold out the right hand of fellowship to chemists and druggists, and so on. If time permitted he could show how from time to time the doors of the Society had been opened very wide indeed to every member of the trade, and that much of the difficulty under which they now suffered was due to the fact that years ago, in 1852 and 1853, all members did not join the ranks to make a compact body to go to the House of Commons. The Council of the Pharmaceutical Society was desirous of giving encouragement by every means and to be associated with all, not for its own good, but that of the whole trade. By the Bill it was proposed that every one who passed his Minor examination should on going into business be eligible for membership. He submitted that was as great an offer as it was possible to make. Another of the clauses exempted chemists from jury service. In view of the important decision given last year in regard to a seller of poisons he thought they ought to get exemption, for a chemist and druggist was more wanted at home in his own shop than at an assizes twenty miles away. Then he need not refer to the penalty clauses or the exemption clauses. Penalties were a source of great difficulty, and it would be a good thing if they could devise some way of getting Parliament to give greater powers in that respect. In some well-known cases they were continually recovering penalties. The penalties were being paid over to them regularly. They never got the culprit into court, and a man could go on transgressing the law continually. They had been very successful in recent years in proceeding against offenders; he was happy to say £30, £40, and even £50 having been paid without going into court. In one case recently the shop of a grocer and bogus company was shut up. In Scotland it was extremely difficult to get the full penalty. He did not remember a case where they had got the full penalty of £5 in court. The expense to which the Society was put was frequently immeasurably greater than the penalty, but in carrying out the law the Society was doing it for the benefit of the whole trade and the public. Then with regard to the last clause to which he would refer it was proposed to give to registered persons the power of dispensing prescriptions, which privilege Ireland had. They proposed to ask that they should have, not the exclusive right, but the right as against outsiders of compounding medical prescriptions, and here he must again emphasize the educational aspect of the question. The educational part of the Bill was the silver coating to the pill, as well as the Bill. In other words, like good men of business they had to approach the House of Commons in a way that would arrest its attention. In the House there was always a sympathetic ear to education, and with an educational Bill there was a chance of being listened to. He reminded his hearers that whatever they had got—it was not much—was got entirely on the basis of examination and education. In spite of the objections raised he could assure them it was good business, from the Parliamentary tactician's point of view, to have educational clauses in the Bill. Well, if they obtained the power to compound medical prescriptions they would be in a position to put a stop to what was becoming very general, the formation of a number of shops thoughout the country, where the whole trade of chemists and druggists was done, barring the sale of poisons. He knew cases where such shops existed next door to a pharmaceutical chemist. How did such a person carry on? Such was the credulity of the public that when such a man was presented with a prescription that had poison in it he said he would dispense the prescription but he would leave out the poison—it was such an obnoxious thing. It might be said that was all very well, but the Bill contained an exemption in favour of medical men. It did. And they were obliged to do that at the present moment. A medical man was licensed by law to dispense prescriptions. Chemists were not. It was not for him to say what that meeting knew so well, that the chemist could do the work better than the medical man. But it was a question of law, and they could not ask a man to give up what he had in law if they did not stand on the same platform. He thought, however, they could prove to the Legislature that they were deserving to be put on the same platform. If they could prove that, and the proposition was assented to, there was only one course to pursue. They must educate an ignorant public, who did not understand the question. The doctor who dispensed his own physic did not do so because he liked it; but he was struggling to get a living, and the ignorance of the public was so great that he could not get a real fee for professional work unless he threw in something tangible. If chemists and druggists could get jointly with medical men the right to dispense, he thought it would be no difficult matter to educate the public to the danger that existed in one man prescribing and compounding. His colleagues were not responsible for this suggestion; it was quite personal, though it might be thought utopian. He thought it would be undesirable to attempt to force the medical man. If they could succeed in the endeavour he had shaped out, and he believed they might by means of such a great body as the British Medical Association, it would be for the mutual benefit of chemists and druggists and the general practitioners. Just as they wanted union amongst themselves they wanted union amid the great branches of medicine for the benefit of the public at large. In London chemists were gradually coming nearer and nearer to the medical profession in that respect. The Pharmaceutical Society was doing all it could to encourage that. The medical profession was well organized. The general practitioner in medicine had an association behind him which numbered about 15,000 persons. The British Medical Association had a well organized legal department considering what it should do to advance the interests of the profession in Parliament. It was a very powerful compact body, and to ask the Pharmaceutical Society—which represented at the present moment only about one-third of the trade—to go to Parliament and try to take away privileges was to ask a thing of which there was no chance of success. When chemists had an organization like the Association they might approach Parliament in a much different spirit. He hoped, however, before long that they, too, might be at least 10,000 strong. Then no doubt it would have been noticed there was no reference in the Bill to company trading. The difficulties under which they laboured in dealing with this question might be best illustrated probably by his quoting the substance of what took place when a legal decision was given, which practically made law on the subject. It was not a case of true co-operation. The Council proceeded against a grocer, and he paid the penalty. He still, however, carried on his business. The Council went at him again, but before the writ was served he had formed a company. He then fought, and was backed up by the representatives of the big co-operative associations. Though he was a grocer, and owned practically 994 out of the 1000 shares, the decision was that a company was outside the Act, and there was no offence, the judges intimating that the public safety was safeguarded by the sale being made by a registered man. The answer he got from members of Parliament was the same as from the judges; that they thought the public were sufficiently protected if the poisons were handed over by a qualified man. The feeling in the House was that whatever had a tendency to increase cheapness was good for the public, and in the face of this strong feeling he hoped the meeting would not be surprised that they had not been able to agree to attack that part of the problem. If it had been possible to attack it with any chance of success it would have been done. In conclusion, he reminded the meeting that what was wanted in regard to illegal trading was the quiet service of their brethren in the trade. They could not by means of any inquiry get at some people. Their only hope was to get members of the trade to assist them in carrying out the law.

Mr. A. Coleman (Cardiff) then said that day they celebrated a red letter day in the annals of pharmacy in South Wales. For the first time in their history they welcomed the advent among them of the President of the Pharmaceutical Society, and listened to his advocacy of the Draft Pharmacy Bill. Further they had the pleasure of meeting with their brother chemists from the neighbouring towns of South Wales and Monmouthshire, of making their acquaintance, of promoting amongst each other that "fellow feeling that makes us wondrous kind," and of fostering and developing that good fellowship, and unity of aim and purpose, which they had so lacked in the past, and without which it was almost certain that no satisfactory progress in pharmaceutical legislation can possibly be made. He took it that all had made themselves acquainted with the clauses of the Bill, and as they had already heard it expounded by their President, his duty was a very light one. He could, however, honestly say that he believed the measure to be one that would be found (if they were able to pass it into law) of very great advantage and usefulness, both to the Society and also to the trade. By it, amongst other things, provision was made for the more regular and systematic training of apprentices. Membership and election to the Council of the Society was placed upon a broader and sounder basis. The dispensing and compounding of medical prescriptions was confined to the qualified pharmacist, and exemption from juries was claimed for every registered chemist. Surely all would agree that this quartette of advantages alone was worth stirring for, and if the Bill did not include all they required they must bear in mind that as a body they were weak; they were disunited, they were but badly equipped for the fray. Had not the Pharmaceutical Council duly considered the matter, and come to the conclusion that it was not wisdom at the present time to go in for more; that it was far better not to overload the frail barque, lest when she has to encounter the stormy waters of the House of Commons she would inevitably be wrecked and the cargo lost? For his part, as one of the progressive and trade interests party at the last Council election, he welcomed the measure as a forward step in the right direction. The advantages conferred upon the trade would be very considerable. The dispensing clause would establish an important principle, which if systematically and perseveringly followed up would result in securing to the trade or profession, as it ought to be, that due monopoly of dispensing for which they were qualified, and by which they ought to be able to obtain the necessary means of subsistence without having to compete with hucksters and oilmen. They claimed that all dispensing and compounding of medicines should be secured to qualified chemists and qualified medical men. Some might think the Bill contained all that was required. Others might imagine it was ridiculously inadequate.

In his opinion, considering their present weak and divided state, and that they had to deal with antagonism in the House of Commons, the Council had acted wisely in bringing forward a modest yet useful measure and one which there was some chance of passing. He hoped, however, they would not conclude there was any finality about it. They accepted it as a first instalment of good things to come. They should combine together to follow up the advantages until they had secured all the privileges and advantages to which they could fairly and justly lay claim. If they were agreed upon this policy then let them strengthen the hands of the Council by supporting the resolution. Let those who were outside the Society come inside and assist to claim from Parliament what was reasonable, fair and just. In conclusion he moved:—

> "That this meeting of chemists of South Wales and Monmouthshire hereby expresses its approval of the Draft Pharmacy Bill, and pledges itself to assist the Pharmaceutical Council to carry it through Parliament."

Mr. Grose (Swansea) observed that after the elaborate address of Mr. Coleman he had very little to say. He was sure to borrow an illustration from a previous speaker that the pill—if it were a pill—had been nicely gilded to go down the gullet. He seconded the proposition.

Mr. Davies (Porth) said that in considering a proposal for the amendment of an existing Act of Parliament the question asked was, how that Act had been administered and in what way it had failed to accomplish that which its framers had in view? His opinion was, and it was the feeling of most chemists in the provinces, that the provisions of the Pharmacy Act of 1868 had not been sufficiently enforced, and with all deference to their esteemed President he ventured to say that the powers vested in the Pharmaceutical Society had not been appreciated to the full. Twelve years after the present Act came into force the Council endeavoured to prove that the person in whose name the business was carried on was the seller, but they failed in the attempt, and it was only after the lapse of twenty-one years that the Council took action on the principle that the person who effects a sale is in the eye of the law a seller. To his mind it seemed inexplicable that the Council should have proceeded against an unqualified assistant to a qualified principal for acting in his temporary absence while there were so many unqualified principals carrying on business in the country without let or hindrance from the Society. Did it not seem strange and illogical that the same body should have allowed all sorts and conditions of men to sell poisonous stamped medicines for twenty-two years without taking some action to obtain the judgment of the courts as to whether such sales are governed by the provisions of the Pharmacy Act or not? Until the Council knew all the power vested in it by the present Act, and until it was prepared to utilize that he thought it was inexpedient to amend the Act. He hoped he might be allowed to say just one word with regard to expenditure. The late Registrar had for years enjoyed a handsome pension of £400 per annum——

The Chairman reminded Mr. Davies that the question before the meeting was the Bill to be proposed, not a question of expenditure. He could bring that in afterwards if he pleased.

Mr. Albert Hagon then proposed the following amendment:—

> "That clause 7 read thus: Unqualified persons not permitted to assume the titles or keep open shop for compounding medical prescriptions or for retailing poisons. It shall be unlawful for any person or combination of persons to assume the title of pharmaceutical chemist or chemist and druggist, or chemist, or druggist, or keep open shop for compounding medical prescriptions, or for retailing poisons, unless he or they be qualified by the examinations of the Pharmaceutical Society as a pharmaceutical chemist, or chemist and druggist, or pharmaceutical chemists or chemists or druggists, or a medical practitioner entitled to and acting within the exemptions concerning certain medical practitioners made by the Pharmacy Act, 1868. Provided nevertheless that nothing in this section contained shall prevent any person registered under the Veterinary Surgeons Act, 1881, or holding a certificate in veterinary-surgery from the Highland and Agricultural Society in Scotland from dispensing medicines for animals. That clause 8 read: After every person add '*or persons.*'"

Speaking to his amendment, Mr. Hagon said the principal provision to his mind in the Bill, and one on which their respected friend the President had laid great stress, was that involved in the curriculum clauses. He thought they had a right to ask as a body, before they assisted in passing this Bill, in what manner and to what extent they would benefit by the measure before them. Their President had given them in a very lucid style the substantial benefits that would accrue to them; but he must be pardoned for saying that he failed to see how as tradesmen and as business men they would gain any great privilege through these clauses. If they sought to impose further restrictions, such as those contemplated in the curriculum clauses, they should have it distinctly shown what were the corresponding advantages to which they might look in the future. It was hardly fair to ask any body of men to impose fresh burthens on themselves unless they could get a *quid pro quo*, and he failed to see that in the net result a *quid pro quo* would be forthcoming. Now the President had urged them to join the Pharmaceutical Society, and he admitted that it was a proposition which deserved great consideration. The attendance of the President at that meeting was worthy of commendation, and they were glad to see him, as being not only one of the most distinguished members of the profession, but it showed a recognition of the democracy of pharmacy. For the first time in the annals of pharmacy, or for very many years, at all events, they had the President among them, a president who did not think it too great a condescension to visit a country town like Cardiff. He would put it to him whether the authorities of the profession could not devise a scheme for attaining that union which they all desired, for it seemed to him, he confessed, that they were as far off from union as ever. He would put it to him whether some clauses could not be introduced securing more completely the union of all the trade. Were they to conclude that from 10,000 to 14,000 men of intelligence could not act together more thoroughly for the common welfare, seeing what other trades were accomplishing by combination all over the country? There were additional restrictions, but there was not sufficient in the Bill to cause enthusiasm. They would see by the amendment which he had proposed that he wished in the first place to provide for the exclusive right to use their titles. To many of them it would come as a surprise that they had not got the exclusive right to the title of chemists and druggists, and although an Act was passed in 1868 which was supposed to confer on them the right to call themselves chemists and druggists on passing certain examinations, at the present moment that right was not maintained; and, apparently, they could not maintain it. Any company of seven individuals, by paying a certain sum of money—not very large—could get registered as a joint stock company, and could mark in big capitals over their door "chemists and druggists," without having any special knowledge, or, indeed, any knowledge at all of the trade. That was done commonly to-day. In Wales they had hitherto been tolerably free from these encroachments, but at the present moment it was done all over the kingdom, and such establishments were springing up like mushrooms. Was it just to say to an individual, you go on examination, you rack your brains to pass that examination, you empty your pocket and devote your time to study, and you shall be at liberty to call yourself a chemist and druggist? But the other seven, who are too ignorant to pass the examination, or who, having tried, failed to pass, are in a better position. The Government says to them in effect, "You pay into our treasury a sum of £10 or £12 as fees, register yourself as a joint stock company, and you can call yourselves and trade as chemists and druggists." And the Pharmaceutical Society pleaded that there was no law against it, that they could do as they liked. In connection with these bogus companies, before he passed away from the subject, he would like to call their attention to a case which took place three or four weeks ago, where the Pharmaceutical Society proceeded against a firm in Edinburgh. It was a joint stock company, not one of the members of which was qualified, and yet they emblazoned the title of chemists and druggists over their doors and traded in the same way as the legitimate holders of the title. The Pharmaceutical Society proceeded against the company and triumphed, but the triumph was not long. The joint stock company carried the case into a higher court, which quashed the verdict, and the company was to-day selling as usual and flourishing in Edinburgh.

The President: It may be some consolation to you know that the company is not flourishing.

Mr. Hagon: Well, its financial position does not affect us. At any rate its members are trading still as chemists and druggists. They had been told that it was not desirable for them to add a clause dealing with bogus companies' shops as long as they retained the widows' clause. The widows' clause meant that when one of them died the widow would be provided for by being allowed to continue the business. Should they give that up? It was one of the few privileges that they had. There was no logic in it, there was no parallel between the two cases—the widow had to employ a qualified man. How is it logical to say that every man, or at any rate every seven men, might start such a shop but yet the widow should be debarred? These bogus companies were not necessarily bound to employ a qualified man. They could open a chemist's shop or any number of chemist's shops on the payment of £10, and they need not employ a single qualified man.

The President: You do not mean that?

Mr. Hagon: Is it not so, sir?

The President: I am afraid you did not listen to my remarks all through. They must employ a qualified man.

Mr. Hagon: But there need not be a single qualified man in the company and yet they call themselves chemists and druggists.

The President said the latter statement was correct. The company could not carry on its business of selling poison unless the person handling it were a registered person, but that registered person need not be a member of the company.

Mr. Hagon: To come to the point. They can use the titles in large capitals of chemists and druggists and sell as such.

The President: Yes; but there must be a chemist and druggist in the shop.

Mr. Hagon observed that there was not a chemist and druggist in some company shops. A company with a qualified man stood in a different position from a company without one, but it was possible for a company to carry on the business with an unqualified man as long as he did not sell poison. He found that there was a case took place the other day in which a man found some one able to carry on his business. He formed a company—this man's name was Gray—and in the shops that he established they set themselves to form a company as chemists and druggists, and it was done in order that dispensing and selling of poisons might be carried on unreservedly. As to the seventh clause in the Bill relating to the compounding of prescriptions he had nothing to say against that, and he would therefore pass over it. There were many chemists who turned up their noses at the selling of poisons; they said they did not sell more than a few bottles in the year, but that was a great mistake. It was on the ground of poisons alone, on the ground that it was highly dangerous for any but a qualified person to handle them, that the legislation they had got had been obtained. The Government, in conferring upon them the title of chemist and druggist, intended to raise up an educated body of men, who, understanding the nature of poisons should be able to prevent crime and see that they were used in a legitimate manner. For many years the Pharmaceutical Society had had an Act of Parliament which it could put in force against any individual that sold poison without the legal qualification, and yet how few were the cases proceeded against! But the Pharmaceutical Society in its strength and wisdom pounced down on a chemist's apprentice and he was proceeded against and fined. Was that the best way for the Pharmaceutical Society to discharge the trust reposed in it by the Government? The Society was given an Act of Parliament by which to protect the public, and yet the Society allowed that Act practically to fall into abeyance till it was called upon by a coroner to take action in this case and action was taken. There were patent medicines, some containing poison, sold freely all over the land, and yet there was no action taken against the vendors. He would say that if they were to go to Parliament at all they might as well go to Parliament to get what they wanted, not a half, or a fourth, or a fiftieth of what they wanted. If they went to Parliament with a Bill framed for the public safety, he maintained that the principles embodied in his amendment would help the Government of the country to secure the public from danger and place their profession on a firmer footing. He maintained that if they came to the conclusion that certain rights were their just rights they should go in for all their rights and not merely for a portion of them. They should ask Parliament to give them the exclusive right to sell poisons and secure the retail business to that class of men who are educated to conduct it. No other persons, be they companies or otherwise, should be permitted to assume a title which belonged in justice only to qualified men, who have demonstrated their qualification by examination and training. They were from 10,000 to 14,000 strong. Could they not combine and assert themselves as well as the London dockers or the labourers all over the country? They asked only what was fair and just, and he hoped the amendment which he had the honour to propose would go in that direction. Let them stick to their guns, and they would carry their project through.

Mr. Anthony (Cardiff), in seconding the amendment, said he believed that the proposed alteration in clauses 7 and 8 embodied all that they required. He did not see why they should limit their demands, inasmuch as Parliament often went on the principle of giving less than what was asked. There was an error committed in the Act of 1868, and it was time to supply the omission. He was sure that if their worthy President only went in for this clause he would have an army of 10,000 or 14,000 at his command, and they would have full confidence to carry the complete measure, especially under the leadership of so able a general. This clause was a desirable supplement. They did not want to interfere with companies at present in existence, but there should be a clause to put a stop to future companies being established.

Mr. Mumford (Cardiff) said he appeared that evening in a rather peculiar position, to support the amendment and to support the Bill as far as it went. He supported the amendment because it tried to push the Bill further. That amendment he hoped, however, would be altered, because as it stood at present it seemed not to preserve the widows' clause, which none of them were prepared to drop. Under this amendment, as he read it, no widow could keep a shop.

The President: That is so.

Mr. Mumford observed that there was another alteration which he should like to see made in the amendment. As he read it no man who was not in business before the Act of 1868 could keep open a shop. He would prefer that it should run, "No man, unless he is qualified by examination, or unless his name is registered by the Pharmaceutical or some other recognized examining body."

Mr. Hagon said he would accept these alterations and embody them in his amendment.

Mr. Smythe, J.P. (Merthyr), said he had not come there that day with the intention of making a formal speech, but as an old chemist, one of the oldest in the business, he wished to say a few words upon the subject. He had been connected with the Pharmaceutical Society, he thought, ever since the year 1852, and for a very large number of years he had been the local secretary at Merthyr. He had always found this feeling amongst the trade, with almost every member of it with whom he came in contact, a feeling that they were not sufficiently protected from unqualified outsiders. Chemists commonly say, "What is the good of so and so, the Pharmaceutical Society does nothing for us, it takes care to force a very high standard of education upon young people before passing them, and when it does pass them it does not care twopence whether they can get a living or whether they cannot." It threw them upon the world; it lets anybody interfere with their rights, and it does not try to stop outsiders from taking away that privilege which they fairly won in passing the examination to qualify them as proper chemists and druggists. It seemed to him an anomaly that the Pharmaceutical Society should be so chicken-hearted in this matter. It was no use establishing a society for the benefit of the trade, if those at the head of it did not come to the rescue of their trade when it was persecuted. He had been, he thought, about forty-seven years behind a druggist's counter. He was going on his forty-first year in business for himself, and he declared that if he had fifty sons he would take care that not one of them should be brought up to the business in which he was now engaged. There was a time when he took a pleasure in his business, a pride in his business—he was fond of his business. But now when grocers and Cardiff people and doctors—for they were quite as bad as others—crowded into the business it was quite a different matter. Doctors took care to dispense everything. The town of Merthyr had over 60,000 inhabitants. They had not a single medical man who wrote a prescription, and, what was more—when they recommended people to go up to town specially and these brought down a prescription they look at it and say "Oh! you need not make it up in town; just bring it to my surgery and I will make it up for you." If they were going to impose restrictions and high class education upon their young men let them take care that all that trouble, expense and self denial implied privileges, and that they will have something to compensate them for the effort. Surely they ought to be placed in a better position, so far as their own business was concerned, than the man who never studied for the druggist's counter or passed an examination, though such a man could now set up next door to them and cut their throats. Well, he meant commercially to cut their throats, for that was what it came to. The modern druggist could not live,—commercially he was in common parlance snuffed out—completely snuffed out, and if the Pharmaceutical Society would only exercise a little more energy and a little more determination in defending the chemists and druggists of the country in the exercise of the just rights and privileges supposed to have been secured to them by being registered he believed the ranks of the Pharmaceutical Society would be much greater than now. If they were asked to combine, the Pharmaceutical Society must be prepared to take their money and impose obligations upon them. The Society must do more, it must go as far as the law will allow, as far as Parliament will permit, to pass such just measures as would keep their rights to themselves and not allow them to be poached upon and operated upon as they were at present. There was the Incorporated Law Society. If a young man went up, passed his examination, and became a lawyer, did they think that the Law Society would allow hedge lawyers to take his practice away from him? Certainly not. It exacted certain fees from him and in return it secured the privileges which were promised to him when he passed. The Pharmaceutical Society did not secure that for chemists, and if it were more zealous in upholding the just rights of the chemists, and the law was not found sufficient for the purpose, he should like to see a Bill framed which would restrain these piratical men, who were no more chemists and druggists than Jack the sweep, as they knew. Now, these pirates could go and take their bread and cheese away, and, in fact, prevent them getting an honest living. He believed, if the Pharmaceutical Society did its duty, there would not need to be such care about the preservation of the widows' clause and the employment of a young man to do the business for her. If they were placed in a fair position by the action of the Pharmaceutical Society and the action of Parliament there would be no need to grumble about their widows or their orphan children. It was a clause which might be useful in some cases—he quite approved of retaining it—but its retention would not be nearly so important if they were amply protected against interlopers. He concluded by heartily supporting the amendment.

Mr. Richards (Aberdare) said he really thought it was time for a great body like the Pharmaceutical Society to take measures, commencing with the grocers on one hand and the doctors on the other, of seeing that the young men entering the profession in future shall not be confined to the honour and trouble and practice of simply selling a few poisons. He agreed with Mr. Smythe that if justice were done to them they could afford to attach little importance to the widows' clause. Let the Society help the chemists so that they may be able when they die to leave their wives in such a position that they would not need to call in young men to help them in their business. The wives were much better without them.

Mr. Davies (Merthyr) said he supported the Bill and also the amendment.

Mr. Sanders (Cardiff) expressed the gratification they all felt at seeing amongst them such an able representative of their profession as Mr. Carteighe. Six years ago he wrote to the Journal of the Society suggesting what Mr. Carteighe had been doing for the last two or three months, that some of the members of the Society should traverse the country and meet the brethren of the various large towns. He should like Mr. Carteighe, when he replied to their remarks, to say whether it would not be possible to put forward a clause relating to apprentices being compelled to pass the Preliminary examination before commencing business. He should like to know whether it would not be possible to have a clause inserted in the Bill making it illegal for any chemist or chemist and druggist to educate a person in pharmacy, and also whether it would not be possible to put into the same clause a provision for compelling every person to be indentured, and in the indenture stating when the Preliminary examination was passed, so that the whole thing would be hemmed in, and they should prevent young men coming into the business who would afterwards become castaways. Of course they had heard what Mr. Carteighe said about three years between the Preliminary and the Minor, but that did not prevent young men coming in. He should like to see a clause in the Bill dealing with that point. With regard to doctors dispensing medicine he would like Mr. Carteighe and the Society to use their influence in London amongst the leaders of the medical profession, so that they might in the interval that would take place before going to Parliament convince them of the unfairness of the medical men encroaching on the domain of the chemists. That conviction would filter down the ranks, and it might after a time be considered an undignified thing for a medical man holding a respectable position to make up his own prescriptions and to do what Mr. Smythe had been telling them of—still further making up the prescriptions of other medical men. They had a population in Cardiff of 130,000, and he supposed they had about two men in the town who wrote their prescriptions, so that between the medical men on the one hand making up their prescriptions and the retailing by grocers on the other hand, they were jammed up, and were in hard straits to get on. With these remarks he would support the Bill, but he would support the amendment as well.

Mr. Loveluck (Aberavon) drew attention to the large quantity of medicines sold in co-operative stores by men having no qualification. Patent medicines containing poison were sold in large quantities in contravention of the Pharmacy Act. Steadman's powders, for instance, had been proved to contain a preparation of morphia.

Mr. Priest (Cardiff) observed that it would save chemists a great deal of trouble if apprentices were able to sell poison. As to the widows' clause, he thought the previous speaker had been a little selfish in the matter. There were many chemists who could leave nothing to their families but the business, and if that business were sacrificed they would be thrown on the world.

Mr. Hicks (Cardiff) said he must endorse a great deal that had been said by Mr. Smythe, who he thought had struck the right key-note as to the position of the outside trade and the Society. There had been for a number of years considerable dissatisfaction with the Pharmaceutical Society. He himself belonged to the Society, and looking at the matter from a business point of view he had said "What on earth is the use of it?" If the Society was asked to prosecute an unqualified person, the reply was it could not get evidence. That was true, perhaps, in certain cases and in certain points, but it must be remembered there were ways of getting evidence; and he thought in many cases the trouble had not been taken where evidence could easily be had. There were not many men who cared to have their names brought before the public. There were not many who even cared to supply direct evidence, and to stamp themselves as informers. He thought the Society had felt itself to be somewhere up in the clouds, and that had been to some extent its downfall. If it had been more liberal with its funds and had sent men out to find where the law was being evaded, much good would have been done. The Society now felt that the time had come for it to look after the interests of the trade. He had listened with great attention to Mr. Carteighe's speech, and he (the speaker) could hardly say how pleased he was to see him present. The effect of his speech and presence he thought would be to make the meeting understand a little more of the internal working of the Society. The Society would also understand more of the opinions and wants of the trade. With regard to the Bill, so far as it went, he agreed with it. But it did not do much for them at all worthy of the trouble. What would it secure that they had not got? It was said chemists were not in a position to make up prescriptions. If it was not the law it was the custom and the custom of the greater part of the people. The only thing he could see in the Bill was that it would widen the foundations of the Society. He hoped himself that it would accomplish that object, and that one and all would belong to the Society. He thought the policy of the Government would be very much altered by their doing this. The exemption from juries was no doubt a very grand thing, but with regard to the curriculum, if that was going to increase the expense it was not worth it, unless they got a *quid pro quo*. He did not think it was worth the while of any man going though such a course when he could get a livelihood by easier means. What was the position of the man when he had got through? He was not speaking of the chemist and druggist who was in a large business, but of the rank and file of the trade. Could such a man get his living legitimately by dispensing medicines? Not in one case in four. He had to sell wall papers, wines and spirits, oils and paints. He had to be a little of everything and very little of that. He would be infinitely better off if he were to become an oil and colourman. And then he had got about him by passing that examination a little pride. When he did get a good living he did it by illegitimate means, by acting as a doctor and prescribing. Mr. Carteighe did not think that anything more was practicable than was proposed; but what they wanted was to get their legitimate trade in their own hands, by means of which they would be able to get a good respectable semi-professional livelihood without trying to rob their neighbours. Chemists found fault right and left with grocers, but they must remember that chemists were the largest poachers of any trade in existence. They would, he believed, never clear the dispensing medical man except by public opinion, but he thought they ought to ask for the sale of poisonous patent medicines. They had some solid ground on which to go to Parliament, for they could show it was for the safety of the public. Then he thought patent medicines were compounded the greater part of them by men who are not druggists. Why on earth should a man who was not qualified to make up a prescription be qualified to make up wholesale medicines, scatter them all over the country, and recommend them—to act as dispenser and medical man? There should be legislation to make these men declare either that the medicines contained no poisons whatever, or declare their contents, if not publicly, at least before some Council in connection either with the Pharmaceutical Society or Medical Council. He thought these claims were reasonable, and if they were put forward energetically and properly and with the support of the whole trade they might be attained. He was perfectly sure that if the Pharmaceutical Society would show that it would endeavour to the best of its ability to push forward constantly whenever opportunity presented itself these schemes for the benefit of the trade, he was perfectly certain it would have their full support and the necessary funds would be found.

Mr. Dagleish (London) said he had been that day in the Forest of Dean, where he saw a person carrying on business which to all external appearances was that of a chemist and druggist and on his shelves were to be seen nearly every scheduled poison. He believed the attention of the Council had been called to this sort of thing and there were several cases where penalties had been imposed. If a prosecution was instituted it should be made public. It would certainly be for the benefit of the trade and for the funds of the Society, because there were many men whom he had heard say the Society had never done anything. There was one instance he knew in Swansea where a person had been fined £5 five years since, and he was still carrying on his illegal practices. Why did not the Society continue to impose penalties? In some of the valleys in South Wales and Monmouthshire he had no hesitation in saying that in some of the shops he had named nearly every shape of poison could be got.

The Chairman said, with regard to that part of Mr. Hagon's amendment that would make it applicable to persons, he thought he was right in saying that in law the singular covered the plural. Therefore to his mind the amendment did not cover combinations of persons. As to stores being done away with, the persons who put that forward were only misleading themselves and others. Corporations had proved themselves to be successes, and if they were able to clear them away they would still find rising up amongst their own ranks men who would carry on exactly the same. Chemists were not the only trade where they had companies or corporations opposing them. A man might start as a dentist though he may not be qualified (A Voice: "He could not call himself a dentist, these men call themselves chemists and druggists"). The Chairman, continuing, said it was true that the man could not recover his fee in a court of law as a dentist, but he could do all the work a dentist could do. Then there were large establishments open from which the medical profession suffered. Take an establishment like Smeddons and Matlock. He knew the case of a man who was sent up there against the wish of his medical advisers, and who had died of consumption in an hour or so. Medical men had a right to complain, and chemists could see they were not the only body that suffered from competition by corporations. He thought the Bill would be a splendid thing for the trade. They knew well enough that the majority of members of the House of Commons were connected in some way with stores. Was it likely then that they were going to support a Bill to injure stores. But supposing they did get such a Bill. Legislation was not retrospective, and before a Bill could pass there would be a rush of unregistered men, as in the case of veterinary surgeons and dentists, and chemists would have three times more competition than at present. The large stores would extend and open branches all over the country, putting a qualified man to dispense. He thought they were better off as they were. At the present time they had only companies to attack, and these could not sell poisons unless through a qualified man, who must be there to control the sale of the most insignificant thing. When the stores first came out there was a tremendous cry to put them down; and this was the best advertisement that they ever had. In the case of dispensing prescriptions he would like to see that carried out in England as it was in France. The medical man did not dispense and the chemist dare not prescribe, and no one but a chemist could sell what was in the Codex. He would like Mr. Carteighe to explain clause 7. He thought if a quack opened a shop similar to a chemist's it was an "open" chemist's shop.

Mr. Carteighe, in replying, declined to give definitions for obvious reasons. He did not think it was in the interest of the trade that he should do so. He could assure them that the whole matter had been thoroughly gone into, and there was not a single point raised that had not been talked over thoroughly, he might say, a hundred times, by the members of the Council of the Pharmaceutical Society. The amendment was nothing new; and he told them plainly—it was best to be candid—the Council could not accept it. He then addressed himself in detail to the points raised.

On the amendment being put it was negatived by 24 votes to 12. The original motion was then agreed to, with but one dissentient.

Mr. Gwilym Evans, in proposing a vote of thanks to Mr. Carteighe, said he had no doubt that Mr. Carteighe was the greatest authority on pharmaceutical politics living. He would like to see the South Wales chemists form an association which could select a man to represent them on the Council.

Alderman Yorath seconded.

Mr. Smythe supported.

This having been agreed to,

Mr. Carteighe replied, and the proceedings terminated.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second annual conversazione and dance under the auspices of the above Association was held in the Northumberland Hall, on Friday evening, December 5, and proved a great success. Besides the members of the Association and their friends, there were present several well known chemists of the town and district who take an interest in the junior association. The musical programme was under the supervision of Mr. George Cormack. At 10 o'clock the floor was cleared for dancing. During the first part of the evening a number of photographs, and scientific and philosophical instruments, etc., kindly lent for the occasion by Messrs. Mawson and Swan, were displayed and excited much interest.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The usual fortnightly meeting of this Society was held on Thursday, December 4, the President, Mr. H Wyatt, Junr., in the chair.

A most interesting paper was read by Miss E. M. Wood on "British Poisonous Plants," before a large number of members and friends. In the course of her paper Miss Wood remarked that it was most important that everyone should be able to distinguish between poisonous and non-poisonous plants, and she thought every school teacher should be in a position to explain the differences to their pupils, especially in country districts. Miss Wood then took up the orders as arranged in the natural system, singling out the poisonous plants, showing the points of interest as to structure, habitat, the nature of the poison they possessed, at the same time giving the derivation of the botanical and common names. The principal plants mentioned were the buttercup, aconite, hellebores, poppy, white and black bryony, hemlock, cowbane, water dropwort, belladonna, dulcamara, hyoscyamus, stramonium, digitalis, mezereon, spurge laurel, dog mercury, herb paris, yew, fungi, etc.

The paper was fully illustrated by mounted specimens and water coloured drawings of the rarer plants.

ABERDEEN CHEMISTS AND DRUGGISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At a meeting of this Association, held in the Silver Street Hall on Friday night, the 5th inst., Mr. G. Cowie in the chair, Mr. D. M. Macdonald read a paper on "Chemical Physics and their Relation to Pharmacy." The chief points treated by the author were the modus *operandi* of the taking of the specific gravities of various bodies, the construction, etc., of thermometers, barometers and hydrometers. The paper was illustrated by diagrams and experimental demonstrations.

A short discussion having been taken part in by several members, a hearty vote of thanks was accorded to Mr. Macdonald.

Mr. MacWilliam then tendered his resignation as Vice-President on account of his leaving town. It was unanimously agreed to record in the minutes the loss the Association would sustain by his removal. Mr. Craw was appointed Vice-President in his stead.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

At the ordinary meeting of this Association, on the 3rd inst., Mr. Jas. P. Gilmour, Secretary, delivered a lecture on "The Microscope." He referred to ancient traditions relating to wonders performed by the lens questioning their probability. The general principles of the microscope, he remarked, are well understood and improvements are only to be looked for in its details. Reference was made to the material theory of light and an explanation given of the now accepted wave theory—applicable also to heat and electricity. By means of diagrams refraction of light was explained. The advantages of the simple lens and the good work done by it were referred to as showing that results are more dependent on the worker than on his instrument or apparatus. The construction and defects of the compound lens as well as the methods of overcoming these defects were explained and illustrated by means of instruments on the table. The lecturer said there were many handbooks giving instructions in the use of the microscope, but all who would attain proficiency in microscopic work must in a great measure be their own instructors and must make up their mind to contend with and overcome many difficulties. If this were done the reward would be ample. Mr. Gilmour then proceeded to show by means of about fifty transparencies some of the different phases of insect and vegetable structure and fossil remains. Commencing with such well known and complete organisms as the flea, louse and house fly, he proceeded to their various organs—of locomotion, apprehension, nutrition, reproduction, attack, defence, etc. Vegetable structure he illustrated by stems of exogens, endogens, stomata, fern scales; and fossils by both animal and vegetable remains as found in various strata of the earth's crust. The last (*Eozoon canadense*), he said, went back to the beginning of life on the earth so far as the scientist has been able to trace it—a beginning so remote that the imagination is lost in trying to contemplate it, as it has, so far, been baffled in the endeavour to penetrate the hidden processes by which matter is daily vitalized.

The late hour at which the lecture closed prevented criticism, but the Chairman's vote of thanks was cordially endorsed.

Obituary.

Notice has been received of the death of the following:

On the 13th of November, Mr. Charles Griffith, Chemist and Druggist, High Street, Weston-super-Mare. Aged 67 years.

On the 24th of November, Mr. Frank Dunn Edwards, Chemist and Druggist, Bridge Street, Usk. Aged 32.

On the 29th of November, Mr. Joseph Harries, Chemist and Druggist, Glanmor, near Newport, Pembrokeshire. Aged 61 years.

On the 29th of November, Mr. George Routledge, Chemist and Druggist, Eastwood, Nottingham. Aged 50 years.

On the 1st of December, Mr. Charles Potter, Chemist and Druggist, Market Place, Knaresborough. Aged 63 years.

On the 2nd of December, Mr. Edward Topliss, Chemist and Druggist, Wainfleet, Lincolnshire. Aged 60 years.

On the 3rd of December, Mr. John Deighton Fisher, Chemist and Druggist, Market Street, Blackpool. Aged 54 years.

Correspondence.

The Draft Pharmacy Bill.

Sir,—When the meeting was held in Leeds, on November 27, I did not vote either for the resolution or the amendments, considering that the proposed Bill did not sufficiently seek to aid the trade, and the amendments did not convey my meaning.

I therefore ask for permission to lay my views before your readers, in the hope that further expressions of opinion will be given, with the object of enabling the Council to glean more thoroughly the ideas prevalent in the minds of every adult connected with the business.

In explaining the curriculum clause, as it is termed, Mr. Carteighe expressed the opinion that the term of apprenticeship should be utilized for the sole purpose of giving instruction in the ordinary routine of a retail chemist's trade, and, also, that it is intended to have an intermediate examination; but it was not clearly stated what this examination was to test—a knowledge of chemistry, botany, and materia medica, or of the practical work of the business. It does not appear, either, when the youth is to attend the classes in the three subjects referred to.

Believing that, if our country is to maintain its position in the world's market, it is necessary to give the rising generation a thoroughly good education in technical science, I am greatly in favour of good sound teaching; but I am a little puzzled to discern the difference between a youth attending a lecture of one hour or one hour and a half in either of these subjects weekly, for a period of fifteen or thirty weeks, interspersed by the work of an ordinary business, and attending similar lectures given on consecutive days, when the mind is freed from the care and thought of trade matters, and is given up entirely to study.

If Mr. Carteighe has expressed the views of the majority of the Pharmaceutical Council correctly, I presume the idea is that a youth shall attend the lectures referred to before going to be an apprentice; if so, why not make the Preliminary examination not only a test of his knowledge of Latin, English, mathematics, etc., but also in the subjects mentioned; and then the intermediate examination could be used to test his knowledge of doses and strengths of the various preparations of the Pharmacopœia.

With reference to clause 7 I quite think there are, in the small towns and villages scattered throughout the country, and even in large towns, a great number of retail chemists who carry on their business with the aid of an apprentice, and it is quite easy to understand that, with careful tuition, such youths can compound an ordinary prescription after they have been in the business a couple of years. It would be very annoying to the retail chemist who was confined to his bed by illness, or wished to take a few hours' run into the country for the benefit of his health, to know that a law existed by which any person could fine his apprentice for correctly dispensing a prescription. If clause 7 were altered by inserting after "chemist and druggist" "or has passed the intermediate examination," then it would stimulate youths to acquire the necessary information requisite for making a careful dispenser.

When the British Medical Association met at Leeds in 1889 there appeared to be a general consensus of opinion amongst the members that the elaborate curriculum through which the student had to go did not really fit him, after passing all the examinations, for the duties of a general medical practitioner, and that it would be better to lengthen the time for study and let a portion be employed in gaining a practical knowledge of his profession; and it seems to me that if, instead of shortening the term of apprenticeship, it were made compulsory for every youth wishing to enter our business to pass the Preliminary examination before he was sixteen years of age, and afterwards serve an apprenticeship of not less than five years, during which he must attend courses of study in the subjects previously referred to, and at the end of two or three years from the date of the indenture, on producing certificate of having done so, shall be eligible to pass the intermediate examination, which shall be held yearly in the various centres agreed upon, and, if successful, shall be granted the privileges I have previously mentioned, it would be advantageous to the trade and the public.

Should the Council of the Pharmaceutical Society determine upon these alterations, I shall be glad to give my support in endeavouring to get the Bill passed; if otherwise, I feel their scheme is impracticable, and shall consider it a duty, in the interests of the public, to oppose the measure. EDWIN YEWDALL.

PHARMACEUTICAL EDUCATION IN IRELAND.

Sir,—Will you give me a little space in the Journal to give expression to the fears that press upon me relative to the future of pharmacy in Ireland from an educational point of view?

My voice may be that of one crying in the wilderness, but even if I stand alone I must protest against the glorification of the cramming system, which bids fair to degrade for all time the status of the pharmacist in this country.

Here he has hitherto enjoyed the support and confidence of the medical profession, and has deserved it. Our medical practitioners have not encroached upon the sphere of work of the dispensing chemist, and have left to him a distinct and respected position. Can we hope that this state of things will continue when, while the education of the medical man is steadily advancing, and while the length of his curriculum is being much extended, the short and the tall, the stout and the lean, are being squeezed for three months or so into a common mould, and shot out through the discharge pipe of an examination necessarily more or less stereotyped?

Can the product of such a system be anything better than a mechanic, more or less skilled?

This condition of things has been confirmed by the School of Pharmacy conducted by the Pharmaceutical Society of Ireland, which may be characterized as grinding *in excelsis*.

I give every credit to this grind as a most successful one, *quâ* grind, as shown by the results of late examinations.

The teachers are men of great experience and ability, and are capable, with larger opportunities, of conveying to their pupils a high-class pharmaceutical education.

What I complain of is that this school has none of the features of a School of Pharmacy, properly so called. It has no published regulations, no fixed curriculum, no course and term of studies. The only compulsory term required by the Society—that in practical chemistry—has recently been described by the President as "of doubtful utility."

On your side of the channel we see the leaders of pharmacy using every effort to raise the pharmacist to the position of a skilled professional man. I appeal to them to say whether the education afforded by this grind is such a one as they contemplate under their proposed regulations. I ask the experienced teachers of Bloomsbury Square, especially Dr. Attfield, who has done so much for the cause of true education in England, is a three months' grind, which is now the high water-mark of pharmaceutical education in Ireland, likely to turn out any Martindales or Threshes or Umneys? If such be the status of the Society's school, what are we to say of the schools (?) which are monthly seeking recognition from the Society?

Why, soon any man who can muster up half a dozen test tubes and a spirit lamp will seek to be recognized as Professor in the —— School of Pharmacy.

The Pharmacy Act of this year has legalized two branches of the drug trade. Of these one has very great and distinct privileges, to which the individual members of the branch should be able to show their special claim by high culture and wide scientific attainments. If the individual cannot show his right to a higher status, how can such artificial and nominal distinctions as those between druggist and pharmacist be maintained?

We have poor inducement to bring up our sons to a career which promises to be only that of a badly paid tradesman.

By all means let us have a School of Pharmacy. We want it and cannot get on without it, but let it be a real school, where something more is contemplated than the passing of an examination.

The Irish Society under its altered constitution ought soon to be in a fairly strong financial position, and therefore able to take the responsibility of a wider venture in the educational way.

The Dublin Medical Schools have all closed their doors to the evening worker, and there is little doubt that a properly equipped school would draw many earnest students from the medical ranks. Here is a grand opportunity, if only those who are responsible will seize it.

I ask the pharmacists of Great Britain to support me in trying to prevent the degradation of pharmacy which must follow on the perpetuation of the present system. It nearly concerns themselves. J. E. BRUNKER.

Dublin.

LINGERING SUPERSTITIONS.

Sir,—With reference to Mr. Turver's note on the superstitious use of mercury as a cure for rheumatism, there is another superstition also regarding an antirheumatic which seems to die hard. I refer to the use of stick sulphur as a remedy for articular rheumatism. A piece of sulphur is simply grasped firmly in the hand for a few minutes at a time, the patient experiencing more or less relief after each "grip." The most notable curative effect, however, is produced when the patient is able to grip the sulphur with sufficient force to cause the finger joints to crackle.

Edinburgh. J. A. FORRET.

NOTICES OF MEETINGS.

Midland Counties Chemists' Association.—Tuesday, Dec. 16, 8·45 p.m., at Mason College.—Paper: "Notes on Urine Analysis," by Mr. H. Campbell.

Newcastle on-Tyne Chemists' Assistants' and Apprentices' Association.—Wednesday, Dec. 17, 8·30 p.m., at Lockhart's Café, St. Nicholas Square.—Paper by Mr. Pike.

Glasgow Chemists' and Druggists' Assistants' Association.—Wednesday, Dec. 17.—Paper: "Notes on Grasses," by Mr. W. Bowie.

Chemical Society.—Thursday, Dec. 18, 8 p.m.—Papers: "The Constitution of Dehydroacetic Acid," by Dr. N. Collie; "The Theory of Dissociation into Ions and its Consequences," by Mr. S. U. Pickering; "Phennoic Acid," by Dr. A. Colefax.

Liverpool Pharmaceutical Students' Society.—Thursday, Dec. 18.—Paper: "Urinalysis, in Theory and Practice," by Mr. T. E. Riddle.

T. E. Taylor.—If ammonium alum were used decomposition would take place, with the formation of potassium alum and liberation of ammonia.

H. A. Andrews.—Baking Powder (Cooley).—Tartaric acid ¼ lb., bicarbonate of soda and potato farina or British arrow root, in powder, of each ¾ lb. Separately dry them perfectly by a very gentle heat; mix in a dry room; pass the mixture through a sieve, and pack at once.

W. J. T.—The difference in colour might be due to variations in the root used. But if a sample of root, bruised in a Wedgwood mortar, yielded a tincture lighter in colour than that extracted by spirit of the same strength from a similar sample that had been cut, the darker colour of the latter might be attributable to contact with iron.

Errata.—Page 431, 19 lines from bottom, *for* "745" *read* 174·5°; page 435, third line of first paragraph, *for* "69" *read* 61; fourth line of same paragraph *for* "the first three portions of the second fraction required a repetition of the treatment to yield about 12 per cent. more," *read* "whilst the first portion of the second fraction yielded about 15 per cent. more;" page 435, second paragraph sixth line *for* "75 per cent." *read* "69 per cent."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Weddell, Hall, Pollitt, Hill, Taylor, Wright, Dr. Pearse.

THE ADDITIONS TO THE BRITISH PHARMACOPŒIA, 1885.

The 'Additions' in 1890 to the British Pharmacopœia, 1885, do not depart widely—at least in number—from accepted precedents. To a total of 899 articles, exclusive of test solutions, etc., contained in the Pharmacopœia, an addition is made of forty-three items. Of these twelve may be classified as belonging to organic materia medica, eight to inorganic, and there are twenty-three preparations. One test solution—Fehling's—is also added.

The Pharmacopœia itself was increased in 1885 by 116 articles and preparations which were not in the B.P., 1867, nor in the additions thereto made in 1874. The latter, made after an interval of seven years, were thirty-four in number. So that the five years just drawing to a close show a progressive increase in the number of novelties making good a claim to admission into the national Pharmacopœia.

But in 1885 the additions were to some extent counterbalanced by twenty-two omissions, and going back to 1867 we find then 119 articles added, but only five omitted. If therefore the Committee exercises its wonted care and judgment in excising from the next edition medicines of questionable or limited value, there seems to be no ground for apprehending that the volume will attain unmanageable dimensions.

The articles are arranged, as in the principal work, in alphabetical order, according to the Latin names. It is in this order that they are referred to in the following remarks:—

Acetanilidum, better known as antifebrin, has also been admitted into the third edition of the German Pharmacopœia, published during the present year, and it will be interesting to compare the characters and tests there given with those of the 'Additions.' Both agree in the physical characters, neutral reaction, melting point, and solubilities of antifebrin.

The Ph.G. is more exact in specifying its solubility in 194 parts of cold water, as compared with "about two hundred" in the 'Additions;' also "freely soluble in spirit of wine" of the latter is defined as "in 3½ parts" in the former. The colour test with solution of perchloride of iron is conducted with a cold saturated solution in the Ph.G., but apparently with the stronger solution obtained by boiling according to the 'Additions.' Both require that it should leave no residue when burnt with free access of air, and should be dissolved by shaking with sulphuric acid to form a colourless solution. But the final test in the 'Additions' is expanded by the Ph.G. into two successive stages. On heating with solution of potash alone antifebrin gives off an aromatic vapour, which after the addition of a drop of chloroform and renewed application of heat, is changed to the disagreeable smell of isonitrile. Further, it is provided by the latter authority that 1 decigramme of antifebrin with 1 cubic centimetre of hydrochloric acid should, after boiling for a minute, give a clear solution; in which, after the addition of 2 cubic centimetres of carbolic acid, a cloudy red colour is produced by solution of chloride of lime; and, if then saturated with ammonia, is permanently coloured thereby—indigo-blue.

The dose is from 3 to 10 grains, while the maximum single dose of the Ph.G. is half-a-gram.

The formula for *Acetum Ipecacuanhæ* is the same as that given in the B.P.C. Formulary, 1888, except that the powdered ipecacuanha is moistened and percolated with diluted acetic acid, so that the pint of finished product will contain 2½ ounces of strong acid. The B.P.C. directs the employment of 2 ounces only, half of which is used to moisten the powder for maceration, and the remainder, diluted with half-a-pint of water, for percolation; distilled water alone being employed to complete the process. The root is to be in No. 20 powder, instead of coarsely powdered as for the vinum.

The statement of the dose is noteworthy for discriminating between the therapeutic uses of this remedy, the expectorant being distinguished from the emetic action. Powdered ipecacuanha itself, the acetate and sulphate of zinc, sulphate of copper, tartar emetic and tincture of rhubarb are similarly dealt with in the Pharmacopœia.

But in the case of oil of turpentine, the dose of which ranges from 10 minims to twenty-four times that quantity, no indication is given of the varying aims to which the dose must be adapted.

The melting point of *Adeps Lanæ*, or anhydrous lanoline, appears to vary within somewhat wide limits. In other respects its characters and tests correspond very closely with those published by the Pharmacopœia Commission of the German Pharmaceutical Association, referring to the hydrated article, containing not more than 30 per cent. of water. The freedom from acid is guarded against in both by adding minute quantities of tincture of phenolphthalein and soda or potash solution to the ethereal solution of the fat; absence of ammonia by freedom from smell when heated with solution of soda. The German authority provides against the presence of fixed alkalies by limiting the amount of ash to from 0·1 to 0·3 per cent., which should not, when moistened with water, alter red litmus paper.

Emplastrum Menthol, a plaster mass containing menthol, is no doubt an unexceptionable preparation; but the use of such by the dispensing chemist has very largely diminished, while its efficacy must depend mainly upon the skill and integrity of the professed plaster spreader and the care taken in storage to prevent loss of the volatile ingredient.

The description of the source of *Eucalyptus Gummi*, or red gum, introduces a new botanical authority, Schlechtendal, into the Pharmacopœia. A second, Jacquin, occurs as a reference in the description of *Euonymi Cortex* which follows. The characters and tests of red gum are very brief, but sufficient, it is to be hoped, to ensure a supply for pharmaceutical purposes of suitable solubility.

Extractum Euonymi Siccum, otherwise euonymin, is one of the so-called eclectic remedies; the first, if podophyllin be removed to the class of pure resins, to be made official. The pharmacist who begins to prepare this substance *ab initio* is not unlikely to be puzzled by the directions; and it is to be regretted that, looking at the existence up to the present time of two distinct varieties, the brown and the green, characters and tests have not been given and the absence of barium salts ensured.

A mixture of equal parts spirit and water is used for the preparation of this, as well as for the *Extractum Hydrastis Liquidum*. For the *Extractum Hamamelidis Liquidum* a different menstruum, one volume of rectified spirit with two volumes of distilled water, is employed, and the fineness of powder is, for euonymus, hamamelis and hydrastis, Nos. 20, 40, and 60 respectively. The details of the process are the same as for the liquid extracts of coca and cimicifuga, except that seventeen ounces are reserved instead of fifteen.

The source of *Gelatinum* is said to be "gelatigenous animal tissues," a term which, though admittedly correct, is somewhat uncouth.

Glusidum, the new name under which "saccharin" is to be known, conveys the idea of sweetness, and is possibly the best which could have been chosen, since glucose and glucoside have been already appropriated.

Homatropinæ Hydrobromas is succinctly described as "prepared from tropine," the formula of which differs from that of atropine by CH_2.

Hydrastis rhizoma has also been admitted into the Ph.G., which adds to the description of it two tests. A watery infusion of the rhizome is said to be yellow and tolerably bitter, and if chlorine water is allowed to flow gently upon a mixture of two parts of it with one part of sulphuric acid, a dusky red layer is formed. Also if to a stronger infusion made with not more than ten parts of water to one of hydrastis, one-tenth its volume of nitric acid be added, clear yellow crystals should form in twelve hours.

Liquor Cocainæ Hydrochloratis is as nearly a 10 per cent. solution as it is possible to make the specified quantity, and it is preserved by the addition of one-twelfth grain salicylic acid to each fluid drachm.

Liquor Morphinæ Sulphatis.—The necessity for introducing a third solution of morphine has been sometimes questioned by busy practitioners, who find the increasing extent of the Pharmacopœia a task for their overburdened memories. Possibly its extensive use in the United States may have had some weight. Since the sulphate differs in percentage of anhydrous morphine by only 0·7 per cent. from the hydrochlorate, its use in preference to the latter would involve no alteration of the dose.

The directions for the preparation of this liquor might well be taken as a model for those of all similar solutions, as combining simplicity with perfect accuracy.

Liquor Trinitrinæ is a return to the older form of alcoholic solution, upon which the chocolate tabellæ of the B.P., 1885, were considered to be an improvement. The omission of nitroglycerine itself from the materia medica is somewhat singular.

Magnesii Sulphas Effervescens.—The crystals of Epsom salt are ordered to be dried at 130°. Fahr. until 23 per cent. of the water of crystallization has been expelled. This corresponds nearly, but not exactly, with the loss of three out of the seven molecules which they contain. In the former Ph.G. magnesium sulphuricum siccum was prepared by exposing the crystals in a warm place until one-fourth of their weight was lost. In the third edition the heat of a water bath is directed to be employed, and 35 to 37 per cent. of water thereby expelled.

In its further details this preparation exactly follows the model of the sod. cit. tart. effervescens, and the principal point of interest is whether so large a proportion of active ingredient will generally be acceptable to the popular taste.

Oleum Cadinum has undergone a long period of probation before its admission to the national Pharmacopœia, which singularly enough coincides with its omission from the Ph.G.

Paraldehydum.—The definition of this substance, which may be graphically if not accurately described as obtained by condensing three molecules of aldehyde, C_2H_4O, into one, is sufficiently wide in its terms "various acids or salts;" yet it excludes the older method of obtaining it by prolonged exposure to a temperature of 32° Fahr.

The sp. gr. 0·998 and melting point, 10° C. agree with those stated in the Ph.G., but the latter authority permits a very feeble acidity, while the 'Additions' requires the aqueous solution to have a neutral reaction. The boiling point is definitely fixed at 124° C. in the British, at from 123° to 125° C. in the German. That its solubility is lessened by warming both agree in stating, but according to the 'Additions' one part dissolves in ten of water, in the Ph.G. one part in eight and a half. The tests of the latter direct that a solution in ten parts of water, which should show no separation of oily drops on standing, after acidifying with nitric acid, should be unaffected by nitrate of silver or nitrate of barium. The 'Additions' provides that the neutral solution should not be coloured by solution of potash or of soda, nor be precipitated by barium chloride or silver nitrate. In the Ph.G. it is stated that 1 cubic centimetre of paraldehyde with 1 of spirit of wine should not, after the addition of one drop of normal potash solution, show an acid reaction. Lastly, the maximum dose of 5 grams is slightly below the 1½ fluid drachms given in the additions to the B.P.

Phenacetinum.—The description accords closely with that in the German Pharmacopœia, but the latter is more precise in specifying that it is soluble in 1400 parts cold, and about 70 parts boiling water, instead of using the expressions "sparingly" and "more freely soluble." It also provides that the solution in 16 parts of spirit shall be neutral to litmus paper. The chromic acid test differs in the proportion of hydrochloric acid ordered. The 'Additions' directs 1 grain in 20 minims, boiled for half a minute, while the Ph.G. orders 1 decigram in a cubic centimetre boiled for one minute, and specifies three drops of the chromic acid solution. The final test in the former, the absence of unpleasant odour when the phenacetin is boiled with solution of potash, and again after the addition of five drops of chloroform, has no counterpart in the latter.

The dose is a maximum of 1 gram in the Ph.G. from 5 to 10 grains in the British Pharmacopœia.

Phenazonum, commonly known as antipyrin, is another derivative of phenol. It may be useful as an aid to memory, although no guide to the actual processes of manufacture, to connect both phenacetin and phenazonum with the 8-carbon alcohol or xylylic alcohol, $C_8H_{10}O$, mentioned by Muller in 1865 as occurring in coal tar.

Antipyrin is thus described :—"Colourless and inodorous scaly crystals with a bitter taste, melting at about 230° F. (110° C.); freely soluble in water, rectified spirit and chloroform; less soluble in ether." This may be compared with the following from the Ph.G. Tabular colourless crystals, with scarcely perceptible odour and mild bitter taste, melting at 113° C. One part dissolves in less than one part cold water, in about one part of spirit of wine, in one part of chloroform, and in about 50 parts of ether. A 1 per cent. watery solution gives with a solution of tannic acid a copious white precipitate. Two cubic centimetres of the same solution give a green colour with two drops of fuming nitric acid, and after raising it to the boiling point a further addition to the solution of one drop of the same acid gives it a red tint. Two cubic centimetres of a solution of 1 part in 1000 of water give a deep red colour with one drop of perchloride of iron solution, passing to a light yellow on the addition of ten drops of sulphuric acid.

The 'Additions' gives the following colour test:—"One grain of nitrite of sodium and 2 fluid drachms of a 1 per cent. aqueous solution of phenazone yield a nearly colourless liquid, which turns deep green on the addition of 10 minims of diluted sulphuric acid;" and two others which are in substantial agreement with those above described.

The dose is 3 to 20 grains, but no comparison with the Ph.G. is possible, since the latter contains no dose of antipyrin.

Picrotoxinum.—The source of this is given as *Anamirta paniculata*, Colebrooke, which makes the third new botanical authority introduced into the Pharmacopœia. The formula for picrotoxin has not, apparently, been sufficiently established.

A description of the plant *Cocculus Indicus*, yielding cocculus berries or seeds, was given in the British Pharmacopœia, 1864, but omitted in 1867. The omission from the present work of any account of the drug itself marks a new departure. In the exactly parallel case of veratrine the Pharmacopœia gives, under the head of sabadilla, an account of the source and the characters of the drug yielding the alkaloid, although it is probably as rarely used *per se* as cocculus berries are, at least in pharmacy.

The solubilities of picrotoxin are very explicitly given, and the fact is noted that when dissolved by the aid of caustic potash solution it reduces Fehling's solution; although its classification with the glucosides would still appear to be an open question. The dose $\frac{1}{100}$ to $\frac{1}{30}$ grain ranges within narrower limits than that given by Martindale, viz., $\frac{1}{120}$ to $\frac{1}{30}$ grain.

Pilula Ferri differs only by a trifling detail in the manipulation from the B.P.C. Formulary, and four pills instead of three constitute the maximum dose.

Pulvis Sodæ Tartaratæ Effervescens.—Now that a standard has been set up in the Pharmacopœia for seidlitz powders, as for other medicines in universal and familiar use, it behoves pharmacists who have varied their preparation from that customarily employed, to be on their guard against a possible charge under the Adulteration Act. This will be more easily done, since seidlitz powders are exempted from the Patent Medicine Stamp Act, and proprietary claims do not therefore involve liability to taxation.

The exclusion of *Sodii Benzoas* from the German Pharmacopœia coincides with its admission to the British. Its solubility in spirit would be better stated thus: "in twenty-four parts of cold and in twelve of boiling rectified spirit." The quantitative test provides that ten grains shall leave, after having been heated, about 3·68 grains of residue, principally caustic soda, requiring for neutralization from 60 to 70 grain measures of the volumetric solution of oxalic acid. This indicates the presence of 3·11 grains of NaHO, which is somewhat above the theoretical yield, owing possibly to a loss of the volatile acid sustained by this salt in keeping.

Sodii Nitris is reintroduced from the B.Ph., 1864, without directions for its preparation, but with copious characters and tests.

The quantitative test is on the lines of Allen's for ethyl nitrite, as already adopted in the Pharmacopœia for spiritus ætheris nitrosi, and the possibility of its contamination with oxalate formed during the process of manufacture is guarded against by the use of solution of calcium chloride as a test, which should not give more than traces of precipitate with the aqueous solution.

Sodii Phosphas Effervescens.—Unlike the magnesium sulphate, the phosphate and the sulphate of sodium are both deprived of the whole of their water of crystallization, before mixing with the other ingredients to form this and the *Sodii Sulphas Effervescens* respectively.

Stramonii Folia are reintroduced from the B.P., 1867, but with a reference to Bentley and Trimen instead of Woodville. The botanical characters are also much more minutely given, and follow upon the lines of the U.S. Pharmacopœia. The condition that the leaves shall be collected from plants in flower, cultivated in Britain, is no longer insisted upon.

Strophanthus hispidus, var. *Kombé.*—The characters of this are given more fully than in the B.P.C. formulary and with some minor differences.

The physical characters of *Sulphonal* agree with those given in the Ph.G., but the latter defines the solubilities more accurately. Sixty-five parts of cold and two parts of boiling spirit, replace the "about fifty" and "very soluble" of the 'Additions,' and 135 parts of ether instead of "readily soluble." The odour of mercaptan is evolved, according to our Pharmacopœia, by heating a few grains of sulphonal with an equal weight of cyanide of potassium. The German directs one decigram to be heated in a test tube with powdered wood charcoal to bring about the same result. The latter adds a simple test that by solution in fifty parts of boiling water no odour of any kind is developed, and provides also that the aqueous solution after cooling and filtering shall not be affected by nitrate of barium or nitrate of silver.

The maximum dose in the Ph.G. is 4 grams, in the 'Additions' it ranges from 15 to 40 grains.

The *Suppositoria Glycerini* consist of 14 parts of gelatine dissolved in 70 parts of glycerine and 16 parts of water, these proportions varying slightly from those given in the 'Extra Pharmacopœia.'

Syrupus Ferri Subchloridi is the old formula of Mr. R. Phillips revived and altered. Rather less acid is employed, wire is directed instead of turnings, ten grains of citric acid are added to the solution as a preservative, and 2 drachms of distilled water used to wash the filter. No characters and tests are given.

The formulæ for the *Tinctura Hamamelidis* and *Tinctura Hydrastis* are those of the B.P.C. Formulary. That for *Tinctura Strophanthi* is very nearly the same, except that percolation is discontinued when Oss of tincture has been obtained, and this is diluted with spirit of wine to the full quantity—a pint.

The *Trochisci Sulphuris* contain each 1 grain o acid tartrate of potash and 5 grains of precipitated sulphur, flavoured with 1 minim of tincture of orange peel.'

Unguentum Conii.—Juice of hemlock is evaporated to one-eighth its bulk, at a temperature not exceeding 140° F., a little boric acid is added, and three parts of lanoline incorporated with each part of the concentrated juice.

This should possess four times the activity of the ointment of the London Pharmacopœia, which was made by boiling the fresh leaves with an equal weight of lard.

Unguentum Hamamelidis differs from that described in the 'Extra Pharmacopœia' in being made with the liquid extract from the leaves, instead of the tincture of the bark.

In the preparation of Fehling's solution Mr. Martindale's modification is adopted.

YERBA SANTA.*

BY HEMAN C. CLEVELAND, PH.G.

I find by experience that the best menstruum to use in the preparation of the fluid extract is 75 per cent. alcohol.

Extractum Eriodictyi Fluidum.

Eriodictyon, No. 50 powder . .	100 grams.
Alcohol	75 „
Water	25 „

or enough to make one hundred cubic centimetres.

Moisten the powder with 30 c.c. of alcohol, pack firmly in a cylindrical percolator, then add enough alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator close the lower orifice. Cover the percolator. Macerate for forty-eight hours, then allow percolation to proceed, adding menstruum until the drug is exhausted. Reserve the first 85 cubic centimetres of the percolate, and evaporate the remainder to a soft extract. Dissolve this in reserved portion, and add menstruum enough to make the fluid extract measure 100 cubic centimetres.

Extractum Eriodictyi.

Evaporate the fluid extract to a pilular consistence, then weigh and incorporate while still warm 5 per cent. of glycerine. Appearance greenish brown.

Syrupus Eriodictyi.

A syrup prepared from eriodictyon leaves is extensively used for the administration of quinine, for the purpose of disguising the bitter taste of quinine when taken immediately after mixtures in which it would be chemically incompatible. The peculiar property of the eriodictyon leaf, of imparting to quinine the taste of starch when chewed and held upon the tongue for a few seconds, has been well known for years to the old settlers of California.

A syrup may be prepared from the fluid extract in the proportion of 1 ounce of fluid extract to the pint, and should be made according to the following formula:—

Fluid extract eriodictyon	1 fl. oz.
Calcined magnesia	½ av. oz.
Water	7½ fl. oz.
Sugar	14 av. oz.

Mix the fluid extract with calcined magnesia and add the water gradually, with constant stirring; let it stand twenty-four hours and filter; add the sugar and dissolve with the aid of gentle heat.

To prepare a fluid extract that will mix directly with simple syrup and form a limpid preparation is very much desired. It can be best made by the following process:—

Eriodictyon leaves, 40 powder. . .	16 tr. oz.
Potassium carbonate	3 „
Aqua ammonia	
Alcohol	
Water	
of each sufficient to make . . .	16 fl. oz.

Mix ammonia water and water in the proportion of 1 part ammonia water to 7 parts of water. Moisten the drug with 8 fluid ounces of this menstruum and pack it firmly into a cylindrical percolator; macerate twenty four hours and percolate slowly, until 3 pints of percolate are obtained. To this add the potassium carbonate, and evaporate until a pasty residue is left. Stir this well with 8 ounces of alcohol gradually added. Let the pasty precipitate subside and decant the supernatant liquor; to the residue gradually add 8 fluid ounces of alcohol as before. Pour this mixture upon a strainer and force the liquid out. Should this second extraction measure more than is needed to complete the intended volume of fluid extract (16 fluid ounces), dissipate the excess of alcohol by appropriate means; unite the residue with the first extraction. Set the mixture aside for twenty-four hours and decant the clear fluid extract from the scant crystalline deposit meanwhile formed.

Analysis proved that the plant contains two distinct resinous principles, the one a bitter, acrid, brittle resin, and the other consisting of inert resinous matter, decolorized by animal charcoal. The resinous principle is characterized by the property of forming with the quinine salts an insoluble quinium-resin salt, and that resin is removed from the drug by percolating with alcohol. For this reason the last formula for making the fluid extract is the best when it is to be used for the preparation of syrup to disguise the taste of quinine. As to its therapeutical value I can say nothing. None of the fluid extracts should be used for the preparation of a syrup for disguising the taste of quinine unless the quinine precipitant is first removed.

By the following table it will be seen that *Eriodictyon glutinosum* contains:—

Matter extracted by ether (a bitter, acrid, brittle resin, about 9 per cent.; green colouring matter, wax and tannic acid in small quantities)	15·10
A volatile oil in very small quantities. Moisture	12·25
Matter extracted by alcohol (inert, resinous matter decolorized by animal charcoal; a peculiar glucoside of the tannic acid series prevailing in the mass)	11·02
Matter extracted by water (tannic acid, gum, trace of sugar, brown extract, inert substance)	18·34
Wood, fibre and ash	43·29
	100·00

THE GUM OF THE LEOPARD-TREE.

(*Flindersia maculosa*, F. v. M.)

BY J. H. MAIDEN, F.L.S., F.C.S.,

Curator of the Technological Museum, Sydney.

Flindersia maculosa, F. v. M. (B. Fl., i. 388) is a synonym of *F. strzeleckiana*, F. v. M., of Mueller's 'Census,' p. 9. It belongs to the natural order *Meliaceæ.** It is an interior species, and is found in New South Wales and Queensland. Owing to the peculiar, and somewhat ornamental, spotted or blotched appearance of its bark, it is known as "spotted, or leopard tree." It also bears the name of "dogwood."

During the summer months large masses of a clear amber colour exude from the stem and branches. It makes good adhesive mucilage, has a pleasant taste, and is eaten by the aboriginals. It is commonly used by bushmen as a remedy in diarrhœa.

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* Abstract from an inaugural essay, Buffalo College of Pharmacy.

* For a discussion on gums of this natural order, see a paper by the author, 'Proc. Linn. Soc.,' N.S.W., 1889.

Two samples have been received at the Technological Museum, and the following is an account of them. In view of the scarcity of good gum-arabic it would be a useful addition to our raw products if abundant supplies of it could be obtained. I have not heard of a gum being yielded by any other Australian species of *Flindersia*:—

Sample I.—From between the Lachlan and Darling Rivers, N.S.W. A most valuable gum. It is in pieces as large as pigeons' eggs, and I have seen a piece half as large as an emu egg, clear and of excellent quality, with only a small portion of bark at the place of attachment to the tree. In parts of the interior it is said to be fairly abundant. In some cases it remains in the liquid state on the trees for some little time before hardening, or else exudes very rapidly, for it is frequently brought to Sydney in pieces as long as an ordinary earthworm, and of the same average diameter.

It dissolves readily and completely in cold water. It hardly appears to affect the transparency and absence of colour of pure water. In this respect it may be ranked very closely to picked Turkey gum-arabic. It gives rise to the faint cloudiness which an aqueous solution of gum-arabic soon assumes.

Sample II.—From Tarella, near Wilcannia, New South Wales. This is by no means so pleasing-looking as the preceding sample. For the most part it is dull and dirty-looking externally, as if the tree had been exposed to dust during its exudation. It is very brittle and has a bright fracture. It is of a very pale colour (almost colourless, in fact), but the presence of the accidental impurity above alluded to reduces its value. This contamination is, however, probably rare. This gum appeared to most frequently exude from half-dead trees.

Leopard-tree gum is, to all intents and purposes, a good gum-arabic. Its average composition may be readily seen from the following:—

Sample.	Arabin.	Metarabin.	Water.	Ash.	Total.
1. .	80·2	nil.	16·49	2·76	99·45
2. .	80·08	nil.	16·4	2·63	99·11

PRIESTLEY AND LAVOISIER.*

BY PROFESSOR T. E. THORPE, B.SC., PH.D., F.R.S., TREAS., C.S.

(*Concluded from page* 230.)

In his account of his own work on dephlogisticated air, given in his 'Observations,' etc., 1790 edition, Lavoisier further says, vol. ii., p. 108: "Being at Paris in the October following (the August of 1774), and knowing that there were several very eminent chemists in that place, I did not omit the opportunity, by means of my friend Mr. Magellan,† to get an ounce of *mercurius calcinatus* prepared by Mr. Cadet, of the genuineness of which there could not possibly be any suspicion; and, at the same time, I frequently mentioned my surprise at the kind of air which I had got from this preparation to Mr. Lavoisier, Mr. le Roy, and several other philosophers, who honoured me with their notice in that city, and who, I dare say, cannot fail to recollect the circumstance."

If any further evidence is required to prove that Lavoisier was not only not "the true and first discoverer" of oxygen, but that he has absolutely no claim to be regarded even as a later and independent discoverer, it is supplied by M. Berthelot himself. Not the least valuable portion of M. Berthelot's book, as an historical work, is that which he devotes to the analysis of the thirteen laboratory journals of Lavoisier, which have been deposited, by the pious care of M. de Chazelles, his heir, in the archives of the Institute. M. Berthelot has given us a synopsis of the contents of almost every page of these journals, with explanatory remarks and dates when these could be ascertained. As he well says, these journals "are of great interest because they inform us of Lavoisier's methods of work and of the direction of his mind—I mean the successive steps in the evolution of his private thought." On the fly-leaf of the third journal is written "*du* 23 *mars*, 1774, *du* 13 *février*, 1776." From p. 30 we glean that Lavoisier visited his friend M. Trudaine at Montigny about ten days after his conversation with Priestley, and repeated the latter's experiments on the marine acid and alkaline airs (hydrochloric acid gas and ammonia). He is again at Montigny some time between the February 28 and the March 31, 1775, and repeats not only Priestley's experiments on the decomposition of mercuric oxide, presumably by means of M. Trudaine's famous burning glass, but also his observations on the character of the gas. The fly-leaf of the fourth journal informs us that it extends from February 13, 1776, to March 3, 1778. On p. 1 is an account of experiments made February 13 on "précipité *per se* de chez M. Baumé," in which the disengaged gas is spoken of as "*l'air déphlogistique de M. Prisley*" (*sic*). Such a phrase in a private notebook is absolutely inconsistent with the idea that at this time Lavoisier considered himself as an independent discoverer of the gas. How he came to regard himself as such we need not inquire. Nor is it necessary to occupy time by any examination of the arguments by which M. Berthelot, with the skill of a practised advocate, would seem to identify himself with the case of his client. We would do him the justice of recognizing the difficulty of his position. He seeks to discharge an obligation, of which the acknowledgment has been too long delayed. The Académie des Sciences a year ago awoke to the sense of its debt of gratitude to the memory of the man who had laboured so zealously for its honour and even for its existence, during the stormy period of which France has just celebrated the centenary, and out of the *éloge* on Lavoisier which M. Berthelot, as perpetual secretary, was commissioned to deliver, has grown 'La Révolution Chimique.' To write eulogy, however, is not necessarily to write history. We cannot but think that M. Berthelot has been hampered by his position, and that his opinion, or at least the free expression of it, has been fettered by the conditions under which he has written. We imagine we discern between the lines the consciousness that, to use Brougham's phrase, the brightness of the illustrious career which he eulogises is dimmed with spots which a regard for historical truth will not permit him wholly to ignore.

Two cardinal facts made the downfall of phlogiston complete—the discovery of oxygen and the determination of the compound nature of water. M. Berthelot's contention is that not only did Lavoisier effect the overthrow, but he also discovered the facts. In other words, he has not only a claim to a participation in the discovery of oxygen, but he is also "the true and first discoverer" of the non-elementary nature of water. The second claim is directly and explicitly stated. Although it is supported by a certain ingenuity of argument, we venture to think that we shall be able to show it has no greater foundation in reality than the first.

Members of the British Association who are at all familiar with its history will recall the fact that this is not the first occasion on which the attempt to transfer "those laurels which both time and truth have fixed upon the brow of Cavendish" has had to be resisted. At the Birmingham meeting of 1839 the Rev. W. Vernon Harcourt, who then presided, devoted a large portion of his address to an able and eloquent vindication of Cavendish's rights. The attack came then, as now, from the perpetual secretary of the French Academy, and the charges were also formulated then, as now, in an *éloge* read before that learned body. The assailant was M. Arago, who did battle, not for his countryman Lavoisier, whose claims are dismissed as "pretensions," but on behalf of James Watt, the great engineer, who was one of the foreign members of the Institute.

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* Presidential Address to the Chemical Section of the British Association.

† Professor Grimaux (Lavoisier, p. 51), says: "Un de ses [Lavoisier's] amis qui habitait Londres, Magalhaens ou Magellan, de la famille du célèbre navigateur, lui envoyait tous les mémoires sur les sciences qui paraissaient en Angleterre et le tenait au courant des découvertes de Priestley."

It is not my wish to trouble you at any length with the details of what has come to be known in the history of scientific discovery as the water controversy—a controversy which has exercised the minds and pens of Harcourt, Whewell, Peacock and Brougham in England; of Brewster, Jeffrey, Muirhead and Wilson in Scotland; of Kopp in Germany; and of Arago and Dumas in France. This controversy, it has been said, takes its place in the history of science side by side with the discussion between Newton and Leibnitz concerning the invention of the differential calculus, and that between the friends of Adams and Leverrier in reference to the discovery of the planet Neptune. Up to now it has practically turned upon the relative merits of Cavendish and Watt. M. Berthelot is the first French *savant* of any note who has seriously put forward the claims of Lavoisier, his countryman and predecessor Dumas having deliberately rejected them.

At the risk of wearying you with detail, I am under the necessity of restating the facts in order to make the position clear. Some time before April 18, 1781, Priestley made what he called "a random experiment" for the entertainment of a few philosophical friends. It consisted in exploding a mixture of inflammable air (presumably hydrogen) and common air, contained in a closed glass vessel, by the electric spark, in the manner first practised by Volta in 1776. The experiment was witnessed by Mr. John Warltire, a lecturer on natural philosophy and a friend of Priestley, who had rendered him the signal service of giving him the sample of the mercuric oxide from which he had first obtained oxygen. Warltire drew Priestley's attention to the fact that after the explosion the sides of the glass vessel were bedewed with moisture. Neither of the experimenters attached any importance to the circumstance at the time, Priestley being being of opinion that the moisture was pre-existent in the gases, as no special pains were taken to dry them. Warltire, however, conceived the notion that the experiment would afford the means of determining whether heat was ponderable or not, and hence he was led to repeat it, firing the mixture in a copper vessel for greater safety. The results of these observations are contained in Priestley's 'Experiments and Observations on Air,' vol. v., 1781, App. p. 395.

At this period Cavendish was engaged on a series of experiments "made, as he says, principally with a view to find out the cause of the diminution which common air is well known to suffer by all the various ways in which it is phlogisticated, and to discover what becomes of the air thus lost or condensed." (Cavendish. *Phil. Trans.*, 1784, p. 119.) On the publication of Priestley's work he repeated Warltire's experiment, for, he says, as it "seemed likely to throw great light on the subject I had in view, I thought it well worth examining more closely." The series of experiments which Cavendish was thus induced to make, and which he made with all his wonted skill in quantitative work, led him some time in the summer of 1781 to the discovery that a mixture of two volumes of the inflammable air from metals (the gas we now call hydrogen) with one volume of the dephlogisticated air of Priestley combine together under the influence of the electric spark, or by burning, to form the same weight of water. If Cavendish had published the result of these observations at or near the time he obtained them, there would have been no water controversy. But in the course of the trials he found that the condensed water was sometimes acid, and the search for the cause of the acidity (which incidentally led to the discovery of the composition of nitric acid) occasioned the delay. The main result that a mixture of two volumes of inflammable air and one volume of dephlogisticated air could be converted into the same weight of water was, however, communicated to Priestley, as he relates in a paper in the *Phil. Trans.*, for 1783. Priestley was at this time interested in an investigation on the seeming convertibility of water into air, and he was led to repeat Cavendish's experiments, some time in March, 1783, on what was apparently the converse problem. Priestley, however, made a fatal blunder in the repetition. With the praiseworthy idea of obviating the possibility of any moisture in the gases, he prepared the dephlogisticated air from nitre, and the inflammable air by heating what he calls "perfectly made charcoal" in an earthenware retort. At this time, it must be remembered, there was no sharp distinction between the various kinds of inflammable air; hydrogen, sulphuretted hydrogen, marsh gas and olefiant gas, coal gas, the vapours of ether and turpentine, and the gas from heated charcoal, consisting of a mixture of carbonic oxide, marsh gas, and carbonic acid were indifferently termed "inflammable air." Priestley attempted to verify Cavendish's conclusion on the identity of the weight of the gases used with that of the water formed; but his method in this respect, as in his choice of the inflammable air, was wholly defective, and could not possibly have given him accurate results. It consisted in wiping out the water from the explosion vessel by means of a weighed piece of blotting paper and determining the increase of weight of the paper. He says, however, "I always found, as near as I could judge, the weight of the decomposed air in the moisture acquired by the paper. . . . I wished, however, to have had a nicer balance for this purpose; the result was such as to afford a strong presumption that the air was reconverted into water, and therefore that the origin of it had been water." These results, together with those on the conversion of water into air, were communicated towards the end of March, 1783, by Priestley to Watt, who began to theorise upon them, and then to put his thoughts together in the form of a letter to Priestley, dated April 26, 1783, and which he requested might be read to the Royal Society on the occasion of the presentation of Priestley's memoir. In this letter Watt says, "Let us now consider what obviously happens in the case of the deflagration of the inflammable and dephlogisticated air. These two kinds of air unite with violence, they become red-hot and upon cooling totally disappear. When the vessel is cooled, a quantity of water is found in it equal to the weight of the air employed. This water is then the only remaining product of the process, and *water*, *light* and *heat* are all the products. *Are we not then authorised to conclude that water is composed of dephlogisticated air and phlogiston deprived of part of their latent or elementary heat; that dephlogisticated or pure air is composed of matter deprived of its phlogiston and united to elementary heat and light, etc.*"

This letter, although shown to several Fellows of the Society was not publicly read at the time intended. Priestley, before its receipt, had detected the fallacy of his experiments on the seeming conversion of water into air, and as much of the letter was concerned with this matter, Watt requested that it should be withdrawn. Watt, however, as he tells Black,* in a letter dated June 23, 1783, had not given up his theory as to the nature of water, and on November 26, 1783, he restated his views more fully in a letter to De Luc. In the meantime, Cavendish, having completed one section of his investigation, sent in a memoir to the Royal Society, which was read on January 15, 1784, in which he gives an account of his experiments and announces his conclusion "that dephlogisticated air is in reality nothing but dephlogisticated water, or water deprived of its phlogiston; or, in other words, that water consists of dephlogisticated air united to phlogiston; and that inflammable air is either pure phlogiston, as Dr. Priestley and Mr. Kirwan suppose, or else water united to phlogiston." Watt thereupon requested that his letter to De Luc should be published, and it was accordingly read to the Royal Society on April 29, 1784. Which of the two—Cavendish or Watt—is, under these circumstances, to be considered as "the true and first discoverer" of the compound nature of water is the question which has been hitherto the main subject of the water controversy.

Let us now consider the matter as it affects Lavoisier. In 1783 Lavoisier had publicly declared against the doctrine of phlogiston, or rather, as M. Dumas puts it, "against the crowd of entities of that name which had no quality in common except that of being intangible by every known method." ('Leçons sur la Philosophie Chimique,' p. 161.) How completely Lavoisier had dissociated himself from the theory may be gleaned from his memoir of that year. "Chemists," he says, "have made a vague principle of phlogiston which is not strictly defined, and which in consequence accommodates itself to every explanation into which it is pressed. Sometimes this principle is heavy and sometimes it is not; sometimes it is free fire and sometimes it is fire combined with the earthy element; sometimes it passes through the pores of vessels and sometimes they are impenetrable to it: it explains at once causticity and non-causticity, transparency and opacity, colours and the absence of colours. It is a veritable Proteus which changes its form every moment."

But Lavoisier had merely renounced one fetich for another. At the time that he penned these lines he was as much under the thraldom of *le principe oxygine* as the most devoted follower of Stahl was in the bondage of phlogiston. The idea that the calcination of metals was but a slow combustion had been fully recognized. M. Berthelot tells us that as far back as the March of 1774 Lavoisier had written in his laboratory journal: "I am persuaded that the inflammation of inflammable air is nothing but a fixation of a portion of the atmospheric air, a decomposition of air. . . . In that case in every inflammation of air there ought to be an increase of weight," and he tried to ascertain this by burning hydrogen at the mouth of a vessel from which it was being disengaged. In the following year he asks, what remains when inflammable air is burnt completely? According to the theory by which he is now swayed it should be an acid, and he made many attempts to capture this acid. In 1777 he and Bucquet burnt six pints of the inflammable air from metals in a bottle containing lime-water, in the expectation that fixed air would be the result. And in 1781 he repeated the experiment with Gengembre, with the modification that the oxygen was caused to burn in an atmosphere of hydrogen, but not a trace of any acid product could be detected. Of course there must have been considerable quantities of water formed in these experiments, but Lavoisier was preoccupied with the conviction that oxidation meant acidification, and its presence was unnoticed, or, if noticed, was unheeded. Macquer, in 1776, had drawn attention to the formation of water during the combustion of hydrogen in air, but Lavoisier has stated that he was ignorant of that observation. What was it then that put him on the right track? We venture to think that M. Berthelot has himself supplied the answer. He says (p. 114): "Rumours of Cavendish's trials had spread throughout the scientific world during the spring of 1783. . . . Lavoisier, always on the alert as to the nature of the products of the combustion of hydrogen, was now in such position that the slightest hint would enable him to comprehend its true nature. He hastened to repeat his trials, as he had the right to do, never having ceased to occupy himself with a question which lay at the very heart of his doctrine."

"On the 24th of June, 1783," continues M. Berthelot, "he repeated the combustion of hydrogen in oxygen, and he obtained a notable quantity of water without any other product, and he concluded from the conditions under which he had worked that the weight of the water formed could not be other than equal to that of the two gases which had formed it. The experiment was made in the presence of several men of science, among whom was Blagden, a member of the Royal Society of London, who on *this occasion* recalled the observations of Cavendish (*qui rappela à cette occasion les observations de Cavendish*)."

On the following day Lavoisier published his results. The following is the official minute of the communication taken from the register of the sittings of the Académie des Sciences:—

Meeting of Wednesday, June 25, 1783.

MM. Lavoisier and De Laplace announced that they had lately repeated the combustion of Combustible Air with Delphlogisticated Air; they worked with about 60 *pints of the airs, and the combustion was made in a closed vessel: the result was very pure water.*

The cautious scribe who penned that minute did not commit himself too far. M. Berthelot, however, regards it as the first certain date of publication, established by authentic documents, in the history of the discovery of the composition of water; "a discovery," he adds, "which, on account of its importance, has excited the keenest discussion."

You will search in vain through the laboratory journals, as given by M. Berthelot, for any indications either of experiments or reflections which would enable you to trace the course of thought by which Lavoisier was guided to the truth. There is absolutely nothing on the subject until in the eighth volume (25 *mars*, 1783, *au février*, 1784), and on p. 63 we come to the experiment of June 24, and we read: "In presence of Messieurs Blagden, of (name illegible), de Laplace, Vandermonde, de Fourcroy, Meusnier, and Legendre, we have combined in a bell-jar dephlogisticated air and inflammable air drawn from iron by means of sulphuric acid, etc. . . . The amount of water may be estimated at 3 drachms; the amount which should have been obtained was 1 ounce, 1 drachm and 12 grains. Thus we must suppose that there was a loss of two-thirds of the amount of the air or that there has been a loss of weight."

And this is the experiment which, according to M. Berthelot, enabled Lavoisier to conclude that, "*the weight of the water formed could not be other than equal to that of the two gases which had formed it*!" It is on this single experiment, hurriedly and imperfectly done, that Lavoisier's claim to the discovery of the compound nature of water is based! M. Berthelot objects to the assumption that it was hurriedly done. He says, on p. 114, "Lavoisier caused a new apparatus to be made, with a couple of tubes and two reservoirs for the gases; an arrangement which would require a certain amount of time to put together; this circumstance proves that it could not have been an improvised trial." To what extent it was improvised will be seen immediately.

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* Watt, 'Correspondence,' p. 31.

Now although the laboratory journals do not in this case "inform us of Lavoisier's methods, and of the direction of his mind . . . . the successive steps in the evolution of his private thought," we have other means of ascertaining how he arrived at his knowledge. The method was simplicity itself: he *was told of the fact, and his informant was none other than Cavendish's assistant, Blagden.*

Cavendish's memoir was published in 1784. Before it was struck off its author caused the following addition to be made: "During the last summer also a friend of mine gave some account of them (the experiments) to M. Lavoisier, as well as of the conclusion drawn from them, that dephlogisticated air is only water deprived of phlogiston: but at that time so far was M. Lavoisier from thinking any such opinion warranted that, till he was prevailed upon to repeat the experiment himself, he found some difficulty in believing that nearly the whole of the two airs could be converted into water." This addition, as I have had the opportunity of verifying by an inspection of the original MSS. in the archives of the Royal Society, was made in the handwriting of Cavendish's assistant and amanuensis, Blagden.

When Lavoisier's memoir appeared it was found to contain the following reference to this circumstance: "It was on June 24 that M. de Laplace and I made this experiment in presence of MM. Le Roi, Vandermonde, and several other academicians, and of Mr. Blagden, the present secretary of the Royal Society of London. The latter informed us (*ce dernier nous apprit*) that Mr. Cavendish had already tried, in London, to burn inflammable air in closed vessels, and that he had obtained a very sensible quantity of water."

This reference was so partial, and its meaning so ambiguous, that Blagden addressed the following letter to Crell to be published in his 'Chemische Annalen' (Crell's 'Annalen,' 1786, vol. i., p. 58). It is so direct and conclusive that I offer no apology for giving it almost entire[*]:

"I can certainly give you the best account of the little dispute about the first discoverer of the artificial generation of water, as I was the principal instrument though which the first news of the discovery that had been already made was communicated to Mr. Lavoisier. The following is a short statement of the history:—

"In the spring of 1783 Mr. Cavendish communicated to me and other members of the Royal Society, his particular friends, the result of some experiments with which he had for a long time been occupied. He showed us that out of them he must draw the conclusion that dephlogisticated air was nothing else than water deprived of its phlogiston; and *vice versâ*, that water was dephlogisticated air united with phlogiston. About the same time the news was brought to London that Mr. Watt, of Birmingham, had been induced by some observations to form a similar opinion. Soon after this I went to Paris, and in the company of Mr. Lavoisier and of some other members of the Royal Academy of Sciences, I gave some account of these new experiments and of the opinions founded upon them. They replied that they had already heard something of these experiments, and particularly that Dr. Priestley had repeated them. They did not doubt that in such manner a considerable quantity of water might be obtained, but they felt convinced that it did not come near to the weight of the two species of air employed, on which account it was not to be regarded as water formed or produced out of the two kinds of air, but was already contained in and united with the airs, and deposited in their combustion. This opinion was held by Mr. Lavoisier, as well as by the rest of the gentlemen who conferred on the subject; but as the experiment itself appeared to them very remarkable in all points of view, they unanimously requested Mr. Lavoisier, who possessed all the necessary preparations, to repeat the experiment, on a somewhat larger scale, as early as possible. This desire he complied with on the 24th June, 1783 (as he relates in the latest volume of the Paris memoirs.) From Mr. Lavoisier's own account of his experiment it sufficiently appears that at that period he had not yet formed the opinion that water was composed of dephlogisticated and inflammable airs, for he expected that a sort of acid would be produced by their union. In general Mr. Lavoisier cannot be convicted of having advanced anything contrary to truth; but it can still less be denied that he concealed a part of the truth; for he should have acknowledged that I had, some days before, apprised him of Mr. Cavendish's experiments, instead of which the expression '*il nous apprit*' gives rise to the idea that I had not informed him earlier than that very day. In like manner Mr. Lavoisier has passed over a very remarkable circumstance, namely, that the experiment was made in consequence of what I had informed him of. He should likewise have stated in his publication not only that Mr. Cavendish had obtained '*une quantité d'eau très sensible*,' but that the water was equal to the weight of the two airs added together. Moreover, he should have added that I had made him acquainted with Messrs. Cavendish and Watt's conclusions, namely, that water, and not an acid, or any other substance, arose from the combustion of the inflammable and dephlogisticated airs. But *these* conclusions opened the way to Mr. Lavoisier's present theory, which perfectly agrees with that of Mr. Cavendish, only that Mr. Lavoisier accommodates it to his old theory, which banishes phlogiston. . . . The course of all this history will clearly convince you that Mr. Lavoisier (instead of being led to the discovery by following up the experiments which he and Mr. Bucquet had commenced in 1777) was induced to institute again such experiments, solely by the account he received from me, and of our English experiments, and that he really discovered nothing but what had before been pointed out to him to have been previously made out and demonstrated in England."

To this letter, reflecting so gravely on his honour and integrity, Lavoisier made no reply. Nor did Laplace, Le Roi, Vandermonde, or any one of the Academicians concerned vouchsafe any explanation. *De non apparentibus et de non existentibus eadem ratio.* No explanation appeared, because none was possible. M. Berthelot ignores this letter, which is the more remarkable, since reference is made to it in more than one of the publications which he tells us he has consulted in the preparation of his account of the water controversy. If he knew of it he must regard it either as unworthy of an answer or as unanswerable.

It would be heaping Ossa on Pelion to adduce further evidence from letters of the time of what Lavoisier's contemporaries thought of his claims. *De mortuis nil nisi bonum.* I would much more willingly have dwelt upon the virtues of Lavoisier, and have let his faults lie gently on him; but I have felt it incumbent on me on this occasion to make some public answer to M. Berthelot's book, and in no place could that answer be more fittingly given than in this town which saw the dawn of that work out of which these grand discoveries arose. It may be that much of what I have had to say is as a twice-told tale to many of you. I trust I need make no apology on that account. The honour of our ancestors is in our keeping, and we should be unworthy of our heritage and false to our trust if we were slow to resent or slack to repel any attempt to rob them of that glory which is their just right and our proud boast.

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[*] Mr. Muirhead's translation; *vide* Watt, 'Correspondence,' 'Composition of Water,' p. 71.

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THE PHARMACEUTICAL CURRICULUM.

The subject referred to by Mr. Yewdall in the letter which appeared in last week's Journal is of such great interest and importance as regards the well-being and future prospects of the pharmaceutical body that regret may well be felt at his having abstained from taking advantage of the opportunity offered by the President's invitation to all who had opinions to express or suggestions to put forward. It was especially for the purpose of hearing such opinions and suggestions from influential and representative members of the craft that the meetings at Leeds and other places have been held, and that the President has been at the pains of attending those meetings. But though we regret this omission on the part of our correspondent we readily acquiesced in his request for space to put his views before the readers of this Journal, and we did so because of the weight which his opinions may be expected to have and of the importance of their subject matter. Unquestionably, the education of those who are to be the pharmacists of the future is a subject that demands serious consideration at the present time. The future interests of the calling depend largely upon the efficiency of the measures now adopted for ensuring the thorough educational training of all who purpose making pharmacy the business of their lives. That this opinion is held by Mr. Yewdall is evident from his letter, and from our knowledge of him we are not surprised that this is the case. But Mr. Yewdall encounters difficulties which he represents as appertaining to the projects of the Council in regard to education. We venture to think that he is mistaken in this respect, and has thus created the difficulties he refers to. It will therefore not be out of place to direct attention to the actual details of the proposed curriculum and to offer some remarks on our correspondent's letter which may serve to put the matter in a different light.

One of the chief points on which Mr. Yewdall appears to misconceive the object of the educational clauses of the Pharmacy Bill is that relating to the division of the qualifying examination into parts. At present it may be correct to say that the term of apprenticeship is, at the best, utilized for the sole purpose of instruction in the ordinary routine of a retail chemist's business; but it is incorrect to credit the President with the opinion that this should be the case. On the contrary it is the aim of the curriculum clauses, in the drafting of which he has taken part, to create inducements and opportunities for adding to that instruction in routine further instruction in the scientific subjects connected with the business in which an examination will eventually have to be passed. Though it is desirable that apprentices should attend courses of lectures on these subjects during the term of apprenticeship, the curriculum would not impose upon them the necessity of doing so. If they had the opportunity of attending courses of instruction during the three years they would have to serve before being admissible to the intermediate examination, and if, by taking advantage of that opportunity, they obtained certificates of attendance, so much of what is requisite from candidates for the final part of the Minor examination would be provided without loss of time or unnatural distraction from business routine. So far as apprentices are concerned, it is difficult to understand how that course can be regarded otherwise than as an improvement on the present system, under which they seldom give attention to scientific subjects until after the apprenticeship has expired. One object of the intermediate examination is to stimulate the study of these subjects during apprenticeship, and as that examination is in form an extension of the Preliminary it provides for the convenience of those in the position of students and candidates for qualification as pharmacists. It is not yet definitely settled what are to be the subjects of the intermediate examination; that would be a matter for the members of the Society to decide upon in general meeting; but we may refer to the proposed bye-laws published five years ago as indicating what is intended to be the general nature of this examination. That will be found to agree exactly with Mr. Yewdall's idea of what it should be. The passing of this intermediate examination would be a step towards the legal qualification, and being practically a partial qualification it would to some extent constitute a ground for latitude in the application of the seventh clause of the Bill of just such a nature as Mr. Yewdall suggests there should be. But whether it is desirable that an apprentice qualification should be established by law in the way he proposes is a much more serious question, and one that we think few who set any just value upon legal qualification would answer affirmatively. Between the passing of the intermediate examination and admission to the final examination for obtaining qualification, it is proposed that there should be an interval of at least one year, and those who had by the end of that time made the requisite attendances at courses of instruction would be competent to present themselves at once as candidates. But it would be quite optional whether they attended those courses during their apprenticeship or after it had been completed.

The curriculum proposed to be established under the educational clauses of the Bill would therefore require a period of at least four years to be spent in obtaining practical instruction in business routine and in attending courses of instruction in scientific subjects, and it would very closely approximate to the curriculum embracing five years' apprenticeship, which Mr. YEWDALL thinks desirable in the interests of the trade and of the public. We are much disposed to agree with him in this opinion, but must at the same time admit having doubts whether it would be feasible to require an apprenticeship of such long duration. But if the prevailing tendency to shorten the period of apprenticeship justifies those doubts, there is so much the more reason and need for establishing a compulsory curriculum of at least four years, and except in regard to this difference of one year the scheme which Mr. YEWDALL lays down as advantageous for the trade and the public is identical with that contemplated by the draft Pharmacy Bill. We are therefore utterly at a loss to understand how Mr. YEWDALL can regard the scheme of the Council of the Society as impracticable, or what are the grounds upon which he contemplates the necessity of having to oppose that scheme in the interests of the public. It seems so requisite that there should be a thorough discussion of this subject that we cordially join in the hope expressed by Mr. YEWDALL that further expressions of opinion will be given to enable the Council to gather more thoroughly the ideas prevalent in the minds of everyone connected with the business. On the other hand a reference to the points above stated seemed to be requisite as a contribution towards correct appreciation of the proposed curriculum, and for the removal of misconceptions concerning it.

By some unaccountable miscarriage the report of a meeting of the Dover Chemists' Association held last Monday week to discuss the Pharmacy Bill has failed to reach us up to the present time; but we take this opportunity of stating that on the motion of Mr. Hambrook, seconded by Mr. J. F. Brown, a resolution was unanimously passed that the members of the Dover Chemists' Association, having considered the draft Pharmacy Act Amendment Bill, approve the same.

* * *

We have much pleasure in calling attention to the report, on page 554, of a meeting of the Manchester Pharmaceutical Association, at which Mr. Benger announced that a gentleman who was present at the meeting lately addressed by Mr. Carteighe, had intimated his intention to offer a scholarship of the yearly value of thirty pounds, to be competed for by students from the North of England, and to be tenable at Bloomsbury Square on lines similar to the Bell Scholarships.

A question of pharmaceutical ethics, in relation to the use of concentrated liquors as a basis for preparations intended to do duty for those of the Pharmacopœia, has just been raised by some legal proceedings in New Jersey. In that State the United States Pharmacopœia has been made the legal standard for preparations included in it. But several pharmacists who were called upon to supply tincture of nux vomica appear to have sold an article prepared by diluting a standard concentrated liquor sent out by a wholesale house, and as a consequence became the subjects of prosecutions for selling an article containing less than 1 per cent. of extractive, whereas the U.S.P. requires that the tincture shall contain not less than 2 per cent. An American contemporary, in reviewing the case, asks what extractive matter has to do with the therapeutic properties of tincture of nux vomica? and whether the requirements of the Pharmacopœia would not have been satisfied by the addition of so much glucose to the dilute alcohol? The first question does not, however, lie within the province of pharmacists to answer; whilst the reply to the second must be in the negative, because although the presence of added glucose might enable the preparation to respond in a measure to one of the tests, it would not answer to the fundamental requirement that the tincture shall contain in each one hundred parts two parts of an extract that is the product of the treatment of nux vomica with alcohol. Moreover, when the writer goes on to affirm that the incriminated tinctures contained the active principles in quantities that it was not possible to suspect in the official preparation he throws away his case, for a pharmacist would be acting at least as wrongly in supplying a medicine containing strychnine in excess of the prescriber's intention as in supplying one in which it was deficient. A French contemporary, *L'Union Pharmaceutique* (Nov., p. 514) also declines to regard the deviation in the same light as the American writer. It remarks that "there are in nux vomica, as in other drugs, not only alkaloids, but extractive matters, the action of which, though obscure, is indisputable and capable of modifying, in one way or another, the action peculiar to the crystalline principles. When the physician prescribes tincture of nux vomica he does not prescribe a simple solution of strychnine, and when the latter is substituted for the former a disloyal act is committed."

* * *

Hitherto the materia medica of China, passing by rhubarb, ginseng, peppermint oil and one or two other substances, has been looked upon as material rather for the amusement, if not the ridicule, of outside barbarians, than for the healing of their diseases. It is therefore somewhat surprising to learn, on the authority of Mr. Consul Alabaster, that during last year there was exported from the port of Canton no less than 2,992,533 lbs. of general medicines, exclusive of special drugs, and 2088 cwts. of pills! Among other articles of export from China mentioned by the Consul, as deserving of extension "in the interest of little boys and girls at home," is preserved ginger, which although perhaps not so pungent as West Indian ginger, he speaks of as wholesome, cheap, agreeable and cleanly made.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

THE CHEMISTRY OF ORGANIC DYES.

BY F. W. PASSMORE, PH.D.

(*Continued from page* 506.)

II. Azo-Compounds.

The members of this large and characteristic class contain the chromophore $-N=N-$, which in distinction from the similar divalent diazo group, is always combined with two benzene nuclei or other aromatic hydrocarbons. The class is subdivided into amidoazo-, oxyazo-, and tetra- or dis-azo-compounds, according to the nature of the auxochromes. As with all dyes of simple constitution, the primary azo compounds are of yellow colour and possess but slight dyeing properties. Through introduction of auxochromes and increase of the number of carbon atoms in the molecule, the shades are deepened to red and finally to violet or brown. Blue azo-dyes are only found among the tetrazo products, and green have not yet been obtained. The relative position of the chromophore groups plays an important *rôle*, but the interesting changes cannot be here recorded. The substituted azo bodies are obtained by the condensation of phenols and amines with diazo compounds resulting from the action of nitrous acid upon amines. The first products of condensation with amines are diazo-amido compounds, from which the amidoazo bodies are derived by an intramolecular rearrangement of the atoms, thus:

$$\underset{\text{Diazobenzene chloride.}}{C_6H_5{\cdot}N{:}N{\cdot}Cl} + \underset{\text{Aniline.}}{NH_2{\cdot}C_6H_5} = \underset{\text{Diazoamidobenzene.}}{C_6H_5{\cdot}N{:}N{\cdot}NH{\cdot}C_6H_5}$$

$$C_6H_5{\cdot}N{:}N{\cdot}NH{\cdot}C_6H_5 = \underset{\text{Amidoazobenzene.}}{C_6H_5{\cdot}N{:}N{\cdot}C_6H_4{\cdot}NH_2}$$

The azo group exhibits a preference for the para-position to the amido or hydroxyl group, but if this be already occupied by a substituting radicle the ortho-position is chosen. Through energetic reduction the double bond between the nitrogen atoms of the azo group is completely dissolved, and two molecules of the corresponding amines result, but frequently by cautious treatment the intermediate, easily oxidizable hydrazines may be isolated. The majority of technically applied azo-dyes are sulphonic acid derivatives (the tropæolines), the number of basic dyes being limited. They are employed extensively for woollen materials, but cotton fibres are incapable of fixing any but a few tetrazo compounds.

a. Amidoazo Compounds.

p-Amidoazobenzene, $C_6H_5-N=N{\cdot}C_6H_4{\cdot}NH_2$, although itself useless as a dye, is the parent substance of many important ones. The mono- and di-sulphonic acids are valuable yellow dyes, the sodium salt of the latter constituting the *Acid yellow* of commerce, and the material for the preparation of tetrazo dyes. The sodium salt of p-dimethylamidoazobenzenesulphonic acid, $NaSO_3{\cdot}C_6H_4N:N{\cdot}C_6H_4{\cdot}N(CH_3)_2$, is a pretty orange dye, which under the names of *Tropæolin D*, *Helianthin*, and *Orange III*, is well known as an indicator in volumetric analysis, and is also employed to colour butter and stearin candles. The corresponding salt of phenylamidoazobenzenesulphonic acid, $HSO_3{\cdot}C_6H_4{\cdot}N:N{\cdot}C_6H_4{\cdot}NH(C_6H_5)$, is *Tropæolin OO*, or *Orange IV*, a fine orange dye for silk or wool, from which *Azoflavine*, *Citronine* and *Indian yellow* are also derived. The amidoazotoluenes and -xylenes and their derivatives have similar properties.

Diamidoazobenzene, $C_6H_5-N=N{\cdot}C_6H_3(NH_2)_2$, the *Chrysoidin* of Will, is obtained from diazoamidobenzene and metaphenylenediamine. The normal hydrochloric acid salt of commerce occurs in violet crystals, and is used especially as an orange-yellow shade for cotton fabrics.

Triamidoazobenzene, $NH_2-C_6H_4{\cdot}N:N{\cdot}C_6H_3(NH_2)_2$. The hydrochloric acid salt comes into commerce under the various names of *Phenylene brown*, *Vesuvine*, *Cinnamon brown*, *Canelle* and *Bismarck brown*. It is employed as a cotton and leather dye, and besides the chrysoidine is the only basic azo dye technically applied.

A few derivatives of the amidoazonaphthalenes have also been made, of which *Orseilline* dyes wool a brown-red.

b. Oxyazyo Compounds.

Oxyazobenzene, $C_6H_5{\cdot}N{:}N{\cdot}C_6H_4{\cdot}OH$, is obtained by the action of diazobenzene upon sodium phenolate. The parasulphonic acid, *Tropæolin Y*, is a dye of dull brown shade.

Dioxyazobenzene, $C_6H_5{\cdot}N=N{\cdot}C_6H_3(OH)_2$. The parasulphonic acid of the unsymmetrical modification obtained from resorcinol is used largely in the silk industry under the names of *Tropæolin O* and *Chrysoin*. It dyes both wool and silk a fine golden yellow.

Azonaphthols.—An important class of oxyazo dyes, introduced within the last decade and distinguished by great dyeing capabilities and beauty of colour. Both isomeric naphthols combine with all diazo compounds to form azo derivatives. Following the rule given above, the azo group takes the para position in α-naphthol and the ortho in β-naphthol. As among the azo dyes the ortho products are more useful as dyes than the para, the derivatives of β-naphthol are of greater importance. The azonaphthols are always used in the form of their monosulphonic acids, of which three derived from α- and two from β-naphthol are known, though the relative positions of the sulphonyl group have not been determined. *Orange I*, or *Tropæolin* 000 No. II, is the monosulphonic acid of azobenzene-α-naphthol, $HSO_3{\cdot}C_6H_4{\cdot}N=N{\cdot}C_{10}H_6{\cdot}OH$. As its name indicates it is an orange dye, producing a redder and less pure shade in silk and wool fabrics than the corresponding β-naphthol derivative. The latter, *Orange II*, *Tropæolin* 000 *No.* 1, or *Mandarin*, is one of the most important of the azo dyes. An isomeric monosulphonic acid of azobenzene-β-naphthol is the *Croceïn orange*, or *Tropæolin* 0000, and a disulphonic acid is *Orange G*. Further a number of dyes are obtained by the reaction of the β-naphtholdisulphonic acids with higher homologues of diazobenzene, among which ten *Ponceaux*, several *Bordeaux* or *Claret Reds*, *Amaranth*, *Rococelin* or *Fast red*, *Coccinin* or *Phenetol red*, and *Anisol red* occur.

c. Tetrazo or Disazo Compounds

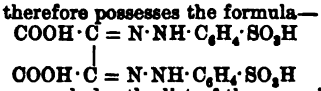
contain more than one azo group in the molecule, and may be again subdivided into three classes according to their origin and constitution. In the first class two azo groups and the auxochromes are connected with the same benzene nucleus; in the second both azo groups are connected with one nucleus, the auxochromes with another; in the third the two azo groups with different nuclei. Bodies containing three and four azo groups in the molecule have also been prepared. Tetrazo compounds of the first and second class are prepared by the action of nitrous acid upon the oxyazo or amidoazo bodies. *Biebrich scarlet*, or *Scarlet 4R*, and *Croceïn scarlet*, two isomeric disulphonic acids of tetrazobenzene-β-naphthol, are the typical representatives of these two classes. The former dyes wool and silk a cochineal red; the latter is a scarlet dye for cotton fabrics. *Blue* or *Azo black*, *Orseille brown*, and *Wool black*, are similarly derived from the naphthylamines. Among the third class occur *Congo red*, *Benzopurpurine*, and *Diamine red*, from the combination of tetrazodiphenyl with the sulphonic acids of β-naphthol, *Azo blue* from tetrazoditolyl, *Chrysamine* from tetrazodiphenyl and salicylic acid, *Heliotrope* and

Azo violet from tetrazodianisdin, and the *Hessian purple*, *violet*, and *yellow* from diamidostilbendisulphonic acids. All these dyes are much employed; their colours are sufficiently indicated by the commercial names.

Among the azo-compounds may also be mentioned a new series of dyes, "the ingrain colours," formed by the diazotization of the base "primuline" and its combination with phenols and amines. These colours are described as extremely fast to light, acids, and alkalies, and reconvertible into primuline by boiling for a few minutes with a solution of sodium hydrosulphite (Na_2SO_2). The diazo-primuline itself is, on the other hand, very sensitive to light, and it has been recently suggested that chromatic photographs may be obtained by the development of exposed primuline plates with suitable phenols and amines.

III. Ketone Compounds.

This comparatively unimportant group contains the ketone imides and osazones, derivatives of the simple ketones. The derivatives of benzophenone $C_6H_5 \cdot CO \cdot C_6H_5$ are colourless; those of thiobenzophenone $C_6H_5 \cdot CS \cdot C_6H_5$ are coloured, but not true dyes. By the introduction of the imido group (NH) into tetramethyldiamidobenzophenone through the action of ammonia, *Auramine*, $\begin{matrix}(CH_3)_2 \cdot N \cdot C_6H_4 \\ (CH_3)_2 \cdot N \cdot C_6H_4\end{matrix}\!\!>C:NH$ results. This is a basic yellow dye much employed in cotton dyeing and printing, and the only useful representative of the ketone imides. The osazones result from the condensation of phenylhydrazine with bodies containing two ketone groups. Tartrazine is a very stable orange-yellow wool dye, produced by the action of two molecules of phenylhydrazinesulphonic acid upon one molecule of dioxytartaric acid, which reacts as the diketonic acid $COOH \cdot CO \cdot CO \cdot COOH$. Tartrazine therefore possesses the formula—

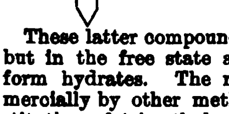


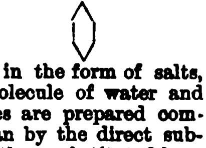
$$\begin{array}{c} COOH \cdot C = N \cdot NH \cdot C_6H_4 \cdot SO_3H \\ | \\ COOH \cdot C = N \cdot NH \cdot C_6H_4 \cdot SO_3H \end{array}$$

This group concludes the list of the more important dyes containing normal or chain chromophores. The molecules of those containing ring chromophores are naturally of more complicated structure, and the limits of this paper do not allow of more than a general description of each group and a categorical enumeration of the principal members.

IV. Triphenylmethane Compounds.

The group contains a large number of dyes of great technical importance, known as the rosaniline and rosolic acid dyes. Through introduction of the auxochrome NH_2 or OH into the para-position of one of the phenyl groups of triphenylmethane $CH(C_6H_5)_3$, leucobodies result, from which two atoms of hydrogen are removed by oxidation and a condensation takes place between the auxochrome and the methane carbon atom.



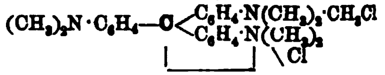


These latter compounds exist in the form of salts, but in the free state add a molecule of water and form hydrates. The rosanilines are prepared commercially by other methods than by the direct substitution of trimethylmethane; thus substituted benzophenones, as tetramethyl-diamidobenzophenone, $(CH_3)_2N \cdot C_6H_4 \cdot CO \cdot C_6H_4 \cdot N(CH_3)_2$, under the influence of dehydrating agents, condense with tertiary bases, as dimethylaniline, $C_6H_5 \cdot N(CH_3)_2$, to highly substituted bodies as hexamethylrosaniline. The oxidation of primary, secondary and tertiary monamines, that have a methyl group attached to either a carbon or nitrogen atom, also yields rosanilines, and these dyes are further prepared from benzene derivatives not containing a methyl group by treatment with reagents like carbon tetrachloride, oxalic acid or iodoform, that withdraw water from and add carbon to the molecule.

The tetramethyldiamidotriphenylmethane, whose salts occur in commerce under the names of *Malachite green*, *Bitter almond oil green*, *Victoria green*, and other fantastic appellations, is prepared by the condensation of one molecule of benzaldehyde with two molecules of dimethylaniline and oxidation of the resulting triphenylmethane base with peroxide of lead. The salts of the corresponding ethyl derivative are known as *Brilliant green*, those of the diethyldibenzyl derivative as *Acid green S.*, and a similar body containing a quinoline group as *Quinoline green*.

The hydrochloric acid salt of triamidotriphenylcarbinol constitutes the *Pararosaniline* of commerce, and is prepared by heating two molecules of aniline and one molecule of paratoluidine with weak oxidizing agents, or by heating pure aniline with carbon tetrachloride or iodoform. In its properties it resembles, and is often mixed with, ordinary rosaniline.

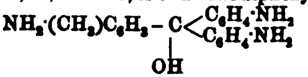
Under the name of *Methyl violet* a mixed product occurs, obtained by the oxidation of dimethylaniline with copper salts. It generally consists of a mixture of tetra-, penta-, and hexa-methylpararosaniline. Sulphonic acids of benzylated methyl-violet are also employed as violet dyes for silk and wool under the name of *Acid violet*. *Methyl green*, the chlormethylate of hexamethylpararosaniline chloride,



$$(CH_3)_2N \cdot C_6H_4 - C \begin{matrix} \diagup C_6H_4 \cdot N(CH_3)_2 \cdot CH_3Cl \\ \diagdown C_6H_4 \cdot N(CH_3)_2 \\ \qquad \diagdown Cl \end{matrix}$$

is obtained by the action of methyl chloride upon methyl violet, whereby the tetra- and penta-methyl derivatives are first converted into hexamethylpararosaniline and the latter combines with a molecule of methyl chloride. Its homologue, the *Ethyl green*, is characterized by a yellow shade, and both dye silk and mordanted cotton fibres, as well as wool after impregnation with sulphur.

Rosaniline, or *fuchsine*, is triamidodiphenyltolylcarbinol, and therefore a higher homologue of pararosaniline.



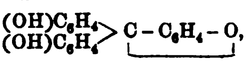
$$NH_2 \cdot (CH_3)C_6H_3 - \underset{\underset{OH}{|}}{C} \begin{matrix} \diagup C_6H_4 \cdot NH_2 \\ \diagdown C_6H_4 \cdot NH_2 \end{matrix}$$

It is obtained by oxidation, generally with arsenic acid or nitrobenzene, of a molecular mixture of ortho-toluidine, para-toluidine, and aniline. Commercial fuchsine obtained by the arsenic acid process generally contains traces of arsenic. The free base is colourless; the hydrochloride, the commercial salt, crystallizes in large octahedrons of greenish glance. Both rosaniline and pararosaniline form colourless compounds with sulphurous acid, from which peculiar violet dyes are obtained by the action of aldehydes. This property allows the sulphite compound to be used as a test for aldehydes. *Acid fuchsine*, or *Fuchsine S*, is the sulphonic acid of rosaniline; *Iodine green* the iodine methylate of pentamethyirosaniline, resulting from the action of methyl iodide upon the parent substance. The yield of rosaniline in its technical preparation is very bad, amounting to only about one-third of the calculated quantity. From the bye-products, *Mauve aniline*, *Violet aniline*, or *Induline*, and *Chrysotoluidine* or *Chrysaniline* have been separated. By treatment of rosaniline with excess of aniline at 180° C., in the presence of certain organic acids, phenyl groups enter the molecule, the amido group of the aniline escaping as ammonia. The highest substituted product obtained is triphenylrosaniline, *Aniline* or *Spirit blue*, the monosulphonic acid of which is known as *Alkali blue*, the disulphonic acid as *Water blue for silk*, and a mixture of the tri- and tetrasulphonic acids as *Water blue for cotton*.

Among the rosaniline dyes may also be included the *Diphenylamine blue*, obtained by heating diphenylamine with oxalic acid to 120° C., and *Aldehyde green*, a sulphuretted product obtained by the treatment of a violet dye from rosaniline, aldehyde and concentrated H_2SO_4, with hyposulphite of soda. The definite constitution of neither of these dyes has yet been determined.

By the condensation of substituted naphthylamines with tetramethyldiamidobenzophenone, bodies analogous to pararosaniline and rosaniline are obtained containing a naphthalene group. Of these *Victoria blue* and *Night blue* come into commerce as hydrochlorides, and are fine blue cotton dyes soluble in water.

Corresponding to the rosanilines are the rosolic acid dyes, which contain hydroxyl instead of amido groups as auxochromes, and are therefore all of acid character. In the free state they are colourless, but their salts dissolve in water with a beautiful red colour. They are obtained by analogous methods to the rosanilines, phenols being substituted for amines. They are not used as dyes proper, but find employment as lakes in the tapestry and paper industries. The most important are *Aurine* or *Pararosolic acid*,



$$\left.\begin{array}{l}(OH)C_6H_4\\(OH)C_6H_4\end{array}\right> \underbrace{C-C_6H_4-O}, $$

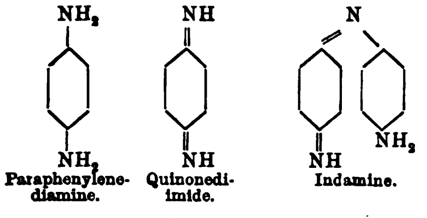
the anhydride of trioxytriphenyl-carbinol, and its homologue, *Rosolic acid*. From aurine two products, *Red coralline*, or *Pæonine*, and *Azuline*, are obtained by heating with ammonia and aniline respectively, the hydroxyl of the parent substance being probably partially substituted by amido or anilido groups.

A product obtained from pyrogallol, the eupithon or eupithonic acid, a hexamethyoxyaurine, although of no technical value, is of interest, as it has been proved to be identical with pithical, resulting from the treatment of a certain fraction of beech wood tar with baryta water.

Of the derivatives of dioxytriphenylmethane, *Benzamine*, *Resorcinbenzëine*, a tetra bromine compound resembling eosine, and *Resorcinsuccineine*, resembling brasileine, may be mentioned.

V. *Quinone-imides.*

This group of dyes, which are derived from the still unknown imides of the quinones, includes the indamines and indophenols. If the one or both oxygen atoms of paraquinone be replaced by imido groups, quinone-imide or quinone-diimide results. These bodies are not known in the free state, but both the monochlorimide and the dichlordiimide have been isolated. The indamine resulting from the oxidation of a mixture of paraphenylenediamine and aniline is supposed to be formed by the theoretical quinone-diimide, resulting from the oxidation of the diamine, attaching itself to the benzene nucleus of the aniline upon further oxidation, as represented by the formulæ:—



Paraphenylene-diamine. Quinonedi-imide. Indamine.

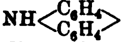
The constitution of the simplest indamine, *Phenylene lue*, is typical of the whole class. The tetramethyl derivative constitutes *Bindschedler's green*, whilst *Toluylene blue* is an amido-indamine containing a toluidine group.

The simplest indophenol is obtained in an analogous manner from paraphenylenediamine and phenol, and therefore possesses the formula—

$$HN=C_6H_4=N-C_6H_4{\cdot}OH.$$

Though very stable towards light and soap they have as yet been little employed.

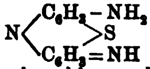
By the introduction of a sulphur atom into either the indamine or indophenol molecule, however, a valuable dye results. The sulphur atom joins two benzene nuclei, and the thioindamines therefore stand in the same relation to thiodiphenylamine—



$$NH\left<\begin{array}{l}C_6H_4\\C_6H_4\end{array}\right>S$$

as the indamines to diphenylamine.

Lauth'sche Violet—



$$N\left<\begin{array}{l}C_6H_3-NH_2\\ \quad\quad >S\\C_6H_3=NH\end{array}\right.$$

corresponds to phenylene blue, and is obtained by the oxidation of paraphenylenediamine in sulphuretted hydrogen solution (Lauth'sche reaction). *Methylene blue*, the tetramethyl derivative, is, besides victoria blue, the only blue basic dye, and therefore used largely for calico printing.

Methylene red, which contains four atoms of sulphur in the molecule, is obtained along with *Methylene blue* if great excess of H_2S is present during the oxidation of dimethylparaphenylenediamine. *Methylene green* is a nitro derivative of *Methylene blue*.

Thionolin is the corresponding thioindophenol to the *Lauth'sche violet*, from which it can be obtained by treatment with alkalies. The dimethyl derivative is known as *Methylene violet*.

The oxyindamines and oxyindophenols obtained by the oxidation of mixed phenols and paradiamines in the warm, contain an oxygen atom in place of the sulphur atom of the thio compounds. *Naphthol blue*, or *Fast blue*, a dimethyloxyindamine containing a naphthalene nucleus, dyes cotton a dull indigo-like violet blue. *Gallocyanin*, from nitrosodimethylaniline and gallic acid, and *Prune*, its methyl ester, are both largely used for calico printing.

Liebermann's phenol dyes, derived from resorcinol, thymol and orcinol, are of analogous constitution, and also contain a diazo group in the molecule.

The formation of the so-called *Aniline black*, an oxidation product of aniline, from paraphenylenediamine and diphenylamine, suggests that this important dye is a phenylated indamine. In distinction from other dyes it is not prepared in the dye factory, but a starch paste mixed with aniline hydrochloride, chlorate of potassium and copper sulphide is printed directly upon the cotton fabrics. It is one of the most stable dyes, being almost unaffected by soap, light or air, and even enduring a weak chlorine treatment.

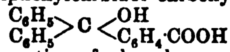
VI. *Induline and Nigrosine Compounds.*

These bodies are obtained by the action of certain azo and nitro bodies upon aromatic amines, and are blue grey or black blue dyes of somewhat uncertain constitution. The indulines are obtained by heating a mixture of amidoazobenzene, aniline, and aniline hydrochloride to different temperatures, the nigrosines from a mixture of nitrobenzene, aniline, hydrochloric acid, and iron filings. Indulines and nigrosines, in the form of hydrochlorides, are soluble in spirit; in the form of alkali salts of their sulphonic acids they are soluble in water. The bodies soluble in spirit are employed to colour lacs and varnishes; those soluble in water as substitutes for indigocarmine in the wool and silk industry.

In the remaining dyes of known constitution chromophores occupy an ortho position, and are classified into five important groups.

VII. *Phthaleines.*

This group corresponds to the rosanilines and rosolic acids of the parachromophore division. The phthaleines are all hydroxyl derivatives from phtalophenone, the lactone of triphenylcarbinol carboxylic acid. They

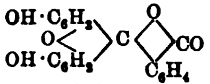


$$\begin{matrix} C_6H_5 \\ C_6H_5 \end{matrix} > C < \begin{matrix} OH \\ C_6H_4{\cdot}COOH \end{matrix}$$

result from the action of phenols upon phthalic anhydride, and with the exception of rhodamine, belong to the acid dyes. True dyes are only produced by phenols that contain two hydroxyl groups in the meta position, as resorcinol and pyrogallol.

Phenolphthaleine, dioxyphtalophenone, from phenol and phthalic anhydride, is a colourless body, dissolving with a red colour in alkalies, from which it may be reprecipitated by acids in a colourless condition. Hence its application in titration.

Fluoresceine is the lactone of the resorcinphthaleine

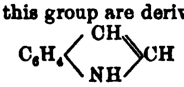


and the most important stem substance of the group. It has acquired its name from the green fluorescence of its alkaline solutions. Eosine is a tetrabrom-derivative, producing beautiful red shades in wool and silk, although the beauty of the tints are perhaps exceeded by those of its mono-methyl and ethyl esters, which have a bluish tone. These are used in silk dyeing under the names of *Spirit eosin* and *Primrose à l'alcohol.* The iodine derivatives, under the general term *Erythrosines*, are used in the cotton and paper industries. The sodium salt of dinitrodibrom-fluoresceine occurs as *Eosin scarlet*, *Emperor red*, *Safrosine* and *Lutelienne*, and gives fine scarlet tones when mixed with yellow dyes. The mixed bromine and chlorine derivatives of fluoresceine are known as *Phloxine*, and their ethyl esters as *Cyanosine*; a mixed iodine and chlorine derivative is the colouring material of *Bengal rose.*

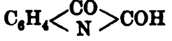
Rhodamine is the general appellation for phthaleines of meta-amidophenol and its derivatives. The grey violet, *Sallein*, and dark green, *Coenilein*, dyes are anhydrides of phthaleines of pyrogallol.

VIII. Indigo Compounds.

The members of this group are derivatives of indole,



the pyrrole of the aromatic series. Indole was first obtained by the reduction of indigo blue, and also by the pancreatic decomposition of albuminoids, and by the fusion of the latter with caustic potash. Its derivatives are obtained by the general reaction of heating the compounds of the hydrazines with ketones with zinc chloride, whereby a molecule of ammonia is split off. The most important products are isatine, an oxidation product of indigo blue, and the lactone of orthoamidophenylglyoxylic acid,



$$C_6H_4 < \begin{matrix} CO \\ N \end{matrix} > COH$$

which condenses with thiophene to a blue dye, *Indophenine.* *Indigo blue* occurs in the form of a glucoside, indican, in different plants. Through the fermentation of the glucoside the separated indigo blue is reduced to its soluble leuco-body, the indigo white, which is reoxidized in the air. The raw product, indigo, contains from 20 to 90 per cent. of indigo blue and variable quantities of *Indigo red*, *Indigo brown* and *Indigo yellow*. The disulphonic acid of indigo blue is largely used in wool dyeing under the name of *Indigo carmine.* The principal application of indigo blue as a dye is, however, based upon its conversion into the alkali soluble indigo white.

Various syntheses of indigo blue or indigotine have been effected, notably those by Baeyer in 1880, from *o*-nitrocinnamic acid. In 1882 the method of dissolving orthonitrobenzaldehyde in acetone or aldehyde and adding excess of soda lye, whereby a large quantity of indigo blue separated upon standing, was introduced. In another method orthoamidoacetophenone is employed as primary material, whilst last month a patent was issued for the preparation of indigotine from phenylglycocol by fusion with caustic alkalies and oxidation of the resulting product.

From its synthetic preparation indigotine may be considered to be an indogenide of pseudoisatine, $C_6H_4 < \begin{matrix} CO \\ NH \end{matrix} > CO$, and to be represented by the symmetrical formula, $\begin{matrix} C_6H_4{-}CO{-}C = C{-}CO{-}C_6H_4 \\ \diagdown NH \diagup \qquad \diagdown NH \diagup \end{matrix}$, of which the synthetic *Indirubine* and *Indigopurpurine* are isomerides. In any case there is no doubt that the dyeing properties of indigotine are due to the chromophore $\begin{matrix} -CO \\ -NH \end{matrix} > C$, which forms a ring with the benzene nucleus.

IX. Oxyquinones and Quinoneoximes.

As already often observed, the quinones are excellent chromogenes, and easily convertible into dyes by the entrance of auxochromes into the molecule. Since the influence of certain elements and radicles upon the colour and dyeing properties of a compound have been more accurately determined in this group, it is advisable to epitomize such knowledge at this point. The presence of alkyl residues in the quinone molecule produces no perceptible effect, but the influence of the halogens increases with increasing atomic weight. The mono-, di-, tri-, and tetra-chlorine quinones are similar to each other; bromine causes a slight increase of colour towards orange, as seen in the brom-thymoquinones. Iodine occasions a distinct reddening, so that all the iodine quinones are of a yellowish grenat-red colour. Alkoxyl groups also cause a distinct advance towards red, and the acetamido group a slight change in the same direction. Derivatives of the quinones that contain only nitro, sulpho, carboxyl, cyan, or other strongly negative radicles in the molecule, have not yet been prepared, and are probably not capable of existence, but the introduction of these groups into oxyquinone molecules indicates a distinct tendency to change the colour from red to yellow. The influence of the hydroxyl group varies according to whether it acts alone or in combination with other groups. Alone the OH group occasions a more or less distinct alteration of colour to red and even violet. A single OH group slightly deepens the yellow; two have much greater influence, and by the accumulation of such groups in the molecule a black violet may be obtained. The formation of an ether by the OH group affects the colour of the compound but little, but the formation of an ester occasions a decided fall from red to yellow. A great change from yellow to dark red, and even to blue and violet, is brought about by the substitution of the hydrogen of the hydroxyl group with positive metals. Thus the yellow red alizarin gives carmine red and blue salts. The influence of the amido group also varies under different conditions. The free group occasions a very strong change from yellow to red, brown, violet or blue; little is effected by the substitution of the amido hydrogen atoms by alkyl residues, but a distinct fall from red to yellow occurs upon the introduction of acetyl radicles in this position.

From these facts the following general rule has been recently adduced by Dr. Kehrmann.* "If the atomic complex united with the quinone group has, as a whole, a positive character, the colour is altered from the yellow of the original body to red and violet; if this complex is negative in character, change of colour in the opposite direction occurs."

After this digression, I must return to the special consideration of this group of oxyquinones, which all contain at least one hydroxyl group; and the quinone-oximes, in which either one or both oxygen atoms of the quinone group are replaced by the isonitroso (=NOH) group. The members of both sections are mordant dyes. The most important class are the anthraquinone or alizarin dyes, which are derivatives containing two hydroxyl groups in the ortho- and meta- position respectively to a carbonyl group of anthraquinone.

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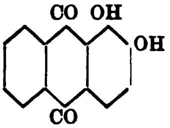
* *Chem. Zeit.*, April 23, 1890.



Alizarin, or dioxyanthraquinone, itself occurs in the form of a glucoside, the ruberythrinic acid, in the roots of the madder (*Rubia tinctoria*) and other plants. Through fermentation or the action of acids this glucoside is split up into alizarin and glucose. For the last fifteen years, however, a synthetical preparation has usurped the natural dye in commerce. It was first prepared by Græbe and Liebermann in 1868 from dibromanthraquinone and caustic potash, but anthraquinone-sulphonic acid is now generally employed. The anthraquinone is obtained by oxidation of anthracene with bichromate of potassium and dilute sulphuric acid, and then converted into the monosulphonic acid by fuming sulphuric acid at a low temperature. Upon melting this under pressure with caustic potash, a substitution of the sulpho group by one hydroxyl, and a direct oxidation to the second hydroxyl occurs. The application of alizarin in dyeing and cotton printing is due to its property of yielding lakes with metallic oxides. With oils as mordants alizarin affords the *Turkey red*. A mono-nitro derivative is also of technical application under the name of *Alizarin orange*.

(*To be continued.*)

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, December 4, Mr. W. F. J. Shepheard, Vice-President, in the chair.

A paper on "Saffron and its Adulterants," by Messrs. F. F. Riches and J. Dunning (which will be published in a future number) was read, and gave rise to a discussion, in which the Chairman, Secretary, Messrs. Browne, Sturch, Davies, S. A. Sturton, Garnett and Roberts took part.

Mr. H. H. Sturch, reporter on botany, then read a paper on "Cross-Fertilization," which dealt particularly with the contrivances and modifications in flowers that seem designed to ensure cross-fertilization by the agency of insects. Among the instances given were the nectary guide-lines in many flowers, the attraction of insects by scents, the shape of the corolla or arrangement of the stamens favouring certain insects to the exclusion of others, such as *Gentiana punctata*, which admits only the long proboscis of the humble bee, and digitalis, whose hairs prevent the entrance of crawling insects. The necessity that the cross-fertilization shall be effected from flowers on another plant and not from other flowers on the same plant in order to secure the full advantage was illustrated, and the means of securing this result explained; the greater readiness with which fertilization is effected by foreign pollen, diœcism, monœcism, and dichogamy being amongst these. A remarkable instance of the latter in the case of *Aristolochia clematitis*, was particularly described and illustrated, and the extraordinary mechanism of *Catasetum saccatum*, one of the orchids, was taken as an example of other special adaptations.

The report was followed by a discussion, in which the Chairman, Messrs. T. M. Taylor, S. A. Sturton, Dunning, Patchitt, Roberts, Garnett, Davies and the Secretary joined.

It was then moved by Mr. Garnett, seconded by Mr. Riches, and unanimously agreed, that Rule III. be amended by the addition of a clause making the subscription for life membership ten shillings and sixpence.

The meeting then adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the thirteenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, December 3, at 9.15 p.m. Mr. Donald McEwan, President, in the Chair. The minutes of last meeting having been read and approved, the following communications were read:—

PHARMACOPŒIAL TINCTURES.

BY JOHN FINDLAY.

Having reviewed the work already done by others the author proceeded to say:—Although this subject has been treated of pretty fully in recent papers there is still a large amount of work to be done before it is exhausted.

I have prepared the majority of the B.P. tinctures, with five different strengths of menstruum, and allowed them to macerate for four different periods of time. At the end of that period the whole of the tincture was poured on a filter, and when the liquid ceased to pass more of the menstruum was added until the desired volume was obtained. I then evaporated a measured portion of each tincture to dryness on a water-bath until the residue ceased to lose weight.

The menstrua which I used were 1, rectified spirit, sp. gr. 0·838; 2, rectified spirit 4 vols., water 1 vol.; 3, rectified spirit 3 vols., water 1 vol.; 4, proof spirit; and 5, equal parts rectified spirit and water. Five sets of tinctures made with each of these were allowed to macerate for twenty-four hours, forty-eight hours, 7 days and 14 days respectively. The following tables show the result of my experiments. The figures represent the number of grains per ounce of dry extractive in each tincture.

Rectified Spirit.

	Time macerated.			
Tinctura	24 hours.	48 hours.	7 days.	14 days.
Aconiti . . .	5	11	11	11
Aloes. . . .	8·5	9·5	10	10
Arnicæ . . .	2·25	2·5	2·5	2·5
Aurantii . .	5	9	9	9
Belladon. . .	2·	2·25	3	3·5
Buchu . . .	4·25	5	6	6
Calumb. . .	2·5	2·5	3·5	3·5
Canthar. . .	·5	·5	·5	·5
Cascaril. . .	3	4	5·5	5·5
Catechu . .	35·5	38·5	40·5	40·5
Chirettæ . .	3	3	5·5	5·5
Cimicifug. . .	7	7·	8	8
Cinchonæ . .	14	17·	19	19
Cinnam. . .	5	5·5	7	7
Cocci . . .	12·5	12·5	12·5	12·5
Colchic. Sem. .	3·5	5·75	8	8
Conii. . . .	2·5	2·5	5·5	5·5
Croci. . . .	4·5	·6	7	7
Cubebæ . . .	4	4·5	8	8
Digitalis . .	5	7·5	10·5	10·5
Ergotæ . . .	9·5	10·5	10·5	10·5
Gallæ . . .	26	38	44	44
Gelsemii . .	2·5	3	4·5	4·5

	Time macerated.			
Tinctura	24 hours.	48 hours.	7 days.	14 days.
Gentian. . .	6·5	7	10	10
Hyoscyam. .	10	14	17	17
Jaborandi . .	7·5	8	12	12
Jalap . . .	6	6	8·5	8·5
Krameriæ . .	16·5	17	20	20
Laricis . . .	5	5·5	7·5	7·5
Lobeliæ . . .	5	5	7	7
Lupuli . . .	5	5·5	7	7
Myrrhæ . . .	20	20	20	20
Opii	12·5	13	15 5	15·5
Pyrethri . .	4·5	5	6·5	6·5
Quassiæ . . .	0·125	0·125	0·125	0·125
Rhei	10	12·5	14	14
Sabinæ . . .	10·5	12	14	14
Scillæ . . .	4	4·5	5	5
Senegæ . . .	12·5	13	15·5	15·5
Sennæ . . .	6	6·5	7·5	7·5
Serpentar. . .	2·5	3	3·5	3·5
Stramon. . .	1·5	1·5	2	2
Sumbul . . .	9	10·5	12·5	12·5
Valerian. . .	3	3·5	5	5
Verat. Vir. .	3	3	4·5	4·5
Zingib. . . .	1·5	1·5	2	2

Rectified Spirit 4 *Vols.* + *Water* 1 *Vol.*

	Time macerated.			
Tinctura	24 hours.	48 hours.	7 days.	14 days.
Aconiti . . .	5·25	12·5	13	13·
Aloes . . .	10·25	10·5	10·5	10·5
Arnicæ . . .	3·5	3·5	3·5	3·5
Aurant. . . .	7	10	12	12
Belladon. . .	3·5	3·5	4·5	4·5
Buchu . . .	5	6	10·5	10·5
Calumb. . .	3·5	3·5	6·5	6·5
Canthar. . .	0·5	0·5	0·5	0·5
Cascaril. . .	3·25	3·5	7	7
Catechu. . .	40	40	48	48
Chirettæ . .	2·25	2·5	7·5	7·5
Cimicifug. . .	7·5	8·5	11·5	11·5
Cinchon. . .	17·5	17·5	21	21
Cinnam. . .	7·5	7·5	9	9
Cocci . . .	13 5	15	15	15
Colchici . .	5·75	6·75	10·5	10·5
Conii . . .	3	3·5	5·5	5·5
Croci . . .	7·5	9·5	10	10
Cubebæ. . .	4	5	8	8
Digitalis . .	10·5	13	17	17
Ergotæ . . .	9·5	10·5	10·5	10·5
Gallæ . . .	30	38	40	40
Gelsem. . .	3·5	4	6·5	6·5
Gentianæ . .	12·5	13·5	16	16
Hyoscyam. .	11·5	13	16	16
Jaborandi . .	10·5	14·5	16	16
Jalap. . . .	10	12·5	14	14
Kramer. . .	16·5	17·	19·5	19·5
Laricis . . .	5	5·5	7	7
Lobeliæ . .	7·5	8·5	10	10
Lupuli . . .	6	6·5	8·5	8·5
Myrrhæ. . .	13	15·5	15·5	15·5
Opii	14·5	15	18	18
Pyrethri . .	9	9·5	10	10
Quassiæ . .	0·5	0·5	0·5	0·5
Rhei. . . .	12·5	15·5	17	17
Sabinæ . . .	11·5	13	15	15
Scillæ . . .	30·5	36	38	38
Senegæ. . .	10·5	15·5	18	18
Sennæ . . .	9	10·5	12	12
Serpentar. . .	2·5	3	4	4
Stramon. . .	1	1·5	2·5	2·5
Sumbul. . .	10·5	12·5	15	15
Valerian, . .	6	6·5	8·5	8·5
Verat. Vir . .	4	4·5	6	6
Zingib. . .	2	2·5	3·5	3·5

Rectified Spirit 3 *Vols.* + *Water* 1 *Vol.*

	Time macerated.			
Tinctura	24 hours.	48 hours.	7 days.	14 days.
Aconiti . .	5·25	13·	13·	13
Aloes . . .	8·5	10·5	10·5	10·5
Arnicæ. . .	3·5	3·5	3·5	3·5
Aurant. . .	8·5	13·	13·5	13·5
Belladon. . .	3·5	4·5	5	5
Buchu . . .	5·5	6·5	7·5	7·5
Calumb. . .	5	5	6	6
Canthar. . .	0·5	0·5	0·5	0·5
Cascaril. . .	3·25	4·5	7·5	7·5
Catechu . .	35·5	46	48	48
Chirettæ . .	2·25	3	7	7
Cimicifugæ .	7	7·5	12	12
Cinchonæ. .	19·	21	22	22
Cinnam. . .	6·5	7	9	9
Cocci . . .	12·25	12·25	15·	15
Colchici . .	6·5	7·5	10·25	10·25
Conii . . .	3	3	6	6
Croci . . .	6·5	8·5	10	10
Cubebæ . .	3	3	8	8
Digital. . .	10·5	13·5	16·5	16·5
Ergot . . .	10	11·5	11·5	11·5
Gallæ . . .	38	38	44	44
Gelsemii . .	3·5	4	6·5	6·5
Gentianæ . .	12·5	12·5	16·5	16·5
Hyoscyami .	10·5	12	16	16
Jaborandi .	12·	12·5	15·5	15·5
Jalapæ . . .	10·	12·5	14·5	14·5
Krameriæ .	17·5	18·	20	20
Laricis . . .	3·5	5·5	7·5	7·5
Lobeliæ . .	7·5	8	10	10
Lupuli . . .	5·5	6·5	8·5	8·5
Myrrhæ . .	9·5	15·5	15·5	15·5
Opii . . .	15·5	16·5	18	18
Pyrethri . .	7	9	10	10
Quassiæ . .	0·5	0·5	0·5	0·5
Rhei . . .	15	15·5	17·5	17·5
Sabinæ . .	12	13	15	15
Scillæ . . .	34·5	35	37·5	37·5
Senegæ . .	13·5	15	18	18
Sennæ . . .	10	10·5	12·5	12·5
Serpentar. .	2·5	3	4·5	4·5
Stramon. . .	1·5	1·5	2	2
Sumbul . .	10·5	12·5	14	14
Valerian. . .	6·5	7·	8·5	8·5
Verat. Vir. .	5	5·5	7	7
Zingib. . .	2	2·5	3·5	3·5

Proof Spirit.

	Time macerated.			
Tinctura	24 hours.	48 hours.	7 days.	14 days.
Aconiti . . .	6·25	16·5	16·5	16·5
Aloes. . . .	10·5	11·5	11·5	11·5
Arnicæ . . .	4·5	4·5	4·5	4·5
Aurant. . . .	8	12·5	13·5	13·5
Belladon. . .	4	4	5	5·5
Buchu . . .	6	7·5	11·5	11·5
Calumb. . .	5·5	5·5	7·5	7·5
Canthar. . .	·75	·75	·75	·75
Cascaril. . .	3·5	3·5	8	8
Catechu. . .	41·5	46	49	49
Chirettæ . .	3·5	5	7·5	7·5
Cimicifug. . .	7·5	10·	14·5	14·5
Cinchon. . .	16·	21·5	23	23·
Cinnam. . .	5·5	7·5	7·5	7·5
Cocci. . . .	14·5	15·5	15·5	15·5
Colchic. . . .	5	7·5	11·5	11·5
Conii. . . .	3	3	6·5	6·5
Croci. . . .	7·5	9	11	11
Cubebæ. . .	5	5	8	8
Digitalis . .	16	18·5	21·5	21·5
Ergot. . . .	10	13	13	13
Gallæ . . .	32	36·	44	44
Gelsemii . .	3·5	4·5	6·5	6·5
Gentianæ . .	13·5	14	17	17

Time macerated.

Tinctura	24 hours.	48 hours.	7 days.	14 days.
Hyoscyam.	12·5	15	19	19
Jaborandi	12	14·5	18	18
Jalapæ	10	12·5	15·5	15·5
Krameriæ	17·5	18	20	20
Laricis	5·5	6	7	7
Lobeliæ	9·5	9·5	11	11
Lupuli	7	7·5	9·5	9 5
Myrrhæ	9	12	12	12
Opii	15·5	16·5	18	18
Pyrethri	7·5	8·5	12	12
Quassiæ	0·5	0·5	0·5	0·5
Rhei	12	12·5	18	18
Sabinæ	10	10·5	14	14
Scillæ	30	36	41	41
Senegæ	12·5	14	18	18
Sennæ	10	10·5	14	14
Serpentar.	3	3	4·5	4·5
Stramon.	1·5	2	3	3
Sumbul	10·5	13	15	15
Valerian.	6	6·5	8·5	8·5
Verat. Vir.	5	5 5	6·5	6·5
Zingib.	2·5	2·5	3·5	3·5

Rectified Spirit and Water, Equal Vols.

Time macerated.

Tinctura.	24 hours.	48 hours.	7 days.	14 days.
Aconiti	6·25	12	14·5	14·5
Aloes	10·5	12	12	12
Arnicæ	3·75	3·75	3·75	3·75
Aurant.	10·5	14	14	14
Belladon.	4	4·5	5·5	5·5
Buchu	6·25	7·25	10	10
Calumbæ	5·5	5·5	8	8
Canthar.	0·75	0·75	1	1
Cascaril.	3	3·5	6	6
Catechu	38 5	46·	49·5	49·5
Chirettæ	4	6	7·5	7·5
Cimicifug.	6	8·5	13·5	13·5
Cinchon.	17	19·	23	23
Cinnam.	5	7 5	7·5	7·5
Cocci	16 5	17·5	17·5	17·5
Colchici.	7	11·5	15·5	15·5
Conii	3·5	4	8	8
Croci	9·5	10·5	12	12
Cubebæ	5	5	8·5	8·5
Digitalis	14·5	18·5	21	21
Ergotæ	10	14	14	14
Gallæ	33	33	40	40
Gelsem.	3·5	6	6·5	6·5
Gentianæ	14·5	15	16·5	16·5
Hyoscyam.	15·5	17 5	19	19
Jaborandi	15	17·5	19·5	19·5
Jalapæ	13	14·5	16	16
Kramer.	16	17 5	19·5	19·5
Laricis	5 5	6	7	7
Lobeliæ	10·5	12·5	14	14
Lupuli	8	9	10	10
Myrrhæ	5	7·5	12	12
Opii	14·5	15	18	18
Pyrethri	9·5	10	11	11
Quassiæ	0·5	0·5	0·5	0·5
Rhei	13	15	18	18
Sabinæ	10·5	12·5	14	14
Scillæ	35·5	38	42	42
Senegæ.	13·5	15	18	18
Sennæ	10·5	12·5	14	14
Serpentar.	2	2·5	3·5	3·5
Stramon.	1·5	2	3	3
Sumbul	9·5	11·5	14	14
Valerianæ	7·5	8	9·5	9·5
Verat. Vir.	4·5	5	6	6
Zingib.	1·5	2·5	3·5	3 5

I have omitted the tinctures of asafœtida and capsicum; the former on account of its odour and the latter on account of the pungency of the extractive when nearing dryness. I feel that I have had to put my results before you in a somewhat incomplete state. I should have liked to have examined the various extractives as to percentage of active principle and the tinctures as to miscibility with water and keeping qualities but the time at my disposal would not permit.

PILULA FERRI PROTOCHLORIDI.

BY JAMES B. MCLAREN.

Prescriptions for pills of protochloride of iron have been pretty common of late. Usually the excipient is left to the discretion of the dispenser, but in several instances recently I have seen anhydrous lanoline prescribed for this purpose.

Probably this excipient has been suggested by the paper read before this Association by Mr. Millar, in which he recommended lanoline as an excipient for potassium permanganate pills and other similar substances.

I made a set of pills with anhydrous protochloride of iron and anhydrous lanoline and kept them under observation. They were rolled in liquorice powder. When first made the pills were fairly hard and looked quite satisfactory. In the course of a few days, however, they became quite moist, and very unsightly externally, at the same time assuming an olive-brown colour. If the pill be cut in two it is seen that internally the mass is still unchanged, but the softening gradually penetrates deeper into the mass till the whole becomes quite pasty in consistence.

I made a second set of pills and coated them well with sandarach varnish, but this appeared to have little effect in preventing the change.

As the result of some experiments I would suggest that these pills should be made with some absorbent powder, such as liquorice or althæa, and beat into a mass with a small quantity of some inert extract. The following formula, I find, does very well:—

Anhydrous protochloride of iron	3 grains.
Powdered liquorice	1 grain.
Extract of liquorice	1 grain.

Mix to make one pill.

The only objection to this method is the size of the pill, but this is counterbalanced by its better keeping properties.

In the discussion, which was taken part in by Messrs. Bennet, Duncan, Findlay, Hill, Hoseason, McEwan, McLaren and Macpherson, it was stated that some who had tried anhydrous lanoline for these pills found it gave a satisfactory result.

The Chairman intimated that Mr. William Macleod had presented several good specimens of the local flora to the Association's herbarium, and moved votes of thanks to him and the authors of the papers, which were cordially awarded.

The seventh annual conversazione took place in the large hall of the Literary Institute, South Clerk Street, on the evening of Friday, December 12, at 8·30. Mr. Donald McEwan, President, occupied the chair, and there was a large attendance. Among others present were Mr. William Gilmour, Chairman of the Executive of the North British Branch, Mr. J. Blenkiron, Vice-President, and Messrs. Wm. Aitken, F. L. Dewar, W. B. Dougall, R. McAlley, D. McGlashan, D. McLaren, C. A. Macpherson, and T. Thompson. Apologies for absence were intimated from Messrs. Wm. Ainslie, D. Storrar, Vice-Chairman of the Executive of the North British Branch, J. B. Stephenson, Chairman of the Scottish Board of Examiners, and Ex-Provost Watt, Haddington. The first two hours were devoted to a very high class and well-rendered programme of songs, recitations, and instrumental pieces. On the motion of the Chairman a hearty vote of thanks was awarded to the contributors, and on the motion of Mr. Gilmour a similar vote of thanks was awarded to the Chairman. A dance programme, taken part in by upwards of seventy couples, was then commenced and went merrily on till 4.30 a.m., the arrangements being in the hands of Messrs. W. B. Cowie and H. G. Parker.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The third monthly meeting of the Session was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday, December 10, Mr. F. Baden Benger, Vice-President, in the chair.

The Chairman said he had been requested by a gentleman (whose name at present he was not at liberty to mention) to state that it was his intention to offer a scholarship of the yearly value of £30, to be competed for by students of the North of England, and to be tenable at Bloomsbury Square, the examination to be conducted on lines similar to the Bell Scholarship, and the final details of the scheme to be left in the hands of the Association. Mr. Benger expressed the pleasure which it gave him to make this announcement, and said that the offer came from a gentleman who was present at the meeting which was addressed by Mr. Carteighe, and was a direct result of that gentleman's visit to Manchester.

The members present also were unanimous in their expression of pleasure, and it was incidentally remarked that this was the first instance in which such an important aid to the advancement of education had been given through a local association.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of this Association was held on Tuesday night at the Mason College, Birmingham, under the presidency of Mr. A. Southall, when Mr. Campbell (dispenser at the Queen's Hospital, Birmingham), read some notes on the "Analysis of Urine."

Mr. Campbell commenced by quoting the words of one of our leading physiologists: "We must eventually look to chemistry for information with regard to the primary alterations that occur in fluids and tissues which are the first step in every disease." He did not, he said, intend to give an exhaustive description of the analysis of urine, but merely to invite the attention of the meeting to the most important processes involved and to certain necessary precautions. He explained that the quantity of urine passed in twenty-four hours was about 50 fluid ounces for an adult, but depended on the diet, exercise and action of the skin. The twenty-four hours urine should be mixed, and the sample analysed taken from the mixture. If that could not be done then two samples should be taken daily—one passed on rising from bed, the other two hours after the principal meal. That was because albumin might be absent in the morning urine and present later in the day. The specific gravity might be taken with sufficient accuracy with the special hydrometer called urinometer at 60° F. He pointed out the reaction and changes which sometimes occurred in the urine of one person at different times in the day; acid probably on rising, before meals neutral, and alkaline soon afterwards. There were several hypotheses to account for this "alkali tide." The acidity was due to acid sodium phosphate, the alkalinity due to volatile alkali (ammonic) or to fixed alkali. He showed the way to distinguish between the different conditions, and said if the urine was ammoniacal when passed there was disease of the urinary mucous membrane. Urine was of a greenish yellow or greenish brown if bile was present, smoky if blood was present, pale in diabetes, high-coloured in febrile conditions. He next touched upon the principal normal constituent in urine—urea—and stated that healthy urine contained about 2 per cent. Dealing with the estimation of urea he urged that the most popular and easiest method of getting an estimation was the hypobromite process. Gerrard's and Doremus' apparatus and Liebig's mercuric nitrate process also gave very good results. Uric acid, next to urea, was the constituent of urine in which most of the nitrogen of the body was excreted. The best method for its estimation was devised by Dr. Haycroft, late Professor of Physiology in Mason's College. Chlorides might be estimated by using a solution of mercuric nitrate, and phosphates were best estimated by the uranic nitrate process. The chief abnormal constituent of urine was albumin. He explained the way to treat it in its different aspects, and next proceeded to dilate upon another abnormal constituent of urine, sugar. Mr. Campbell concluded by giving a number of precautions as to how experiments with urine should be conducted.

The Chairman proposed a vote of thanks to Mr. Campbell for his paper. Mr. Cripps seconded, and spoke of the advantage a knowledge of the subject Mr. Campbell had dealt with would be to the chemist. Mr. Perry, Mr. Alcock and Mr. Gibbs also spoke and the motion was carried.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

A meeting of chemists was held at the Mayor's Parlour, Old Town Hall, Leicester, Thursday evening, Dec. 11, to consider the "Draft Pharmacy Act Amendment Bill." Mr. J. G. F. Richardson presided, and there was a very fair attendance.

Mr. W. B. Clark (local secretary) gave a *résumé* of the Draft Bill, which was followed by a long discussion on the various clauses. By clause 7 it was thought that a large number of unqualified men would be suddenly thrown out of employment and that there was nothing to prevent them banding together and opening stores. The Chairman explained at some length the various features of the Bill and how it would affect medical men, dispensaries and branch shops. The following resolution was proposed by Mr. W. B. Clark, seconded by Mr. S. G. Cox, and carried unanimously:—

"That this meeting, having considered the Draft Pharmacy Act Amendment Bill, approves of the Bill, but recommends that clause 7 should not come into force for two years from the passing of the Act."

Votes of thanks to the Chairman and to the Mayor for the use of the room brought the meeting to a close.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual dinner of this Association was held at the Masonic Hall, Nottingham, on Wednesday, Dec. 10.

The chemists of both town and county mustered in good force. Councillor Fitzhugh, J.P., President of the Association, presided, the vice-chairs being occupied by Mr. W. H. Parker (vice-president) and Mr. W. H. Gill (hon. secretary).

After the usual loyal toasts, Mr. Beilby proposed "The Pharmaceutical Society of Great Britain." He said he scarcely thought the toast would be received with great enthusiasm, as the Society was not well supported by the chemists of the town. They did not think it looked after trade interests as it should do. However, it was doing a very good educational work, and chemists were having their position improved by the examined and qualified men who were filling their ranks. The public appeared to be gainers also, for chemists were not only better educated, but were more generous.

Mr. W. H. Parker (local secretary of the Society), in responding said that he must confess that the Pharmaceutical Society did not do as much as it might do for the good of the trade, nevertheless it was the only Society which had the power to do the trade any good, so he always gave it his support, and would like to see more chemists become members, for it was only by being thoroughly united that anything could be accomplished.

Mr. W. Gill, in proposing "The Teachers of Science Classes," said that ever since the Nottingham and Notts Chemists' Association was founded in 1868, science classes had formed an important item in its programme, and when the University College was opened overtures were made to the authorities of that institution for permission to hold the classes there. This was readily granted, and with the kind assistance of Professor Clowes the educational system of the association had become so well organized that now it stood in the forefront of the centres of pharmaceutical education; in fact the President of the Pharmaceutical Society of Great Britain had acknowledged that the work done at Nottingham was among the best in the country. The Pharmaceutical Botany Class Mr. Carr was conducting was attended by a larger number of students than any previous one.

Professor Clowes expressed his hearty thanks for the kind manner in which the toast had been proposed and received. It had always been his endeavour to be really useful to his pupils, and he was very pleased to hear from one of them that his efforts had been so well appreciated.

Mr. J. W. Carr also responded. He said that his work was among the apprentices and not the masters, and it was to them he looked for the true recognition of his services. It was very gratifying to note that this year he had not only a larger class, but a better average attendance than in previous years. The pharmaceutical students were placed at a disadvantage when compared with the ordinary students of the college, inasmuch as they often had to do about twelve hours' work behind the counter before attending the class, and would consequently not feel so fresh and ready for study as those who had more time at their disposal.

"Success to the Nottingham and Notts Chemists' Association" was proposed by Professor Clowes. He said this Association was his ideal of what a chemists' association should be. He had frequently been consulted by deputations from mining and agricultural districts with regard to the best way in which they could make use of the college for obtaining education in their special branch of science, and he always referred them to the Chemists' Association as a model they should attempt to copy. All his relations with the Association had been marked by great cordiality, and he most heartily wished them success.

Councillor Fitzhugh, whose name was coupled with the toast, remarked that it was always a pleasure to him to respond on behalf of the association with which he had been connected for so many years. He had always been anxious for its welfare, and would continue to be so. They had a very good friend in Professor Clowes, who was ever ready to give them assistance in educational matters; with his aid they had been able to establish a course of lectures and class work which would enable their apprentices to prepare for their final examination without the expense of going to London for a special course of study.

Mr. J. Wilford (treasurer) also responded. He announced that a donation of £20 had been received from the Pharmaceutical Society to assist in founding a dispensing class. The arrangements were now almost completed, and the classes would be fairly launched after the Christmas vacation.

Mr. Rogerson proposed "The Town and Trade of Nottingham," to which Mr. C. A. Bolton responded. Other toasts were "The Visitors," proposed by Mr. Middleton, and responded to by Mr. F. Gibson (Manchester) and Mr. F. Gill (Nottingham); and "The Chairman and Vice-Chairman," proposed by Mr. Radford, and drunk with musical honours.

Review.

INFLUENZA, OR EPIDEMIC CATARRHAL FEVER. An Historical Survey of Past Epidemics in Great Britain from 1510 to 1890. By E. SYMES THOMPSON, M.D., F.R.C.S., etc.*

The subject of this volume, although pertaining to medicine, has only recently been so prominently and painfully brought within the cognizance of the general public, that many persons besides medical men will feel a legitimate interest in this historical survey of the epidemics of influenza that have occurred in this country during nearly four centuries. The greater part of the work consists of a revised reprint of the 'Annals of Influenza,' compiled by the late Dr. Theophilus Thompson at the request of the Sydenham Society. It commences with 1510 and has been brought down to date, so as to include a considerable amount of information respecting the epidemic of 1889-90 by his son Dr. E. Symes Thompson.

The plan followed in the work has been "to present the picture of influenza exactly as it was delineated by the original observers," without any colouring due to bias in the mind of the editor. Commencing with the year 1510, twenty-five epidemics in all are reported upon, so that, as may be guessed, the pages do not lack quaint descriptions, wild theories or acute suggestions. Thus in the extract for 1510 Dr. Short tells the reader how the disease was called "coccoluche," or "coccolucio," because the sick all wore a cap or covering over their heads. He states that it came from "the island Melite, in Africa," and raged all over Europe, not missing a family and scarcely a person. The symptoms are described as commencing with "a grievous pain of the head, heaviness, difficulty of breathing, loss of strength and appetite, restlessness, watchings, from a terrible taring cough. Presently, succeeded a chilness and so a violent cough that many were in danger of suffocation. The first day it was without spitting; but about the seventh or eighth day much viscid phlegm was spit up. Others (though fewer) spit only water and froth. When they began to spit, cough and shortness of breath were easier. None died except some children." Soon after we find Erasmus complaining in a letter to Cardinal Wolsey's physician, that "the English have no regard to what quarter of the heavens their windows and doors are turned," and that their sitting rooms are so constructed as to be incapable of ventilation. "The streets, too," he says, "are generally covered with clay and rushes, which are so seldom removed that the covering sometimes remains twenty years, concealing beneath a mass of all descriptions of filth, not fit to mention. Hence, upon a change in the atmosphere a certain vapour is exhaled, in my opinion not at all wholesome for the human body." Among other suggestions, Erasmus says it would tend to make the island more healthy "if certain public officers were commissioned to keep the roads more free from nuisances."

Naturally there has always been much speculation as to the cause of each outbreak of the disease. Comets, meteors, earthquakes, "signacula" on food and linen, "blood rain," fogs, excessive moisture, swarms of caterpillars, moths and beetles, and disease among domestic animals have been more or less coincident phenomena. One observer of the epidemic in 1803 attributes a cotemporaneous sickness among horses to the animals having eaten some very peculiar insects, which for many weeks were innumerable and covered the grass everywhere with a sort of spider's web. His description of the insect is worth quoting. He says, "I noticed them many times; they were a long-legged, indeed a sort of *winged spider*, I believe of the class *Diptera*, named *Oleracea*." Cats and dogs, cows, sheep and swine appear also to have suffered unusually from epidemics about the same periods. Diverse opinions have always been prevalent also as to the transmission of the disease. Dr. Haygarth, a believer in personal contagion, writes in 1782 that in Chester, and most of the towns that surround that city, he had the good fortune to discover the individual person who brought it into each place, whilst at the same time he admits that there are physicians of great respectability and authors of the highest reputation who ascribe outbreaks of influenza and other epidemics to "a morbid constitution of the atmosphere." Naturally, too, the treatment has varied immensely, but it must suffice upon this point to say that Dr. Thompson, writing after the latest epidemic, considers that at present the consensus of opinion is in favour of a laxative, followed by a stimulating diaphoretic, with quinine on the second or third day and during convalescence.

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* London: Percival and Co., 1890. Demy 8vo. Pp. i.—xv., 1—490, 21s.

Apart from its value as a contribution to medical history the volume, which is well and clearly printed, is very interesting from the glimpses it affords of conditions that obtained in this country in the "good old times" that have now passed away, it may be hoped, for ever.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PHARMACEUTICAL EDUCATION IN IRELAND.

Sir,—In your Journal of the 13th inst. I regret to see a letter of Mr. Brunker's regarding pharmaceutical education in Ireland, with special reference to the School of Pharmacy. It is strange that since the resignation of Mr. Brunker and Mr. Allen such *animus* should be manifested to the Society.

On the 22nd January, Mr. Allen wrote to Sir William Kaye, C.B. (as inserted in the *Chemist and Druggist* of May 17), to say, "The Council of the Pharmaceutical Society has not submitted to the Lord Lieutenant and Her Majesty's Privy Council in Ireland the resolution under which the School is established, as required by the Pharmacy Act (Ireland), 1875," and that "the Council of the Pharmaceutical Society appears to consider it has the right to institute a school as well as the power to recognize it when instituted."

He further concludes his letter by saying, "At present no member of the Council is eligible for the office of examiner, but there is no rule forbidding a member of the Council to act as a teacher; thus the teacher may give a certificate, and afterwards as a member of the Council adjudicate upon its correctness."

I would only say in reference to those communications that (1) owing to there not being a quorum at the January meeting, no Council was held, so that a resolution could not be submitted for the sanction of the Privy Council. (2) No letter of objection was forwarded to the Council of the Pharmaceutical Society till Mr. Allen had been asked by Sir William Kaye if the subject matter of the letter had been brought under the notice of the Council of the Pharmaceutical Society. 3. The Council never adjudicates on certificates, as this is the business of the Committee to inspect candidates' certificates appointed annually for this purpose, nor has the Council any voice in accepting or rejecting a candidate, as this power is left entirely in the hands of the examiners (*vide* Pharmaceutical Examination, Regulation vii., p. 66, Calendar, 1890): "They (the examiners) shall have, in conference and jointly, a discretionary power to pass a candidate."

I merely state these few facts; your readers can draw their conclusions as to why this gentleman wrote to Sir Wm. Kaye without first drawing the attention of the Council of the Pharmaceutical Society to what he considered wrong.

In reference to the 100 hours' rule being of doubtful utility, I would ask, can anyone seriously think that 100 hours work at the bench is sufficient to qualify a candidate as an analytical chemist? But I considered it a hardship to ask country candidates for the licence to take 100 hours' course, when it involved an attendance on two courses at a medical school, entailing double fees, and a prolonged residence in the large centres. However, the power of imagination is so great that at the Annual Meeting of 1888 the then President stated "in the percentage of candidates who have passed you have a practical illustration of the advantage of the change in the system of instruction." As the rule only came into force in July of that year, no candidate for examination could have taken the 100 hours' course, so that they had the advantage of a system of instruction which they never received.

The comparison with the English Society is uncalled for, but everyone will agree in the desire that the Irish Society had amongst its members men of such ability as adorn the Society in England and Scotland, not to speak of the financial position, but I doubt if it ever had to combat the determined opposition of ex-Presidents.

The School now established, whatever its defects, has succeeded beyond expectation, and I can only reiterate what I said at the annual meeting, that in the peculiarly difficult circumstances through which the Society has passed during the last twelve months, it is to be congratulated on having amongst its members such efficient conductors, both able and willing to take the management of the School, whose aim it is to educate men, not merely to pass their examinations, but to become expert manipulators. It is strange, however, that the pharmacists of Great Britain should be asked for support in trying to prevent the degradation of pharmacy by one who wrote to a widely-circulated public journal, wishing *bon voyage* to a Bill introduced into Parliament by those who at the time were the opponents of the Pharmaceutical Society, and which, had it become law without the modifications introduced and obtained by the Marquis of Waterford, would have been very detrimental to the interests of pharmacy in the estimation of pharmacists generally in Ireland.

Dublin. CHARLES EVANS, *President.*

ATTITUDE OF CHEMISTS TOWARDS THE PHARMACEUTICAL SOCIETY.

Sir,—I have been very much surprised, in talking with chemists generally regarding topics of general interest to the trade, and especially at this time of the draft Pharmacy Bill, to find in the first place how little interest they take in these matters because they are not done exactly as they would have them, and secondly how disparagingly they speak of the Pharmaceutical Society itself.

I would ask such men, just for argument's sake, to compare for a moment the Pharmaceutical Society to a greenhouse and the Council to a vine placed in it, and then think what would be the result if a vine so placed was left without any nourishment or warmth and the greenhouse pelted with stones by everyone that passed by. They would then realize what they are doing to their own Society and at the same time expecting it to bear fruit of the finest quality. H. HYKE.

Quillaia.—The mixture would be decidedly improper.

A. B.—Unless the ammonia salts used were the same in both mixtures, the objectionable odour was probably due to them.

J. A. Hays.— Proctor's 'Manual of Pharmaceutical Testing,' published at 42, Cannon Street, E.C.

A Correction.—Mr. Priest, of Cardiff, asks for a correction to be made of the remark attributed to him on p. 553, to the effect "that it would save chemists a great deal of trouble if apprentices were able to sell poison." He wishes the sentence to read, "If young men were compelled to pass the Preliminary prior to their apprenticeship it would save a deal of trouble and valuable time."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wilson, Mair, Humphrey, Phillips, Hays, Seccombe, Campbell, Bennett.

"THE MONTH."

Diphtheria and Tetanus Immunity.

The intense excitement that has followed the somewhat premature publication of Professor Koch's experience on the treatment of tuberculosis has probably dwarfed the interest that would otherwise have been roused by some other important researches of an analogous character. Among these may be mentioned the communication of Messrs. Behring and Kitasato upon the conditions involving immunity from diphtheria and tetanus in animals (*Deut. med. Woch.*, Dec. 4, p. 1113). The first advance in this investigation seems to have been made by studying the blood of rats and mice, which animals are naturally immune from diphtheria, and of guinea-pigs in which immunity had been artificially produced. The observations were extended to tetanus, and the experiments recorded in this paper relate to that disease, the results obtained being formulated in four propositions: (1) That the blood of rabbits immune to tetanus possesses the property of destroying the tetanus poison; (2) this property is also recognizable in the extravascular blood and in cell-free serum obtained from it; (3) this property is of so persistent a nature as to remain active in the organism of another animal, so that important therapeutic action may be produced by the transfusion of the blood or serum; and (4) the tetanus destroying property is absent from the blood of animals not immune from tetanus, the tetanus poison being recognizable in the blood and secretions of such animals after they have been killed by it. In a second paper (*Deut. med. Woch.*, Dec. 11, p. 1145) Dr. Behring deals especially with diphtheria and describes five methods for making animals artificially immune against the disease. Four of these consist in inoculation with the diphtheria bacilli or the products of the bacilli. The fifth consists in the introduction into the blood of various chemical substances, the best results being obtained, both for diphtheria and tetanus, with iodine trichloride. This last observation marks a distinct advance in knowledge; for in this case there is evidently no question of the establishment in the organism of a tolerance either of the bacilli or of their poisonous products, or of the antagonism of one to the other, the immunity being due to the presence of a chemical compound, having nothing to do with the disease. Dr. Behring, however, carefully guards against the inference that iodine trichloride is a suitable agent for rendering human beings immune to diphtheria; such an agent is still the object of search.

Poisons of Proteus Vulgaris.

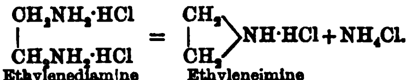
In some experiments having for their object to make animals immune to the poison of the putrescent organisms classed under the name *Proteus vulgaris*, Dr. Carbone has attacked the problem in a different way by isolating and investigating the action of the substances produced by the action of the organisms upon meat (*Apot.-Zeit.*, Dec. 17, p. 770). The product was found to contain choline, ethylenediamine, gadinine, and trymethylamine, but no neurine. It was already known that animals could be made immune to the action of these organisms by the injection of a mixture of choline and neurine. Dr. Carbone now reports that he has found the same protective influence follow the injection of solution of choline hydrochloride, as well as of other substances resembling choline in their physiological action, but which are not products of the *Proteus* culture.

Physiological Action of Isomerides.

In a research undertaken by Messrs. Gibbs and Hase for the purpose of determining the action of constitutionally related chemical compounds upon the animal organism, the investigators found (*Chem. Zeit.*, *Rep.*, Dec. 13, p. 351) that ortho-, meta-, and para- toluidine act destructively upon the blood corpuscles, paralysing the spinal cord, though sensitiveness of the peripheral nerves is retained. The temperature of warm-blooded animals is perceptibly lowered by the ortho-compound and more decidedly by the meta-, whilst the fatal dose of paratoluidine, 0·1 gram per kilogram weight in the case of dogs, is half that of the ortho- compound, the meta- occupying an intermediate position. Of the dioxybenzenes, pyrocatechol is the most toxic, hydroquinone less so, and the meta- compound, resorcinol, is the weakest poison of the group. Pyrogallol and phloroglucinol change the colour of the blood, the former to ink-black, the latter to a brown-red colour, and both affect the respiration, though pyrogallol is considerably the more toxic.

Piperazidine as a Solvent of Uric Acid.

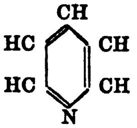
Recently, under the name "pyrazidinum hydrochloricum," with the synonyms "synthetic spermine" and "Ladenburg's ethyleneimine," a preparation has been placed on the market as probably representing Schreiner's base "spermine," to which attention has been directed, especially in Russia, in consequence of statements made by Dr. Brown-Séquard. In respect to the association of the three names it may be of interest to recall that "spermine" was the name applied by Schreiner in 1878 to a base obtained from crystals separating from spermatic liquid and other organic secretions, in which it existed in combination with phosphoric acid. Schreiner represented the hydrochloride by the formula C_2H_5N,HCl, and described the free base as crystalline (*Annalen*, cxciv., 68). Ten years later, Ladenburg and Abel, whilst working upon the imines, found that ethylenediamine hydrochloride could be split up by heat into ammonium chloride and a compound that they looked upon as ethyleneimine hydrochloride, the base of which was possibly identical with spermine (*Berichte*, xxi., 798):—

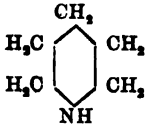


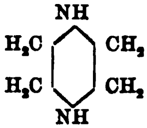
$$\begin{array}{l} CH_2NH_2{\cdot}HCl \\ | \\ CH_2NH_2{\cdot}HCl \end{array} = \left.\begin{array}{l} CH_2 \\ | \\ CH_2 \end{array}\right\rangle NH{\cdot}HCl + NH_4Cl.$$

Ethylenediamine Hydrochloride. Ethyleneimine Hydrochloride.

But upon setting free the base, the expectation that it would be a low-boiling compound, volatile at the ordinary temperature, was not realized, and the suggestion that polymerization had taken place was confirmed by the vapour density. In fact, the molecular weight had doubled through the formation of diethylenediimine or piperazidine. The new compound appeared, however, to correspond closely in all its properties to spermine, except that Ladenburg and Abel failed to obtain a crystalline phosphate, which Schreiner had described as the most characteristic salt, but which, for reasons given, was probably really a double phosphate of calcium and spermine. Whether or not these two compounds are actually identical, it would appear that the compound now introduced is Ladenburg and Abel's diethylenediimine, or piperazidine. In constitution it is a hexahydropyrazine, standing in the same relation to pyrazine as piperidine to pyridine. In fact, piperazidine may be looked upon as piperidine with the CH_2 group in the γ position replaced by NH.


Pyridine.


Piperidine.


Piperazidine.

The free base piperazidine is represented as occurring as a white crystalline powder, and the hydrochloride as beautiful small crystalline needles, very soluble in water, tasting like sal ammoniac, and non-poisonous. Possibly the property of this compound that will prove to be of greatest value is its power to dissolve uric acid, which it is said to possess to a remarkable degree. Dissolved in cold water, in which piperazidine is soluble in all proportions, it is said to be capable of dissolving twelve times as much uric acid as an equal quantity of lithium carbonate. Piperazidine urate, obtained by boiling piperazidine with excess of uric acid, is described as being seven times more soluble than lithium urate in water at 17°C., the respective solubilities being 1 in 50 and 1 in 368. Even in presence of great excess of uric acid an acid salt is not formed, but only the neutral salt, $C_4H_8(NH)_2\cdot C_5H_4N_4O_3$, as from the constitution of the compound might be expected.

Antipyrin and Quinine Valerianates.

The preparation of a valerianate of antipyrin and of a double valerianate of antipyrin and quinine is announced by M. Sochaczewski, a French pharmacien (*L'Union Pharm.*, Nov. 15, p. 540). The valerianate of antipyrin—which, by the way, is not new, since a specimen was shown in the Paris Exhibition of 1889—is stated to be more active than antipyrin, and is described as occurring in white, very regular cubic crystals, very soluble in water, and as having a strong valerian odour and a slightly disagreeable taste. The double valerianate of antipyrin is spoken of as occurring in long, white, transparent prismatic crystals, very soluble in water and in alcohol, and resembling in taste and odour valerianate of quinine. It is claimed that its action is very marked in neuralgia.

Synthesis of Citric Acid.

Citric acid has been already synthesized from symmetric dichloracetone by Grimaux and Adam, and from malic acid by Kekulé. Dunschmann has also prepared it from the ester of acetonedicarboxylic acid, $COOH\cdot CH_2\cdot CO\cdot CH_2\cdot COOH$; but since the latter acid up to the present has only been obtained from citric acid, this mode of preparation did not amount to a complete synthesis. As Messrs. Haller and Held (*Mon. Scient.*, Dec., p. 1221) have, however, now succeeded in preparing the diethylester of acetonedicarboxylic acid from acetoacetic ester, a third very instructive synthesis of citric acid has been effected. By the passage of dry chlorine gas into strongly cooled acetoacetic ester, $CH_3\cdot CO\cdot CH_2\cdot COOC_2H_5$, a mixture is obtained of two isomeric (α and γ) mono-chlorine derivatives, $CH_3\cdot CO\cdot CHCl\cdot COOC_2H_5$ and $CH_2Cl\cdot CO\cdot CH_2\cdot COOC_2H_5$, from which, by shaking with dry potassium cyanide, the corresponding cyan derivatives are prepared. After the α-cyanacetoacetic ester has been removed by filtration and saponification with carbonate of soda, the solution of the γ-compound, $CH_2(CN)\cdot CO\cdot CH_2\cdot COOC_2H_5$, in absolute alcohol is saturated with dry hydrochloric acid gas and carefully warmed. The rise of temperature decomposes the intermediate products into acetonedicarboxylic acid ester and ammonium chloride, which falls out of solution. To obtain citric acid Messrs. Haller and Held heat an ethereal solution of this ester with potassium cyanide and an equivalent amount of hydrochloric acid, whereupon the liberated prussic acid reacts slowly upon the ketone group of the ester, with the production of the cyanhydrine, $COOC_2H_5\cdot CH_2\cdot C(CN)(OH)\cdot CH_2\cdot COOC_2H_5$, the nitrile group of which is saponified by boiling with concentrated hydrochloric acid, and the citric acid so produced precipitated as a lead salt. The synthetic acid liberated from the lead salt by sulphuretted hydrogen was found to possess all the physical and chemical characters of the natural acid, about 10 grams being obtained from 50 grams of the γ-cyanacetoacetic ester.

A New Lactic Acid.

At a recent meeting of the Academy of Sciences in Vienna Dr. F. Schardinger exhibited a new optically active modification of ethylidene lactic acid, $CH_3\cdot CH(OH)\cdot COOH$, which he had obtained by the decomposition of cane sugar through the activity of a schizomycetes resembling closely the ordinary lactic acid bacillus in appearance, but of considerably greater fermentative power. The acid so obtained resembles the so-called "para" lactic acid obtained from the animal organism both in chemical properties and in the composition of its salts, the zinc and calcium salts crystallizing with two and four molecules of water respectively. It differs, however, in its behaviour toward polarized light, the plane being turned to the left by the free acid and to the right by the anhydride and salts, the exact reverse of the effect produced by paralactic acid. When equal quantities of the zinc salt of the new acid and that of para-lactic acid were mixed, Dr. Schardinger obtained an inactive zinc lactate crystallizing with three molecules of water, and identical in every respect with the zinc salt of ordinary "fermentation" lactic acid.

Colorimetrical Estimation of Nitrates in Water.

The following method is recommended by G. Looff (*Chem. Zeit.*, *Rep.*, Dec. 13, p. 351) for the detection of nitrates in water. Several centigrams of sodium salicylate are dissolved in 5 c.c. water and 10 c.c. pure sulphuric acid cautiously added by pouring down the side of the vessel. Mixture is then effected by shaking, when a red coloration indicates the presence of 0·02 per cent. N_2O_5, and a light yellow colour a percentage of 0·002. By comparison with a standardized potassium nitrate solution the percentage of nitric acid can be fairly accurately estimated.

Polyrotation.

An explanation of the property of poly- or multirotation exhibited by many optically active bodies has been sought by Herr Hammerschmidt. From his investigations he concludes (*Chem. Zeit.*, *Rep.*, Dec. 13, p. 347) that polyrotation is a physical property confined to crystalline bodies, arising from the combination of molecules to molecular complexes of crystalline and optically active formation. When the change from the original (A) to the final (E) rotatory power is completed, the substance converted from the A to E modification is always a proportional quantity of the amount taken, and always amounts to the same fraction, but a simple relation of A to E has not been satisfactorily established. Instances of polyrotation observed when solutions are heated or diluted, are due to chemical changes, such as the formation of hydrates or anhydrides. Herr Hammerschmidt further asserts that one inactive and eight active modifications of every optically active body are conceivable.

Coloration of Aromatic Compounds by Light.

Two years ago M. Bidet published the observation that nitrobenzene, aniline and phenol prepared from benzene free from thiophene, are not affected by exposure to light. The same chemist reported at a recent meeting of the Chemical Society in Paris (*Chem. Zeit.*, Dec. 17, p. 1707) that he has now prepared a large number of aromatic derivatives, as naphthol, quinoline, etc., from pure hydrocarbons, and that all these compounds remain colourless even after exposure to light for several months, access of air being naturally carefully guarded against. From these results it appears that coloration under the influence of light is not the absolute property of these organic compounds, but only obtains when foreign substances are present.

Berberis Alkaloids.

In a paper published in the *Archiv der Pharmacie* (Nov. 30, p. 596), Professor Schmidt gives a *résumé* of a number of researches upon berberine and its derivatives that he has carried out in conjunction with his pupils, Messrs. Schreiber, Gaze and Stubbe. The points of the investigation presenting most interest to the readers of this Journal are the determination of the formula of berberine and the experiments made to ascertain whether samples of berberine of different origin consisted of one and the same alkaloid or were mixtures of different bases. The results of analyses corresponded most closely with the formula originally attributed by Perrin to berberine, $C_{20}H_{17}NO_4$; this would give for hydroberberine the formula $C_{20}H_{21}NO_4$. The best method of obtaining pure berberine appears to be by first forming an acetone compound, $C_{20}H_{17}NO_4 \cdot C_3H_6O$, from which the base is liberated by heating in alcoholic solution. When obtained in this way it differs from the product of the decomposition of berberine sulphate in losing all six molecules of water of crystallization, instead of only four, at 100° C., and in not undergoing change when exposed to moist air. In the hydroberberine prepared from the two kinds no differences could be detected. Commercial "berberine" salts, probably prepared from hydrastis root, were found to be not always homogeneous substances. Commercial "berberine purum," like that obtained by decomposing "berberine sulphate," melted at 145° C., whilst berberine from the acetone compound scarcely begins to darken below 150° C. In one case, the mother-liquor of the preparation of hydroberberine from commercial berberine sulphate yielded methylhydroberberine, $C_{20}H_{20}(CH_3)NO_4$, indicating that the original material was a mixture of berberine and methylberberine sulphates.

Californian Soap Plant.

In an investigation of the "Californian soap plant" (*Chlorogalum pomeridianum*), which is used by the Mexicans and Indians as a detergent, and for preparing a dentifrice, shampoo liquid and face lotion, Mr. Trimble obtained from the fresh bulb 1·87 per cent. of saponin, or equal to nearly 7 per cent. of the dried root (*Amer. Journ. Pharm.*, Dec., p. 598). He also separated by means of ether a reddish-brown crystalline glucoside that was soluble in water.

Solanum Carolinense.

Mr. Krauss reports the results of an analysis of the root-bark of *Solanum Carolinense*, a perennial herb that grows abundantly in the Southern States, the investigation having been undertaken in consequence of the reported poisoning of horses and cattle through eating the plant (*Amer. Journ. Pharm.*, Dec., p. 601). The principal result was the separation of about 0·4 per cent. of alkaloids, 0·285 per cent. of which appeared to be solanine.

Lobelia pupurascens.

In a note presented recently to the Linnean Society of New South Wales (Proceedings, p. 279), Mr. Maiden states that he has had a specimen of *Lobelia purpurascens* sent to him from Port Macquarie as "a newly discovered antidote to snake-bite." Mr. Maiden states that he and Mr. Hamlet, the Sydney Government analyst, have both found the oily alkaloid lobeline in this species, while, according to Dr. Bancroft, the plant has the same active properties as *Lobelia inflata*, and might be used as a substitute for it.

Derrid.

In the late Colonial and Indian Exhibition in London, a plant was exhibited in the Straits Settlements Court under the name of *Derris elliptica*. This plant was stated to afford the most important of several drugs passing under the name of "tuba root" in that colony. The root possesses an extremely acrid taste, causing a flow of saliva, like lobelia, but ultimately a feeling of numbness of the tongue and palate and a lessened secretion of saliva, with the sensation of a "thick tongue," so much as to affect the speech. By the natives of Java it is used as a fish poison; in Borneo it forms an ingredient of the Siren arrow poison, and in the Straits Settlements, of the Malay arrow poison called "ipoh." In the report on the Exhibition that appeared in this Journal the desirability of an investigation of this drug was pointed out (*Pharm. Journ.*, [3], xvii., p. 5), but up till last year the plant, notwithstanding its evident possession of powerful physiological action, does not appear to have been subjected to chemical examination. This has now been done in the chemico-physiological laboratory in connection with the Buitenzorg Gardens at Java, where there exists every facility for obtaining tuba root of botanically definite origin, which would not be the case in the bazaars. The active principle is neither a glucoside nor an alkaloid, but a resinous body with an acid reaction, to which the name "derrid" has been given. Crude derrid melts at 61° C., but decomposes when heated to 160°, giving off an odour resembling that of coumarin. Heated with caustic alkali it yields salicylic acid and a little protocatechuic acid. In the root it exists together with a brown colouring matter called "derris red," derived from the tannin of derris, which yields the same colouring matter on oxidation. The derris red can be separated from the tannin by acetic ether. The best method of extracting the derrid yet devised appears to be to treat the coarsely powdered root-bark in a percolator with cold water (so as to remove tannin, mucilage and derris red), until the water passes colourless, and only gives a slight tannin reaction with perchloride of iron. The strongly pressed and dried powder is next exhausted with rectified spirit of wine. One-fifth of its volume of water is added to the percolate and the spirit distilled off, when the derrid separates in a melted form under a milky supernatant fluid. The crude derrid, of which the root bark yields about 5 per cent., is then treated with dilute spirit and subsequently with lye containing ½ per cent. of alkali, after which it is dissolved in chloroform and washed with water to remove traces of alkali. The chloroformic solution is then digested with animal charcoal and the chloroform distilled off. The amorphous residue heated with absolute alcohol affords on cooling yellow acicular crystals, melting at 190° C., with partial decomposition. These are easily soluble in chloroform and bisulphide of carbon, but they are absolutely insoluble in water, and separate from the alcoholic solution on the addition of water in the form of crystals, but without forming an emulsion as is the case with the crude derrid. The amorphous derrid remains in the mother liquor after the separation of the crystals. The exact relation of the crystalline to the amorphous derrid has not yet been determined. It has been found that derrid is soluble in all proportions in acetone, phenol, xylol, aniline and pyridine, and that a 20 per cent. solution in pure pyridine can be fractionally precipitated by gradually adding petroleum ether rectified at 60° C. The first portion precipitated is the most coloured, and finally the crystals above mentioned separate on the sides of the glass vessel. Derrid appears to be one of the most powerful fish poisons known. A solution containing only one five-millionth part stupefied gold-fishes in a few minutes and killed them within half an hour. Further experiments are, however, necessary to determine whether derrid has any medicinal value or whether it can be used as an insecticide. Mr. Oxley, many years ago, found a decoction of the root effective for destroying an insect infesting the leaves of the nutmeg tree. It is noteworthy that the derris belongs to a group of the Leguminosæ, which furnishes fish poisons in many parts of the world, viz., *Louchocarpus*, *Millettia* and *Piscidia*.

Carpaine.

A new alkaloid has recently been detected in papaw leaves by M. Greshoff, of the Chemico-Pharmacological Laboratory at Buitenzorg, in Java. It was obtained by digesting the powdered leaves in spirit acidulated with acetic acid, removing the spirit by distillation, and treating the resulting extract with water so as to leave behind resin and chlorophyll. The aqueous solution was then shaken repeatedly with ether and carbonate of soda was added until an alkaline reaction was evident. The precipitate thus obtained was readily soluble in ether, and on evaporation of the ether the "carpaine" was obtained in colourless rosettes of crystals to the extent of about 0·25 per cent. of the leaves employed. Although the freshly precipitated alkaloid is readily soluble in ether, when once crystallized it redissolves but slowly, so that the crystals can be purified and rendered perfectly white by washing with a little ether, but the percentage obtained is thus reduced to 0·15 per cent. On a large scale the lime and petroleum method gives very good results, about 0·19 per cent., and would probably be preferred on the score of expense. Comparative experiments made on the young and old leaves freed from the stalks show that the old leaves afford when dried 0·072 per cent. of the alkaloid, the young leaves 0·25 per cent., and that on an average a papaw plant can be calculated to afford 30 grams of the alkaloid per year from the leaves. The hydrochlorate of carpaine, which contains about 82 per cent. of the pure alkaloid, is freely soluble in water. As yet comparatively little is known of the physiological action of the alkaloid. It appears, however, to act more especially upon the heart, slowing its action. The lethal dose for a fowl of 500 grams weight was found to be about 200 milligrams. In a fowl of 350 grams weight no poisonous symptoms were produced with 50 milligrams of the alkaloid; with 100 milligrams symptoms of poisoning occurred in ten minutes after injection into the breast muscles, but after twenty-five minutes the animal recovered its normal condition. The bird lay on its side and breathed deeply in a jerky manner, and showed slight convulsive movement of the whole body, but no irritability was noticed. Further observations are necessary to determine the usefulness or otherwise of the alkaloid in medicine; should it prove of utility there can be no difficulty in obtaining it in almost unlimited quantity and in a definite crystalline condition. The alkaloid is easily precipitated from its solutions by the alkaloid reagents. The most delicate reaction is with Mayer's reagent, iodo-iodide of potassium, which in a solution of 1 in 300,000 gives a turbidity, and in 80,000 parts an evident precipitate; phosphomolybdate of ammonium has its limit of reaction at 1 in 75,000 parts, picric acid at 1 in 30,000, and chloride of gold at 1 in 25,000. The alkaloid has a bitter taste, which is perceptible even in a solution of 1 part in 100,000.

Digestive Ferment in Fig Sap.

In 1880, in a communication to the French Academy of Sciences, M. Bouchut reported that he had found the juice collected from the common fig tree (*Ficus Carica*) to contain a powerful ferment capable of digesting albumenoid substances, thus confirming a belief of the ancients that the juice possesses digestive properties (*Pharm. Journ.*, [3], xi., 250). This ferment is now the subject of a paper by Dr. Mussi, in which he reports its isolation and describes its properties (*L'Orosi*, Nov., p. 364). Juice collected from the fruit and branches of the fig was filtered to remove the serous portion from the insoluble, the latter repeatedly washed with water and the washings added to the filtrate. This liquid, which after repeated filtration was obtained limpid, was distinctly acid in reaction, and when placed in contact with moist fibrin digested it completely. It was evaporated to a small volume, again filtered, and treated with absolute alcohol, which threw down a plentiful white precipitate that dried, when exposed to the air, to a dark yellow amorphous mass. This, when treated with water, swelled up and imparted a milky appearance to the liquid, but a clear filtrate from it, though it gave the reactions of vegetable albumen, had no digestive power. The residue, insoluble in water, dissolved readily upon the addition of a trace of acid or alkali, and the solution, placed in contact with moist fibrin, effected complete and true digestion. To the ferment thus isolated Dr. Mussi gives the name "cradina," from *krade*, the name given by the Greeks to the part of the fig with which they specially associated the digestive property. It contains nitrogen, and in the dry state it forms a friable, semi-transparent, dark yellow, amorphous mass, yielding an amber-yellow powder. In water it swells, but does not dissolve, though upon being shaken it imparts to the liquid a milky appearance. When dissolved by the aid of alkali or acid a concentrated solution is dark yellow, but becomes colourless upon being diluted. Cradina differs from pepsin in maintaining its digestive power in an alkaline liquor, and from papain or papayotin in being insoluble in water, not precipitated from solution by alcohol or lead acetate, and in its activity not being diminished in the presence of hydrochloric acid. In a neutral liquid it is devoid of digestive power and it has no action upon starch.

The Rôle of Tannins in Plants.

The classification of tannins adopted in Hager's 'Commentary on the German Pharmacopœia' was the subject of an interesting criticism by Herr T. Waage at a recent meeting of the Berlin Pharmaceutical Society (*Pharm. Zeit.*, Dec. 10, p. 770). The disputed article, in which the tannins are divided into bodies of physiological importance and excretive matters of normal and pathological origin, defines an excretion as the final product of the chemical changes within the plant, but in the following lines admits that the excretive tannins may be converted into phlobaphenes and similar coloured bodies. Herr Waage proceeded to show by reference to the recent researches of Pick, Braun, Möller and others, that the phlobaphenes are the real excretions, or end products, since they are removed with the dead portions of the plant without undergoing further change, and that all tannins must be regarded as bye-products still possessing more or less physiological importance. Even some of the plant colouring matters of which tannin is the mother substance, such as the widely distributed red and violet pigments, erythrophyll and anthocyan, do not appear to be always final products or without physiological importance. Thus the red coloration observed in the leaves of many trees in the spring has disappeared in the summer, showing that the red pigments derived from the tannin have been reconverted into colourless compounds. The principal employment of the tannic acids, the theoretical formation of which was discussed in these columns last month (p. 472), is according to Möller, as glucosegenides, which act as carriers of carbohydrates from one part of the plant to another. It is supposed that the carbohydrates form with tannin readily decomposable compounds of glucosidal nature, from which, upon their arrival at a part of the plant where the carbohydrates are needed, the tannic acid is separated and passes on in the circulation, the starch or cellulose being deposited. Whether the tannins themselves are reconvertible into carbohydrates remains still an open question, but their persistence in the leaves after the withdrawal of starch and nitrogenous bodies before the autumn fall suggests that they are not sufficiently valuable products to have led to the elaboration of a process by the plant for their recovery. The observed decrease of intensity of tannin reactions in young plants and growing organisms has furnished support to the opposite view, but may be explained by the assumption that the capacity of young cells increases more rapidly than the supply of tannin.

Influence of Soil on Growth of Plants.

An instructive article on the effect of soil on the growth of annuals appears in the *Gardeners' Chronicle* (Dec. 7, p. 663) from the pen of Mr. G. F. Scott Elliot. His experiments show that leaf mould, manure, lime, sand and peat, are of value for the growth of annuals in the descending order in which they are here arranged. The height of the plant, the length and the spread of roots, the length of the leaves and the number of branches and of flowers per plant all follow the same order. The breadth of the leaf, however, appears slightly greater in the case of manure than of leaf mould. The plants experimented on included chiefly garden annuals, such as *Nigella damascena*, *Linum rubrum*, *Papaver umbrosum*, *Saponaria calabrica*, *Convolvulus minor*, nasturtium, candytuft, mignonette, etc. The result thus obtained may perhaps be utilized in the cultivation of medicinal plants like the poppy.

Eucalyptus Globulus.

According to a note in the *Gardeners' Chronicle* (Dec. 13, p. 694) there is in a garden at Ventnor a tree *Eucalyptus Globulus* with ripe fruit upon it. One of the trees in that neighbourhood is forty feet in height. Severe winters often cut off the tops of young eucalyptus trees, but when wood is well formed the trees appear capable of flourishing on the south coast of Britain.

Croton flavens as an Insecticide.

At the last meeting of the newly-formed Berlin Pharmaceutical Society Herr Waage read a communication upon *Croton flavens* as yielding a possible substitute for "Persian insect powder" (*Pharm. Zeit.*, Dec. 10, p. 771). The sample referred to had been received from Venezuela, but the *Croton flavens* is said to be pretty fairly distributed throughout the northern part of South America and the West Indies. It varies, however, considerably in form, several varieties being distinguished, the one under notice being probably var. *balsamifer*, differing from the typical form in the more elliptico-spheroid form of the capsule. The leaves and younger parts of the plant are described as having a whitish, yellowish or rust-coloured felt-like appearance, due to large much-radiating stellate hairs, some of which are sessile, but more, apparently, stalked. The leaves are ovate and lanceolate, sometimes blunt and sometimes cordate or hastate at the base, and narrowing somewhat at the point. The odour is peculiar, though not exactly disagreeable, the leaves when rubbed smelling strongly of sage. The powder produces irritation of the mucous membrane.

Artificial Rubies.

The artificial production of rubies and sapphires has been for several years past an accomplished fact, having been first effected by Messrs. Fremy and Feil, by heating together alumina and lead oxide in a siliceous crucible in the presence of a salt of chromium or cobalt oxide. Under these conditions it was supposed that the lead silicate formed by the action of the lead oxide upon the crucible favoured he crystallization of the alumina (*Pharm. Journ.*, [3], viii., 732). Subsequently, however, it was observed that the crystallization of the alumina was still more favoured by the presence of a fluoride of an alkaline earth (*Pharm. Journ.*, [3], xvii., 805). But the crystals were still so minute as to be practically worthless. Messrs. Fremy and Verneuil now report that they have found it advantageous to add a little potassium carbonate. They also state that it has proved possible to grow ruby crystals in the dry process similarly as other crystals are grown in wet processes (*Compt. Rend.*, cxi., 667). The time of exposure to heat is prolonged to a week or more, the length of the calcination exercising a great influence upon the size of the crystals. In nature rubies are occasionally found approximating to sapphires in presenting in parts a blue coloration, and it is curious to learn that sometimes among the red crystals of rubies produced artificially, a chromium salt being used as a colouring agent, crystals will occur that are bluish or violet. This is thought to indicate that rubies and sapphires may both owe their colour to the same metal—possibly chromium—in different stages of oxidation.

A RAPID METHOD FOR THE ESTIMATION OF UREA IN URINE.

BY C. J. H. WARDEN.

Professor of Chemistry, Medical College, Calcutta.

As Sutton has remarked, the sodic hypobromite method of estimating urea in urine has given rise to endless forms of apparatus, the principle of construction being in all similar, with the exception, I believe, of Lunge's nitrometer, when it is used for the estimation of urea. In all the instruments hitherto proposed the decomposition of the urea by the hypobromite has been accomplished in one apparatus and the evolved gas measured in a separate tube. In the method now described the evolved nitrogen is measured in the tube used for the decomposition of the urea, and the procedure is consequently much simplified.

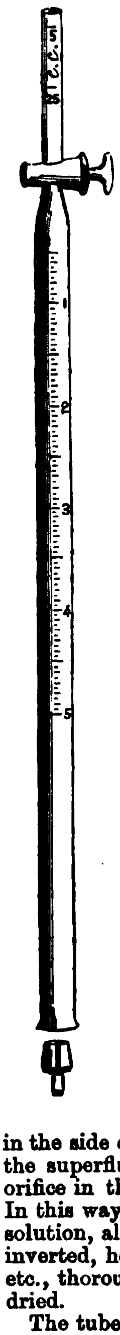
The apparatus for the decomposition of the urea and measurement of the liberated nitrogen consists of a slightly modified form of Crum's well-known nitrometer. Crum's tube, as usually constructed, has a total length of 210 mm., an internal diameter of 15 mm. and a capacity of about 25 c.c., the cup at the top having a capacity of a little over 2·5 c.c. The modifications desirable in adapting the tube for the estimation of urea may be thus summarized.

(*a*) Trebling the length of the tube, and thus making it 6·30 mm. long; the capacity being increased to 75 c.c., while the internal diameter is not altered.

(*b*) Grinding on to the lower open end of the tube a glass stopper, on which two narrow grooves have been filed.

(*c*) Increasing the capacity of the small cup at the top of the tube to 5 c.c. and having it accurately graduated to hold 2·5 c.c., when filled to a certain mark.

(*d*) Using somewhat thinner glass than that employed in the construction of Crum's tubes, as no mercury is used in the process.



The tube is graduated on the principle of Russell and West's receiver. Russell and West's apparatus was constructed to be used with 5 c.c. of urine. It was found that 5 c.c. of a 2 per cent. solution of pure urea evolved 37·1 c.c. of nitrogen, and this volume was taken as the basis of graduation of the measuring tube. In the process now being described only 2·5 c.c. of urine is used, and as 2·5 c.c. of a 2 per cent. urea solution evolves 18·55 c.c. of nitrogen, this volume of gas will necessarily be equivalent to 2 per cent. of urea. One per cent. of urea is therefore equal to 9·27 c.c. of nitrogen, and the 9·27 c.c. volume is divided into ten equal parts, each part being equal to 1 per cent. of urea; these divisions are further subdivided into two, each representing 0 5 per cent. of urea. The graduations should be continued so as to indicate up to 3 per cent. of urea. As in Russell and West's tube, all calculations are avoided, the observed volume of gas at once indicating the percentage of urea in the specimen of urine under examination.

In using the apparatus the following solutions are required.

1. A cold, aqueous, saturated solution of common salt.
2. Hypobromite solution, made by dissolving 100 grains of caustic soda in 750 c.c. of distilled water and adding 25 c.c. of bromine. This solution should be freshly prepared in small quantities as required for use.

To use the apparatus the stop cock should be first slightly greased and closed, the tube inverted and the grooved stopper removed. The hypobromite solution is then poured into the tube to overflowing, the stop-cock opened to allow a drop or two to escape and thus displace the small column of air in the base of the stop-cock. The grooved stopper is then pressed home, the excess of hypobromite solution escaping by the grooves in the side of the stopper, in the same manner as the superfluous fluid escapes through the capillary orifice in the stopper of a specific gravity bottle. In this way the tube is filled with the hypobromite solution, all air being excluded. The tube is now inverted, held under a tap of water, and the cup, etc., thoroughly washed, and then most carefully dried.

The tube is now stood in a small trough of urine—a finger-bowl answers very well—and supported by a filter ring or clip. The sample of urine to be examined is then poured into the dry cup up to the 2·5 c.c. graduation, any excess of urine accidentally introduced being removed by a fine fold of blotting paper. The cup is then filled up with urine, which is well mixed with the urine by a small and slender glass rod. The object of diluting the urine with urine is to increase its density. If ordinary urine were introduced into the tube it would float upon the surface of the hypobromite, and only a slight reaction would immediately occur at the point of function of the two fluids, but by increasing the specific gravity of the urine, in the way indicated, it flows through the hypobromite solution, and brisk effervescence ensues.

If the urine solution were allowed to enter the tube while closed with the grooved stopper, a portion of the evolved gas would escape through the bore in the stop-cock; in order, therefore, to avoid losing gas from this cause the grooved stopper is first removed before urine is allowed to escape from the cup into the tube. In allowing the urine to enter the tube, the stop-cock should be opened sharply and a small amount of urine in a full stream allowed to enter; decomposition of the urea at once ensues and the gas collects at the top of the tube. When effervescence has ceased more urine is introduced and so on until the cup has been emptied. The cup is then filled with 2·5 of dilute urine and rinsed round by means of the glass rod; the whole of the urine is then allowed to enter the tube at one operation. The same amount of dilute urine is then again placed in the cup, rinsed round and allowed to enter the tube. The tube is now grasped by the right hand, the thumb being lightly pressed against the open end and the contents thoroughly agitated.

Lastly the tube is placed in a vessel of water, and the thumb removed, when the saline solution flows out and water occupies its place. If, while the open end of the tube is below the surface of water, water from a tap be allowed to flow down the tube, the temperature of the gas will be rapidly reduced to that of the water. The remaining operation consists in taking the volume of gas with the usual precautions, the volume indicating the percentage of urea in the urine without the trouble of any calculation. Corrections for temperature and pressure can of course be applied if necessary.

In using the tube, if the evolved gas should exceed the volume yielded by 3 per cent. of urea, the urine must first be diluted with an equal volume of water and 2·5 c.c. of the diluted urine used in the manner already described; the percentage of urea as indicated by the volume of gas being doubled.

The points to which special attention may be drawn in connection with this method of estimating urea, are—

1. Extreme simplicity of apparatus. All the various operations of measuring the urine, decomposing the urea, and measuring the volume of evolved gas, being performed with one instrument.
2. Ease and rapidity of manipulation.
3. Results as accurate as those afforded by any of the various modifications of Russell and West's original method.

Messrs. E. Cetti and Sons are prepared to supply these modified Crum tubes, and the well-known name of the firm is a sufficient guarantee that the graduations will be accurate.

THE CONSTITUENTS OF COMMERCIAL ASAFŒTIDA.*

BY W. A. PUCKNER.

In regard to authorities on the mineral constituents of asafœtida, Pelletier is quoted in the U. S. D. as finding traces of the acid malate of calcium. Brandes finds 6·2 per cent. of calcic sulphate, 3·5 per cent. of calcic carbonate, 0·4 per cent. of oxide of iron and alumina, and 4·6 per cent. of *impurities*, consisting chiefly of sand and woody fibre. Maisch, 'Proc. Amer. Phar. Assoc.,' 1871, reports 57, 44, 15, 51 and 62 per cent. ash, consisting chiefly of $CaSO_4$, in specimens examined by him. Both the German and British Pharmacopœias limit the ash to 10 per cent. without defining its composition. Under these circumstances I thought it best to determine carefully the quantity and quantitative composition of the ash in the specimens at hand.

The following is the method adopted. A weighed quantity of a representative sample of the drug was dried in an air-bath until it could be reduced to a fine powder: the loss of weight was noted, and 2 or 3 grams, calculated to weight of the original sample taken for analysis. This was first extracted with alcohol in a Soxhlet extractor, and from the requirement of the U.S.P., that 60 per cent. should be soluble in alcohol, the loss under this treatment was noted. As the substance, after extraction, was dried at 100° C. and then weighed, the figures given in this paper give the amount soluble in alcohol plus the water contained in the original sample, as I inferred that the standard of 60 per cent. refers to the air-dry substance. The residue from alcohol extraction was then slowly ignited in a shallow platinum capsule, and this residue designated as ash.

The ash obtained was not a fixed quantity, as the organic matter present reduced a portion of the calcic sulphate to the sulphide. The ash was treated with hydrochloric acid and water, the residue again united and weighed as "insoluble ash." In the soluble portion alumina and iron were determined as oxides, calcium was precipitated as oxalate, dried in a Gooch filter at 100° C. and calculated as $CaC_2O_4(H_2O)$, and magnesium determined as pyrophosphate. Carbonic acid was determined by the method of Rose (absorption by caustic alkali). Sulphuric acid was determined by extracting a fresh portion with alcohol, treating residue with dilute hydrochloric acid, evaporating, and treating with HCl and $KClO_3$, to destroy organic matter, then precipitating with baric chloride. The baric sulphate was separated with a Gooch filter, dried at 130°–140° C. and weighed.

The following were the results obtained:—

	Soluble in Alcohol.	Total Ash.	Insoluble Ash (earth, clay, sand, etc.).	Alumina and Iron.	CaO.	MgO.	SO_3.	CO_2.
No. 1 in mass	59·49	19·45	2·32	1·16	7·12	1·14	8·57	1·09
No. 2 ,, ...	27·39	56·03	1·37	·42	25·07	2·03	20·49	10·78
No. 3 powdered ..	44·48	38·59	2·36	·68	16·57	1·39	16·18	5·32
No. 4 ,, ..	33·47	47·86	1·95	·60	18·85	·42	23·51	2·02
No. 5 ,, ..	31·35	55·38	21·96	2·57	9·91	6·49	8·96	4·25

Silica found—not determined.

Of the two specimens of lump asafœtida, No. 1 was dark and irregular, hard and dry portions intermixed with softer parts, while No. 2, bought as of extra quality, was of a lighter colour and homogeneous throughout. The former gave 19 per cent. while the latter showed 56 per cent. of ash, of which about 34 per cent. was calcic sulphate and 19 per cent. calcic carbonate. Of the specimens of powdered gum, No. 3 was obtained of a Chicago drug house, No. 4, with its 47 per cent., of ash containing 40 per cent. calcic sulphate, was purchased of a New York jobber, while No. 5, containing 55 per cent. of ash, bore the label of a drug miller, claiming it to be a *purified* gum.

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* Read at the meeting of the American Pharmaceutical Association, September 12, 1890.

The Pharmaceutical Journal,

SATURDAY, DECEMBER 27, 1890.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

HOW CHEMISTS' INTERESTS MAY BE PROTECTED.

ON looking through the speeches and letters in which a feeling of antagonism to the proposed Pharmacy Bill has been expressed, it is impossible to avoid being struck with the fact that the grounds upon which such a feeling is based are remarkably weak and unreasonable. This view of the matter has been very well stated by a correspondent writing from the neighbourhood of Manchester, and as the recent unusual pressure upon our space has prevented the publication of his letter hitherto, it may be useful to place before our readers the substance of his comments. Our correspondent claims to be one of those who take great interest in all topics that have a pharmaceutical bearing and speaking, from that point of view, of the correspondence that has appeared in reference to the Pharmacy Bill, he expresses his amazement at the indifference and hostility to this measure which appear to prevail with some chemists. Taking the main features of the Bill, it is difficult to understand the reasons either for indifference or for hostility. The proposed establishment of a uniform system of pharmaceutical education certainly ought not to be a reason for either indifference or hostility to the Bill on the part of those now engaged in business on their own account. To them in large part belongs the duty of training prospective pharmacists and preparing them for their future position as principals, as well as to undergo the ordeal of examination, which is the necessary preliminary. In that respect much is now left undone, largely, perhaps, from the want of any recognized system, and what is done is more or less accidental, instead of being the result of compliance with requirements established out of consideration for the future interests and well-being of apprentices. The educational provisions of the Pharmacy Bill, being intended to give facilities for the introduction of a more definite and systematic procedure, ought to be hailed by those who take apprentices as a means of rendering their duties less onerous, and of improving the general relations between apprentices and their masters. If those provisions were to become law the contemplated revision of the Society's bye-laws would have the effect of restricting admission to apprenticeship to those who were at the time educationally fitted for it, and it would also have the equally important effect of making intending apprentices and their parents appreciate the necessity of considering beforehand whether they are disposed to comply with all the conditions that are essential for ultimately obtaining creditable qualification. The operation of such a system could not be other than beneficial for apprentices, while at the same time it would help to assure persons already qualified against the invasion of their calling by incompetent competitors.

So far, therefore, as the educational provisions of the Bill are concerned it could not do harm, and even if it were not to produce any beneficial effect it would have the recommendation of having been the expression of an attempt to improve the condition of the pharmaceutical body. But it is not so much on account of the educational features of the Pharmacy Bill that there seems to be in some quarters a feeling of hostility. This seems to arise more from a sense of the fact that chemists have neither the success in trade which they used to have in former years, nor that which, from the nature of their business, they ought to have. But, as our correspondent remarks, chemists are chiefly responsible for this falling off by reason of their own neglect. Instead of exerting themselves to make the most of the necessity, that before entering upon business they must be qualified by registration on the basis of an examination intended to prove their practical training and scientific education, and instead of seeking to impress upon the public that this necessity, established by law in the public interest, places chemists in a totally different position from ordinary traders, it has been too customary to rail against the examination as an imposition disproportionate to the requirements of the business. Moreover, it is too often the case that chemists, having passed their examination, disregard this fact altogether, and settle down to the level of ordinary traders who require neither special skill nor legal qualification. To use the words of our correspondent, they neglect the considerations which entitle them to a fair remuneration for their special knowledge and skill, and retail their drugs at prices so absurdly low as to be little benefit to themselves while detrimental to their brother chemists. Another point in which our correspondent considers that chemists are negligent is the condition of their shops, and speaking of his own locality he refers to many whose "condition is such as "to drive away any respectable persons to some "grocer or store whose establishment stands out in "favourable contrast by its brilliancy and neatness. "Many of the shops referred to have not the faintest "resemblance to what a chemist's shop should be.

"The windows and shelves are simply repositories of "dusty bottles and seedy looking sundries; the chief "place is given to the advertisement of catch-penny "articles, the sale of which occupies a prominent "position in the business, while pharmaceutical "products have only a second-rate place in these "establishments."

We trust that the description thus given of some chemists' shops may be more exceptional in its applicability than our correspondent believes, but we cannot to the same extent dissent from him in his opinion that chemists too frequently neglect to maintain their true position of superiority as traders, and that it is this neglect which places them at a disadvantage with their unqualified competitors. Perhaps no better illustration of this neglect can be found than the common want of appreciation of the value of registration manifested in the complaints that have been called forth by the **Wheeldon** case. It is scarcely conceivable that those practically interested, those who have an actual trade interest in the fact of being registered persons, should hold this advantage so lightly as to desire to have the right of deputing unregistered persons to perform for them duties that are specifically restricted to registered persons. From the point of view to which we now refer it is of little importance whether the persons to whom such duties are entrusted are competent or not to perform them. The more weighty consideration is that by permitting an unregistered person to perform any of those duties, except in a mere mechanical manner under direct supervision, the value of registration as a matter of strict trade interest is lowered, and damage is thus done not only to the individual who is so inconsiderate, but also to the entire body of which he is a member. It would be more rational, and from the point of view of the chemist's interest more useful, to exaggerate the importance of the restrictions attached to registration, and to seek to extend the application of them. There is a valid reason for doing so, inasmuch as those restrictions were established in the interests of the public, and if chemists loyally supported each other in upholding the restrictions which the law authorizes and is intended to enforce, a more decided step would be made towards the protection of the trade interests of the craft than we can ever expect to gain by means of further legislation. In this sense the provisions of the Pharmacy Bill in regard to dispensing ought to commend themselves to every chemist who has a true appreciation of the interests of his calling and of the means by which they may be advanced.

The introduction of "wool fat" into the British Pharmacopœia will no doubt have the effect of directing increased attention to this material and to the advantages it presents in certain respects as a basis for ointments. The range of melting point that has been adopted in the 'Additions' is higher than the normal temperature of the human body, and it may therefore be doubted whether this would not involve the retention of that sticky character which has been one of the chief grounds of objection to "wool fat" as hitherto met with, and was one of the reasons for the exclusion of this material from the recent German Pharmacopœia. The melting point of wool fat varies considerably, some of it being almost liquid at the ordinary temperature, while other kinds, containing a preponderating amount of a waxy constituent, to which the sticky character is due, have a proportionately higher melting point. To overcome this defect the addition of soft or liquid paraffin has been suggested; but it is probable that oleic acid would be more efficacious and more suitable, since wool fat contains in its natural condition a considerable amount of uncombined soft fat acid resembling oleic acid, and by the removal of this the objectionable sticky character is increased.

* * *

The following chemists and druggists, Messrs. Samuel Parker Boyd, Dublin, and Arthur H. Jones, Doneraile, having submitted to an examination in accordance with the Pharmacy Act (Ireland), 1875, Amendment Act, 1890, sec. 7, have been certified by the Examiner to have passed same and to be qualified to keep open shop for the sale of poisons.

* * *

The third annual ball of the Leicester Chemists' Association took place on the 4th inst. at the County Assembly Rooms, the use of which had been kindly permitted by Sir Henry St. John Halford, Bart., C.B. Upwards of 150 persons were present, and the gathering was in every respect a great success under the management of the acting stewards, Messrs. Rowe, Davey, Ward and Weall.

* * *

The son of a chemist at Sunderland was summoned last week for selling laudanum without a label on the bottle. The evidence was conflicting and therefore held by the magistrates to be insufficient for conviction, but they cautioned the defendant that he would be laying himself open to a penalty by selling drugs as a chemist without being duly registered.

* * *

At a meeting of chemists' assistants and apprentices held in Brighton last week it was resolved to form a Junior Pharmacy Association in that town. Mr. A. P. Nosworthy was elected President, Mr. Willis Bailey, Honorary Treasurer and Secretary, with Messrs. Price, Coleman, Tinbury, Jefferson, Horsey, and Colenutt as a Council to which the drawing up of rules was entrusted. It was decided to inaugurate the session with a dinner to be held at Booth's Restaurant on January 8, when the chair will be taken by Mr. Marshall Leigh.

* * *

In a recent report by Mr. Vice-Consul Rouquette on the trade of the Lofoden Islands it is stated that some interesting experiments were made last year, during the fishing season, with a view to ascertain the temperature of the water which is frequented by the cod. The fish were generally met with in water having a temperature of 4° to 5° C., but why they prefer this temperature, whether for feeding or spawning purposes, has not yet been ascertained.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 11, 12, 16, 17, 18 *and* 19, 1890.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 12th and 19th on behalf of the Privy Council.

MAJOR EXAMINATION.

11*th*.—*Seven* candidates were examined. *Two* failed. The undermentioned *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Andrew, John Herbert	Oldham.
Bell, Robert Henry	Sunderland.
Haigh, Walter	Halifax.
Hillman, Charles Edward	Westbury.
Mawer, William Fred.	Grimsby.

12*th*.—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Metcalfe, Henry Theodore	Tickhill.
Mountain, John Thomas	Woodbridge.
Sleath, Edmund Watson	Manchester.
Wrench, Frederick William	Silverdale.

MINOR EXAMINATION.

11*th*. — *Twenty-two* candidates were examined. *Twelve* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Abbott, Alfred Arthur	Alresford.
Adair, Elliot	Workington.
Arthur, Arthur	Carmarthen.
Axe, William John	York.
Baker, William Herbert	Cosham.
Bolwell, William Tanner	Weston-super-Mare.
Bonner, Clifford Goodwin	Berechurch.
Boorne, Herbert Edward	Frome.
Brown, Ernest Ansell	Margate.
Claridge, Charles	London.

12*th*.—*Twenty-four* candidates were examined. *Fifteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, James	London.
Cooper, Frederick William	Brightlingsea.
Cope, Edward James	Reading.
Dewey, Thomas Henry	Merton.
Dixon, Richard	Newport.
Dudderidge, Frank Rawlinson	Blandford.
Elliott, Edward Matthews	Walsall.
Funnell, Richard	Whittlesea.
Smith, Arthur Sidney	Doncaster.

16*th*. — *Twenty-nine* candidates were examined. *Fourteen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Arrandale, John Samuel	Denton.
Davies, Griffith	Cardigan.
Fisher, Ernest Hunter	Blackheath.
Fletcher, Fred Taylor	London.
Freeman, William Marshall	Birmingham.
Gardiner, John Adams	Bridgnorth.
Gibson, Joseph	Keswick.
Green, Edward Joseph	Boroughbridge.
Gregory. Bromley George	Weymouth.
Harden, Arthur George	Ash.
Heath, Robert Philip	Norwich.
Heny, Alfred Warrington	Duffield.
Hodges, Thomas Walter	Tueford.
Jenkins, William Thomas	Kidwelly.
Smith, Ernest Alfred Austin	Bristol.

17*th*. — *Twenty-nine* candidates were examined. *Eighteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Davies, Jenkin William	London.
Jones, Thomas Lloyd	Denbigh.
Knight, William	Chichester.
Lawton, Charles Edward	Lockwood.
Leytham, Thomas Arthur	Lancaster.
Linstead, Edward Flatman	London.
Littlefield, William Henry	Ventnor.
Lobbett, James Godfrey	Hingham.
Long, Fred. James Towell	Dover.
Minnikin, George Rennison	Keswick.
Smith, Harry George	Downham Market.

18*th*.—*Twenty-seven* candidates were examined. *Eighteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Morley, Charles	Lelant.
Morris, John	Neath.
Palmer, Frederick	London.
Petter, Edward Arthur	Folkestone.
Place, Edward Bland	Pickering.
Rees, Joseph	Brynamman.
Richards, John	London.
Roper, Henry Arthur	Plymouth.
Turney, Edward Genge	Plymouth.

19*th*.—*Twenty-eight* candidates were examined. *Thirteen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Reynolds, William Colebrook	Harrogate.
Saunders, Charles Edward	Highgate.
Stephens, Albert Francis H.	Falmouth.
Sumners, Henry Tindale	Heckington.
Swift, Arthur Hayball	York.
Turner, George Pain	Taunton.
Underwood, George	Whitby.
Vasey, Frederick William	Stanhope.
Walker, George Bilderbeck	Wellingborough.
West, Joseph Arthur	Peckham.
Wharram, William Allan	Naburn.
White, Samuel Banfield	Taunton.
Whittle, George	London.
Williams, Hugh Alfred	St. Clears.
Wills, Alfred George	London.

MODIFIED EXAMINATION

11*th*.—*Two* candidates were examined. *Both* failed.

PRELIMINARY EXAMINATION.

19*th*.—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Bishop, John Henry	Norwich.
Burnett, Albert Edward	Bristol.
Clarke, William Edward	Foxholes.
Clayton, George Francis	Leyton.
Crawford, Andrew	Greenock
Dransfield, John Dearman	Penistone.
Fitch, Frederic William	Shalford.
Francis, Arthur Llewelyn	Wrexham.
Gerrish, Emerson	Bristol.
Gillett, Francis John	Hampstead.
Happold, Charles	Barrow-in-Furness.
Harrison, Thomas Blair	Sunderland.
Hudson, Frederick W.	Grange-over-Sands.
Muir, Thomas Holmes	Glasgow.
Wilson, William E	Edinburgh.

Retirement of Mr. Gale.

On the motion of Mr. Corder, seconded by Mr. Taylor, it was unanimously resolved:—

> "That this Board desires to place on record its high appreciation of the services rendered to the Board by Mr. Samuel Gale during a period extending over twenty-six years. Mr. Gale's services in the interest of the Pharmaceutical Society and in the cause of pharmaceutical education deserve the warmest thanks of his colleagues on the Board of Examiners and the members of the Society at large."

Proceedings of Societies in London.

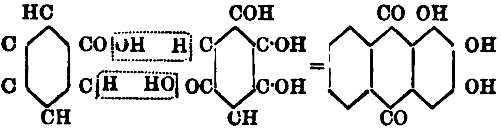
CHEMISTS' ASSISTANTS' ASSOCIATION.

THE CHEMISTRY OF ORGANIC DYES.

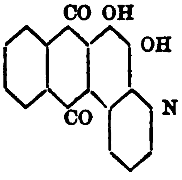
BY F. W. PASSMORE, PH.D.

(*Concluded from page* 551.)

Among the trioxyanthraquinones occur *Purpurine*, which accompanies alizarin in the madder root, *Iso-* or *Anthra-purpurine* and *Flavo-purpurine*, products obtained from β- and α-anthraquinone-disulphonic acids respectively. The presence of the two latter purpurines in commercial alizarin gives it a yellow tinge. By the condensation of gallic and benzoic acids, when heated with concentrated sulphuric acid, a dioxyanthraquinone, *Anthragallol* or *Alizarin brown*, results:—

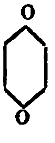


An analogous condensation of two molecules of gallic acid yields a hexa-oxyanthraquinone, the *Rufigallic acid.* Upon heating alizarine orange with glycerol and sulphuric acid a peculiar blue dye, the *Alizarin blue*, results. From Skraup's quinoline synthesis it follows that this compound bears the same relation to alizarin as quinoline to benzene, and therefore possesses the constitutional formula—

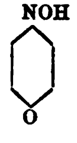


Naphtharizin, or *Alizarin grey*, previously supposed to be identical with the natural alizarin, proves to be a dioxynaphthoquinone.

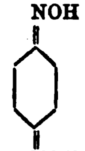
The quinone-oximes result from the action of nitrous acid upon phenols and have been called nitrosophenols. The fact that they can also be obtained by the action of hydroxylamine upon the quinones suggests, however, that they are mono- or di-oximes of the latter.



Quinone.



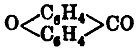
Monoxime.



Dioxime.

Like the alizarins they form strongly coloured lakes with metallic oxides, especially with those of iron and cobalt. The dinitrosoresorcinol or *Fast green* and the naphthoquinone monoxime, or *Naphthol green*, are the principal dyes of this class.

Nearly related to the quinones is the euxanthinic acid, which contains as chromogene the diphenylene ketonoxide group—



$$O{<}^{C_6H_4}_{C_6H_4}{>}CO$$

resembling anthraquinone in its constitution. The animal excrementitous matter "*Purrée* or *Indian yellow*" is the magnesium salt of euxanthinic acid, which is an ester-like compound of glycuronic acid with euxanthon, a dioxybenzophenone oxide.

Galloflavine, obtained by the action of the atmospheric oxygen upon an alkaline gallic acid solution is also probably a ketone oxide.

X. Quinoline and Acridine Compounds.

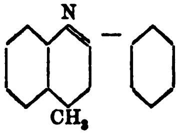
Quinoline and acridine and their homologues virtually belong to the chromogenes, although even this character is feebly marked, but it is convenient to class under this heading some mixed derivatives of these bodies which are nearly related to the rosanilines and phthaleines.

Cyanine is a blue dye obtained by heating a mixture of quinoline and lepidine (γ-methylquinoline) with alkalies and alkyliodides. Although one of the first artificial dyes, its constitution is not accurately known, but is probably analogous to that of the triphenylmethane, the methyl group of lepidine affording the central carbon atom.

Quinoline red, from benzotrichloride and quinoline, is probably also analogously constituted, the methane carbon being provided by the benzotrichloride.

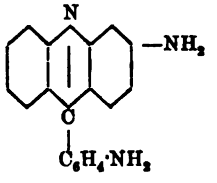
Quinoline yellow results from the action of phthalic anhydride on quinaldin (α-methylquinoline) in the presence of dehydrating agents. It is a very stable pure yellow dye, but of high price.

Flavaniline is obtained by heating acetanilide (antifebrine) with zinc chloride to 270°C. It is a fine yellow dye belonging to the quinolines and probably represented by the formula—



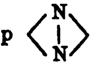
Berberine, an alkaloid that is found in many plants, may also, from our knowledge of its oxidation products, be classed with the quinoline dyes, and is of interest as being the only known natural dye of basic properties. It is used principally in yellow dyeing.

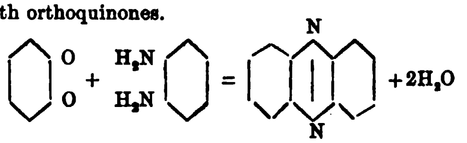
Phosphine, or *Chrysaniline*, occurs in small quantities in the preparation of fuchsine, both by the arsenic acid and nitrobenzene methods. Its behaviour towards nitrous acid causes it to be regarded as a diamidophenylacridine, which, from its formation from *o*-nitrobenzaldehyde and aniline must possess the constitutional formula—



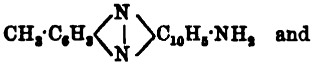
For a long time chrysaniline was the only basic yellow dye known, and therefore much esteemed in the cotton industry, but it is now used only for silk dyeing under the name of phosphine. An isomeric body is *Benzoflavine*, a dye resembling auramine.

XI.—Azine (Chinoxaline) Compounds.

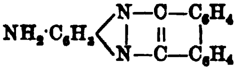
This is the last group of dyes of known constitution, but a very important one, since it contains the *Eurhodines* and *Safranines*. The chromophore of the whole class is the group  which enters into two benzene nuclei in the ortho position. The compounds result from the condensation of ortho-diamines with orthoquinones.



The simple azines are not dyes, but by the introduction of amido groups, basic dyes, and by the introduction of OH groups, acid dyes result. Two homologous eurhodines are obtained from *o*-amidoazotoluene and naphthylamine, and from phenanthrenquinone and triamidobenzene respectively, and possess the formulæ—

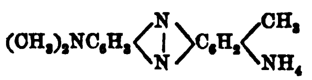


$$CH_3{\cdot}C_6H_3\left\langle\begin{matrix}N\\|\\N\end{matrix}\right\rangle C_{10}H_5{\cdot}NH_2 \quad \text{and}$$



$$NH_2{\cdot}C_6H_3\left\langle\begin{matrix}N-C-C_6H_4\\ | \quad\; \| \quad\;\; | \\ N-C-C_6H_4\end{matrix}\right.$$

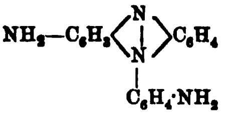
By heating the indamine "toluylene blue" two atoms of hydrogen are removed and the *Toluylène red* is formed, an azine of the formula



$$(CH_3)_2NC_6H_3\left\langle\begin{matrix}N\\|\\N\end{matrix}\right\rangle C_6H_2\left\langle\begin{matrix}CH_3\\NH_4\end{matrix}\right.$$

This occurs as a basic cotton dye under the name of *Neutral red*. A *Toluylene* or *Neutral violet* is obtained by treating toluylene blue with excess of m-toluylenediamine.

The safranines have a very complex molecule containing four nitrogen atoms, the azine group and two amido groups, and at least three aromatic hydrocarbon nuclei. The simplest, *Phenosafranine hydrochloride*, possesses the graphic formula—



$$NH_2{-}C_6H_3\left\langle\begin{matrix}N\\|\\N\end{matrix}\right\rangle C_6H_4 \qquad \overset{\textstyle N}{\underset{\textstyle C_6H_4{\cdot}NH_2}{|}}$$

Only the *Tolusafranines* are used as dyes, and these mostly in the cotton industry for producing scarlet-red tones in yellow dyes, in imitation of alizarin. Technically they are prepared by the oxidation of one molecule of a paradiamine with two molecules of a monamine.

The long known and very stable *Magdala red* is probably a safranine of the naphthalene class, and *Mauvine*, the first manufactured aniline dye (Perkin, 1856), is a phenylated safranine. The coloration of aniline with chloride of lime solution is probably due to its formation. It is now only used as a print for English postage stamps and for the lighter shades in silk.

Before proceeding to the twelfth and last class, I would refer to two dyes, *Canarine* and *Murexide*, that cannot well be included in any group.

Canarine results from the oxidizing action of potassium chlorate upon potassium sulphocyanate. It forms a yellow insoluble powder, soluble in alkalies and borax solution. The alkaline solution dyes unmordanted cotton a bright or orange yellow, very stable both towards light and soap. *Murexide*, the ammonia salt of the theoretical purpuric acid, is formed by the action of ammonia upon a mixture of alloxan and alloxantin, as by the evaporation of a solution of uric acid with strong nitric acid. Hence the well known murexide test.

XII. Natural Dyes of Unknown Constitution.

Hæmatoxylin is contained in the so-called logwood, the heartwood of *Hæmatoxylon campechianum*. By its oxidation *Hæmatin* results. Both bodies are used in dyeing and printing of cotton and wool, especially as a black dye in conjunction with chromic acid and iron. The so-called *Indigo substitute* is a mixture of logwood extract and chromium acetate.

Brasilin and its oxidation product *Brasilein* are obtained from Brazil and red wood, the wood of various species of *Cæsalpinia*. Used in the form of an extract they produce lakes on mordanted wool and cotton resembling those of alizarin.

Morin, the colouring constituent of the yellow wood of *Morus tinctoria*, is used largely in the wool industry as a base for black and other dyes. It is a derivative of resorcinol.

Quercitrin occurs in the bark of *Quercus tinctoria*; also in hops, horse chestnuts and other plants. It possesses a glucosidal nature, being decomposed by dilute acids into rhamnose and *Quercetrin*. The latter is a fine yellow cotton dye, and is also used under the name of *Flavin* to shade cochineal.

Xanthorhamnine and Rhamnetin are analogous products from the fruits of various species of *Rhamnus*. The latter especially affords a yellow print for stuffs that has not yet been surpassed by any artificial dye.

Luteolin, from *Reseda Luteola*, is also a much esteemed yellow silk dye.

Bixin constitutes the colouring matter of "orlean," a fermented preparation from the fruit rind of *Bixa orellana*. It dyes both animal and vegetable fibres a pretty orange yellow shade. It is also used to colour butter, cheese and other foods.

Curcumin, from the roots of *Curcuma longa* and *C. viridiflora*, is a yellow dye, somewhat unstable to light, but largely used to shade red cotton dyes like the safranines. It is employed, as well as bixin, to colour butter, wax and fatty oils.

Carotin, from the ordinary carrot (*Daucus Carota*), has been asserted to be a hydrocarbon, but this does not agree with the present theory of chromophore groups.

Litmus.—Numerous lichens and some algæ contain a number of peculiar acids, lecanoric, orseillic and roccellic acids, etc., which under the influence of alkalies decompose into orcin and erythrol. *Orcin*, under the simultaneous action of ammonia and air, is converted into the brown *Orcein*, which dissolves in alkalies with a blue coloration. If the lichens be exposed to continued fermentation in presence of alkalies, litmus is obtained, a red dye in the free state and forming blue salts.

Carthamin, from the safflower (*Carthamus tinctoria*), before the discovery of artificial products was an important red dye for silk and cotton. It still occurs in commerce under the name of *Safflower carmine*.

Santalin, the colouring matter of the red sandalwood (*Pterocarpus Santalinus*), is employed to colour tinctures and varnishes and to dye wood.

Alkannin, a red dye from the roots of *Anchusa tinctoria*, serves as colouring matter for fatty oils pomades, tinctures, etc.

Lo-Kao, or *Chinese green*, consists of the alumina and lime lakes of an acid, lokain, which like a glucoside splits up into glucose and lokaetin. It is largely used by the Chinese to dye cotton and silk, producing bluish green shades very stable towards light.

Cochineal, the dried females of a coccus that feeds upon various *Cactus* species, owes its dyeing properties to the glucoside, carminic acid. This splits up into a sugar and carmine red. *Carmine*, a preparation of cochineal, is employed as a paint and face powder and also to colour confectionery. In the dye industry cochineal is employed to produce scarlet red tones, mostly in wool.

The reddish violet dye obtained from the various sorts of molluscs (*Purpurea* and *Murex*), and much valued by the ancients, is according to Will a mixture of indigotine with a red dye.

Cachou de Laval is a stable dye obtained by the fusion of all possible organic substances with sodium sulphide.

The Chairman (Mr. W. Lloyd Williams) said the Association was to be congratulated upon numbering Dr. Passmore amongst its members, and they felt it a special mark of distinction that he should have come forward so willingly, with so excellent a paper at such a short notice. The subject of organic dyes was one of the most extensive and complicated in the whole of chemistry, and the points of interest raised by Dr. Passmore's paper were very numerous. He (the speaker) would refer to a few only of those which had presented themselves to him. As Englishmen, they were proud to remember that the aniline colour industry, which now had assumed such enormous dimensions, was inaugurated by one of their countrymen, Dr. Perkin. Though the German chemists had somewhat monopolized the subject from both the practical and theoretical points of view, yet it was comforting to reflect that they could point to men in England who were quite able to hold their own with the Germans. It was interesting to note that a certain relationship seemed to exist between some colours and odours; for instance, the very fine indigo compounds contained indole, and methylindole was one of the most repulsive smelling substances imaginable. Dr. Passmore had explained why so many of the so-called aromatic compounds gave rise to colouring principles, due, as they had been told, to the presence of the colour-giving group for chromogene. At the same time they would remember that coloured compounds were not confined to the aromatic series, for many of the cyanogen derivatives were highly coloured; he need only mention murexide, alloxan and the cyanogen combinations with iron. The passage from the paraffin series to the benzene compounds was, they all knew, a difficult process, and triphenylmethane with three of the H atoms in methane replaced by phenyl groups, was interesting not less on account of its chemical constitution than of its relation to colouring agents. In addition to what might be termed the normal uses of dyes, that of colouring fabrics, several of them had been employed in other ways; for example, meta-phenylene-diamine was used as a test for nitrous acid, indigo-carmine was used in the estimation of tannin, and the different indicators in volumetric analysis. The long names might seem bewildering to some of them, but they had the merit of being descriptive, and to supply a trivial name to the multitude of organic compounds would necessitate the creative genius of a second Adam. Much existing knowledge of the subject had grown out of a desire to synthetize alkaloids, and especially quinine. In conclusion Mr. Williams asked Dr. Passmore if he could furnish him with any information upon the colouring principles of flowers; if it had been clearly established as to what was the composition of chlorophyll, and inquired if there was any way of estimating anthraquinone.

Mr. Martindale thanked Dr. Passmore for the clear and lucid manner in which he had treated the subject. It was one of the deepest interest, and its increasing study had enabled them to regard in a new light many points in connection with aniline colours, which since his time had been shrouded in mystery. He hoped this paper would be published in full, as it would form a very useful reference for the purpose of identification.

Mr. T. A. Ellwood remarked that the able paper, read by Dr. Passmore, was illustrative of the rapid strides made in the study of organic chemistry during the last generation. It was beyond what the most sanguine chemists could have expected, especially when they recollected that it was only as recently as 1856 that Dr. Perkin patented the first aniline dye prepared by him from coal tar, viz., mauve aniline, or as it was then termed, *Perkin's* violet. From that time to the present there had been a rapid succession of newly discovered colours, each trying to outrival its predecessor. Either in England or Germany several new ones were discovered every month, and indeed if they only reviewed the past year they would see that the work was still as exciting as ever. So, out of the black dirty looking substance known as "coal tar," long regarded as a "waste product," could be produced colour to vie with the peacock's hue or the rainbow's tint. But after all, was it an advantage to the technical and practical dyer to have such a legion of products, in many instances giving a like result, but bearing a different name, composition, and price? Really the dyer must be as perplexed as the poor pharmacist, who was so constantly having such a multiplication of new remedies thrust upon him, each claiming to be a panacea for certain, if not all, the woes of the human race, that he discovered that even passing the Major examination did not exempt him from hard study in order to keep abreast of the times and conversant with the remedies of the age. Certainly from a chemical point of view these many discoveries of new colours were interesting, as they were all demonstrating that much might yet be done in synthesizing substances useful but expensive, and that the laboratory if not creative might be productive. These artificial dyes, however, were not yet brought to the perfection of the old natural dyes, although it was peculiar that the nearer they approached them in composition the greater were their brilliancy and permanence of colour; for example, alizarin, which was the artificial product of the dye of madder. Further, many of these aniline colours were poisonous, and being affected by perspiration were absorbed by the skin, producing irritating and unpleasant eruptions. Several years ago, Mr. Alexander Chance pointed out in a Birmingham daily paper that such cases had arisen among the working classes from the dyes in the material of which their shirts were made. Mr. Ellwood asked what class of dyes would produce this effect, or was it due to any special colours of the different classes. He further asked if any work had been done on the toxicological question of these dyes, and, if so, if there were any general rules whereby it might be easily ascertained if these dyes were injurious. Dr. Passmore had said that certain classes of colours needed mordants. Was it not a fact that all the aniline colours needed mordants, the nature of which depended partly upon the colour and partly upon the material to be dyed, especially with cotton goods? Mr. Ellwood also wished to ask if, in actual practice, a thickening medium, such as dextrin, soluble starch or gum, were used as a carrier of the dye, in the same manner as with natural dyes, or whether the ready solubility of the aniline colour would obviate this. It was very interesting chemically to note that the strongest dyes were generally those of the ortho derivatives, and that the different colours of the same class were invariably of the same derivative, either all ortho, all meta or all para, thus seeming to illustrate that to obtain a colour of any of the classes, the nucleus would only provide it if acted upon in the same position.

Mr. Helbing said that the chemistry of the aniline dyes was full of interest for the pharmacist, as especially in consequence of the advance of this part of chemistry, medicine had been enriched by a number of synthetical compounds, of which antipyrin and others might be mentioned as instances. Further, quite recently some of the aniline dyes themselves had been employed, such as methylene violets and blues, and the compounds used as antiseptic under the name pyoctanins. Aniline itself was also used in medicine, and of course the dyes found extensive application for microscopical preparations.

Mr. F. Ashley Rogers asked for information as to a perfect aniline black, one that was non-poisonous and unaffected by perspiration.

Mr. E. Richards asked Dr. Passmore to explain the difference in the shade of the "eosine" exhibited, which was totally different from the eosines of commerce; were the latter produced from mixtures of eosine and erythrosine? Further, the *soluble* aniline blue exhibited was in powder, but he had always seen this in the crystalline form, and should say the powder was that known as "Nicholson's Blue."

Mr. Seccombe remarked that one of the most wonderful and interesting of the different branches of study which a deeper knowledge of organic chemistry had opened out was that which related to the artificial production of dyes. Dr. Passmore had made an excellent hit when he decided to bring this subject before them, for it was one that he believed the average chemist knew very little about, and personally he was much indebted to him for the clear and able manner in which the subject had been treated. He had always understood that aniline as a base for the production of dyes depended upon the bye-products it contained, such as azobenzene, diamidobenzene, etc., and it was peculiar how these were affected by the manner of reduction of nitrobenzene to aniline by means of nascent hydrogen. He would like to ask Dr. Passmore if chloraniline was largely used commercially in the manufacture of colouring matters, as Poulain strongly recommended it for this purpose. He formed rosaniline by heating a mixture of chloraniline and chlorotoluidine, and various dye stuffs were produced by the withdrawal of the elements of hydrochloric acid from methylchloraniline and analogous substances. Mr. Ellwood had referred to the stability of the ortho isomerides, and Mr. Seccombe asked if orthotoluene had been definitely proved to exist in ordinary commercial aniline oil, such as in the sample handed round. Dr. Passmore had mentioned methyl- and dimethyl-aniline as bases from which various colours could be obtained by oxidation, and it was curious that notwithstanding the close connection between dyes got by oxidizing methylated anilines and those obtained by methylating rosaniline, *ethyl*-aniline did not yield by oxidation any noteworthy quantity of dyes such as those got by ethylating rosaniline.

In reply Dr. Passmore said that although much had been published on the subject of chlorophyll, little was yet known concerning its chemical constitution. Several varieties had been isolated giving different spectra, and iron had been found to be an essential constituent of green chlorophyll. His remarks concerning berberine appeared to have been misunderstood by the chairman, for he had not meant to suggest that synthetical berberine is employed commercially, but that the constitution of the natural alkaloid is known. With respect to the literature of the subject of dyes, Dr. Passmore said that the best text books are in the German language, and, as far as he knew, untranslated, illustrating the recent statement of an eminent chemist that one of the first acquirements of a chemical student should be a knowledge of German. In composing this essay at such short notice he had relied very much upon Nietski's book, but the system of nomenclature adopted was mainly that recently published by Möhlau. For information on the testing and recognition of dyes Julius's book was also much esteemed. The essayist expressed his surprise that Mr. Ellwood had questioned the wisdom of chemists in proceeding further with the synthesis of dyes; he thought Mr. Roger's questions had shown that some wants had still to be supplied. Apologizing for not further entering, on account of the late hour, into a detailed discussion of the remarks addressed to him, Dr. Passmore then closed with a brief *résumé* of the pharmacology of the dyes, since several questions had been asked as to their poisonous properties. The most systematic investigation that had come under the speaker's notice, was a research by Dr. Weyl in 1889, who, for the purpose of comparison, had classed the dyes examined into three groups, the nitroso, nitro, and azo bodies. Of the nitroso bodies Dr. Weyl found that dinitrosoresorcinol (*Resorcin green*) and *Naphthol green* produce no injurious effects when partaken of in even fairly large doses by dogs, but that 0·2 gram per kilogram weight is sufficient to cause death within twenty-four hours when injected subcutaneously. Picric acid and *Martius yellow*, in the nitro group, both possess toxic properties, but the sulphonic acids, like *Naphthol yellow*, are inoffensive. Of twenty-three azo dyes examined Dr. Weyl found the majority to be harmless, though the *Acid yellow* produced death when administered to dogs in doses of 0·5 gram per kilogram weight. Also *Orange II*, from β-naphthol, was found to be toxic, although the corresponding *Orange I*, from α-napthol, proved innocuous. *Bismarck brown* was also mentioned as inducing vomiting, *Chrysamine* as causing diarrhœa, and many others slight albuminuria. The alleged production of abscesses by *Azo blue* and other cotton dyes was thought probably to be due to micro-organisms, but much difficulty was experienced in subcutaneous experiments owing to the slow absorption of the dyes by the cellular tissues.

THE WESTERN CHEMISTS' ASSOCIATION (OF LONDON).

A meeting of the Western Chemists' Association (of London) was held at the Westbourne Restaurant on Wednesday evening, the 17th inst., the Vice-President, Mr. R. H. Parker, in the chair.

The rules of the Association were read and confirmed.

Several matters of considerable trade interest were discussed, upon some of which the Honorary Secretary was directed to take action.

Mr. Hyslop read some practical and instructive notes upon the ointments of the Pharmacopœia.

A FEW NOTES ON THE OINTMENTS OF THE PHARMACOPŒIA.

BY J. C. HYSLOP.

"Quot homines, tot sententiæ." What an abundance of things we meet with in the practice of pharmacy—things not dreamed of in common philosophy—that makes this ancient, inveterate phrase of special application to us, its devotees! And when we reflect that alongside this bold claim that we fearlessly cherish for freedom of thought and independence of judgment, there runs parallel a constant reminder that the reign of law can never be ignored with impunity; that in all our processes, rule, system, order must be maintained or we have to smart for it in proportion to the vigour with which we kick against the pricks; no wonder that of those who assay to follow pharmacy whithersoever she leads so many cry out so soon, "carry me out of the battle for I am wounded," whilst those who peg away and fight their way become the "characters" they do. It is from a deep-seated conviction that as the pharmaceutic art becomes better defined, cleared still more of chronic obstacles to its progress, and by a full assertion of its native dignity, throws off the mean disguise that foes are ever loading it with, there will go on a still further differentiation of labour amongst its professors; that eventually pill-building, ointment making, tincture extraction, etc., will each be relegated to distinct groups of men, men with identic educational qualifications morally, socially, intellectually;—it is with this conviction I accept the honour that devolves upon me now of asking your attention to a few practical considerations on a branch of our business that has always been a favourite one with me, that has always paid me well to cultivate, and that is, I think, sure to demand in the future more attention from each individual pharmacist than has been accorded it up to now.

The "ointment" has held a high position amongst medicaments from the earliest antiquity. "An ointment compounded after the art of the apothecary pure and holy." The compound and compounder alike received due recognition, respect and honour; so it ever will be where purity and worth are first considerations.

One great advantage in dealing with the ointment is that its goodness or badness is apparent to the dispenser and the patient alike. Everyone knows that if an ointment is lumpy or granular or rancid or not of the same colour throughout it is not good. Where these defects exist they force themselves into notice. It is not so with a pill. People are hoodwinked to any extent with respect to the pill as long as it is not too soft nor too large. No matter who prescribes it, who makes it, or what it is made of, down it goes without a question; and in this age of quackery one cannot very easily convert his zeal for good pill-making into the needful £ *s.* *d.*, but he can as to good ointment making. Often during the last twenty years has the sale of a penny box of ointment procured for me a good customer, and as science knows no secrets and gives the merit where it is due *voila tout.*

No. 1. *Boric Acid Ointment.*—One of the most satisfactory of the lot. The boric acid is easily obtainable in a state of purity, is very low in price, and if one selects the soft paraffin of good vaseline-like quality, *i.e.*, devoid of all glutinous nature, and proceeds according to directions, the result becomes eminently successful. An ointment that is really good for almost anything, is very cheaply prepared, and pleases everybody.

No. 2. *Carbolic Acid Ointment.*—This must be prepared with "absolute phenol" if you want a really good ointment. The article sold as pure carbolic acid I find invariably contains some dirty defilement or another, small in quantity, but enough to spoil a batch of ointment very quickly. Melt the paraffins together, remove from the water bath, stir in the phenol, and keep stirring till cold.

No. 3. *Salicylic Ointment.*—I have not yet prepared this one and so I have nothing to say about it.

No. 4 to No. 8. Aconitine, Tartarated Antimony, Atropine, Belladonna and Calamine Ointments.—These must be freshly prepared, or closely watched to see they are in good condition. After the lapse of a week or so, dependent mainly on the temperature of the locality they are kept in, they begin to smell nasty in spite of being prepared with good benzoated lard, and why shouldn't they? Cremate them at once is then the proper thing to do with them.

A word as to benzoated lard. I presume the *raison d'être* of this article is that one may always have at hand a supply of wholesome lard to use for the preparation of his ointments when required, and this purpose is served to perfection, but I have often found that the benzoation tends itself to bring about a change in the compounded ointments. Taken altogether benzoated lard is a great blessing. But do not be deceived, you cannot prepare this article for yourselves—not to perfection, I mean. More than thirty years ago I recollect that Mr. Septimus Piesse, in his work, 'The Art of Perfumery,' spoke of there being in London but one house whence we could get at all times purified lard, suet and marrow, fresh and good, and to the best of my knowledge and belief that state of things still exists. At Messrs. Ewen and Sons, Hatfield St., Blackfriars, can be procured this desirable article whenever required and nowhere else. To follow out the directions for preparing adeps præp. given in the B.P. you must have elaborate machinery, give to it your whole attention, and employ skilled industry on a large scale, and without good and fresh pure adeps præp. you cannot get an adeps benzoatus that is worth the name.

No. 9, *Ung. Cantharides*, contains wax and ought to be called, as of old, "ceratum," on that account.

No. 10, *Ung. Cetacei*, is enough to make one cry, when we think of the beautiful article we used to make in days of yore, the *Ceratum cetacei* of those times so deservedly popular, now replaced by this fancy, soft, messy stuff that pleases nobody and takes two or three hours to make. *O tempora! O mores!* say we.

The twelve next in order I may be allowed to pass over as presenting no point of special interest that I know of.

No. 23, *Nitrate of Mercury Ointment*, is one of the best. At last we have a formula for this which is absolutely perfect, but our lard and our olive oil must be B.P.

The 24th, *Red Oxide of Mercury Ointment*, is an abomination. I have not yet seen a good sample prepared by this process; I always make mine according to B.P., 1867: ¼th good English wax—yellow wax of course—¾ths almond oil. One may prepare pounds of it in an hour; and if one manipulate with clean vulcanite or horn spatulas, well pulverizes the oxide, stirs it in just as the basis begins to thicken, and stores the product in a cool place, near the shop floor anywhere, almost, it will keep good for years if required.

We skip another ten and arrive at No. 35, *Ung. Resinæ*; this, I beg to submit, is not "yellow basilicon," though it is usually regarded as such. It is a very good ointment; but it would approach more to the traditional "basilicon" were the resin replaced, as it is in some of the continental pharmacopœias, by Burgundy pitch, which gives a nicer colour and does not vary its tints by age so readily.

36, *Ung. Simplex*, ought, I think, to have a little bit of spermaceti in it, and then the ancient name and graces of "spermaceti ointment," *sive* "simple dressing," would be revived in this article, and the present *Ung. Cetacei* being abolished, its popularity would come back with speed.

42. Lastly we come to *Zinc Ointment*. Who knows what this ought to be? We are told to use oxide of zinc, but upon turning to the article zinc oxidum, one is coolly told what he knew before, that being made from the carbonate of zinc by combustion zinc oxide is nearly white—rather yellow would be better—and that being made from metallic zinc by combustion it is white, but as to which is to be used in making the ointment, this is not stated. As a matter of fact, neither is used, that prepared by precipitation being usually employed. No doubt the yellowish variety makes the better ointment, but until people become educated to the fact we must go on supplying the white zinc ointment in peace. And now, sir, I beg in conclusion to suggest the insertion of two other ointments.

No. 8a, *Ung. Camphoræ*. This is contained in no fewer than nine continental pharmacopœias. The formula I use is from the Russian: wax 1, camphor 2, lard 6. This is a really beautiful ointment and sells well under its proper name. It is also handy in very populous localities where people are worrying you for a pennyworth of annequentum—or anguentum—corruption, as we know, for unguentum. A white article that smells of camphor will satisfy their wishes at all times and save a deal of trouble.

Then last, but not least, there is a dear old friend that ought never to have been expunged, that continues by an ever increasing popular demand to cry out for vengeance on us until it be readmitted. "Ceratum" or—*sive*, if you like—Unguentum Galeni. No. 14a, "Cold cream": Wax 1oz., spermaceti 1oz., oil of almonds 8oz., fresh distilled water 4oz., otto of rose ten drops, M.S.A.

In thanking you, sir, and the gentlemen present for your kind attention to these desultory "notes," allow me to add that the idea of asking your kind indulgence arose from noting the success which has now for about twelve years attended the meetings of the Chemists' Assistants' Association. Short papers on important matters, chiefly theoretical, as becomes those who have the world "all before them," whose first object it is to know how to judge what may be the soundest theories on which to base a long course of practical usefulness, are periodically read and discussed by that Association with great profit to its members; topics relating chiefly to chemistry and botany, the two main pillars of pharmaceutic art. And I thought to myself if we, with the world so much behind us, steeped each day in practical work, can but now and then confer together on our varied *modus operandi* that we find, or think we find, to be the best under the circumstances, it may tend materially to bring about the desired ends for which our own Association is formed, and help forward the day when the practical pharmacist, being allowed his own proper share of influence in the compilation of the national Pharmacopœia, we shall be able, all of us, to steer on with perfect ease where at present the light is but fickle and uncertain.

A very interesting and useful discussion followed, in which Messrs. Parker, Long, Mathews and others took part. A case was mentioned in which very unpleasant effects had resulted from the use of ung. hydrarg. nitratis, made, by direction of the physician, with vaseline instead of lard and oil, as directed in the Pharmacopœia.

The business of the evening terminated with a most cordial vote of thanks to Mr. Hyslop, but the members remained in friendly conversation for some considerable time.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the forty-first session was held at the Royal Institution on Thursday evening, December 11, the President, Mr. C. Symes, Ph.D., in the chair.

The minutes of the previous meeting were read and confirmed, and the donations announced.

Messrs. R. Davies, Jno. Smith, Jas. Conroy and F. Mercer were unanimously elected members of the Association.

The President drew the attention of the members to the announcement that the "Additions to the Pharmacopœia" would be published in a few days, and suggested that some one should make them the subject of a communication to the Association at an early date.

The question of meeting at an earlier hour was now considered, and from the discussion it was evident that 7 o'clock would be preferred to the present hour (8 p.m.) by the majority.

The President explained that no decisive action could be taken at that meeting; the object in discussing the question then was simply to ascertain the feeling of the members generally. But he had no doubt the Council would now take the matter in hand, and it would probably be brought forward at the annual meeting.

The President now called upon Mr. M. Conroy to read a—

NOTE ON CITRATE OF MAGNESIA.

BY M. CONROY, F.C.S.

In a report recently issued for the quarter ending September 30, 1890, Dr. Carter Bell, the public analyst for the county of Chester, states that during the quarter he had analysed thirty-one samples of various substances, three of which were adulterated, one being citrate of magnesia. This, Dr. Bell states, "was adulterated with sugar and carbonate of soda." The article here referred to is undoubtedly the popular granular effervescent preparation known to the public by the conventional name of citrate of magnesia, under which name it has been known for over thirty years. The composition of this article is no secret, but in the face of the report just issued by the public analyst of so important a division as the county of Chester, I have thought it worth while to again make public its composition. It consists of a mixture in certain proportions of bicarbonate of soda, tartaric acid, citric acid, sulphate of magnesium and sugar. These articles in fine powder are thoroughly mixed, heated gently, and passed through suitable sieves with the object of forming granules. I may here mention that it cannot be made in a granular form, the only form in which it is sold, without the use of tartaric acid, and it is rather singular that Dr. Carter Bell should have missed this, which forms one of the chief ingredients.

The article prepared as described possesses mild aperient properties, hundreds of tons being made and sold annually in this country, where it is known as one of the most popular household medicines of the present day. It is the *only* article met with in ordinary trade as "citrate of magnesia," and it is therefore extremely absurd for a public analyst, who should know better, to report carbonate of soda and sugar as adulterants, when they are in reality constituents of the preparation.

I do not wish to defend the name "citrate of magnesia," which was given to this article some thirty years ago or more, when it was first introduced. To my mind, the name was an unfortunate one, and only imperfectly descriptive, notwithstanding the fact that it contains both citric acid and magnesium sulphate. The pharmacists of the present day, however, are not responsible for it, and the public demand the article under its old popular name. A true citrate of magnesia could be made, but it would be totally different, both in appearance and in properties, from the popular article, and the public do not want it and would not have it if offered. It is, in fact, an article for which there is no demand whatever. Another point that presents itself is that no prosecution under the Sale of Food and Drugs Act, so far as I can find, has taken place in reference to this case, and I submit that reports of this kind should not be accepted by the authorities to whom they are submitted unless they have been proved in court. It is now over fifteen years since, through an excess of zeal on the part of another public analyst, a similar case was tried at the Greenock Police court on October 16, 1875, before Bailie Paton, and I cannot do better than quote the judgment given in that case for the benefit of Dr. Carter Bell and others whom it might concern. Bailie Paton said:—"I must say that this is a most important case, affecting the whole drug trade. I acknowledge the ability of the agents in mastering technical subject and also the great scientific research of the professional witnesses examined to-day. The question is simply this. Was the citrate of magnesia adulterated? Taking the evidence as my guide I must say the proof fails to substantiate the charge against Mr. Kerr. Drs. Whiteford and Robertson have stated that if they prescribe citrate of magnesia, the article sold by Mr. Kerr is what they wish, and not the article known as pure citrate of magnesia. Although the professional gentlemen differed to some extent, they substantially agree that the medicine before the court, while not pure citrate of magnesia, is the article of commerce known by that name. The term does not appear in the Pharmacopœia. I think the dispenser of drugs is quite entitled to sell the article known in the trade as citrate of magnesia when it is made up in the recognized way and acknowledged by the medical faculty. I must therefore find Mr. Kerr not guilty of the alleged adulteration."

A short discussion ensued, in which Messrs. R. Parkinson, J. Barratt, E. Evans, A. C. Abraham, J. S. Ward and the President took part, and a vote of thanks, proposed by Mr. A. C. Abraham, and seconded by Mr. J. S. Ward, was accorded to Mr. Conroy for his paper.

The next paper read was on—

THIOPHENE AND ITS MODE OF PREPARATION.

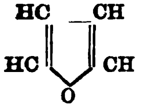
BY JAMES T. CONROY, B.SC.

Between the fatty and aromatic groups of carbon compounds there existed until recently a wide gap. Fatty compounds are, as a rule, built up in the form of open carbon chains, while the aromatic bodies contain at least one benzene nucleus in which we have six carbon atoms forming a closed ring. This difference in the constitution of the two classes causes them to act very differently towards one and the same reagent.

Recent research has, however, produced bodies intermediate between these two classes, bodies containing closed rings of less than six carbon atoms, and also a group of three closely related compounds containing a chain of four carbon atoms, bound to the ring form by an atom of either oxygen, nitrogen or sulphur.

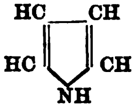
These three substances are furfuran, pyrrol and thiophene, and their relationship is exhibited by the following structural formulæ:—

Furfuran.



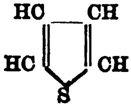
C_4H_4O

Pyrrol.



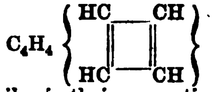
C_4H_4NH

Thiophene.



C_4H_4S.

All three are closely related to the hypothetical tetrol—



and are very similar in their properties to benzene. Of special interest is the fact that all three can be prepared from mucic acid $C_4H_4(OH)_4(COOH)_2$, and their dimethyl derivatives from acetonyl acetone—

$$CH_3COCH_2\cdot CH_2COCH_3,$$

by very simple reactions. We will now consider thiophene itself.

A former test for benzene was the production of a deep blue colour by adding to the benzene a few drops of a solution of isatin dissolved in concentrated sulphuric acid.

In 1883 Professor Victor Meyer tried this test with some benzene which he had prepared from benzoic acid and failed to obtain the colour, whilst the reaction in all cases took place with coal tar benzene.

From this he concluded that the colour was due either to a minute impurity in coal-tar benzene or to an impurity in the benzoic acid benzene, which prevented the reaction, or finally to the presence of two modifications of benzene in coal-tar, and on investigation he found the first supposition to be correct.

The impurity, which he calls thiophene, occurs to the extent of about 0·5 per cent. in all coal-tar benzene.

He now set to work to isolate the thiophene, and found that he could do so by agitating ordinary coal-tar benzene with one-tenth part concentrated sulphuric acid till the residual benzene no longer gave the colour with isatin. All the thiophene and some of the benzene have now been converted to the sulphonic acids. From the mixture of the acids we obtain the thiophene and benzene by saturating the aqueous solution with lead carbonate and distilling the dry lead salt with ammonium chloride, or, more simply, by distilling the sulphonic acids with steam.

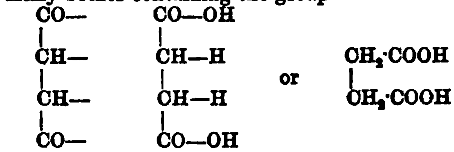
The product, which contains about 80 per cent. of thiophene, is again agitated with concentrated sulphuric acid and treated as above, until finally we have practically pure thiophene.

On trying to synthesize the new body Victor Meyer and Sandmeyer found that it was produced in small amount by passing ethylene, C_2H_4, or acetylene, C_2H_2, through boiling sulphur, and also by passing ethylene or coal gas over heated pyrites.

It is further produced by passing ethyl sulphide through a red hot tube:—

$$\begin{matrix}CH_3\cdot CH_2\\CH_3\cdot CH_2\end{matrix}\!\!>S = C_4H_4S + 3H_2$$

Many bodies containing the group—



$$\begin{array}{l} CO—\\ |\\ CH—\\ |\\ CH—\\ |\\ CO— \end{array}\qquad \begin{array}{l} CO—OH\\ |\\ CH—H\\ |\\ CH—H\\ |\\ CO—OH \end{array}\qquad \text{or}\qquad \begin{array}{l} CH_2\cdot COOH\\ |\\ CH_2\cdot COOH \end{array}$$

Succinic acid.

yield thiophene on distillation with one of the sulphides of phosphorus, and in 1884 Erdmann and Volhardt synthesized thiophene by distilling succinic anhydride with phosphorus pentasulphide (P_2S_5) and also by the distillation of sodium succinate with the trisulphide (P_2S_3), obtaining by this last method nearly 50 per cent. of the theoretical yield. Friedburg, in April number for this year of the *Journal of the American Chemical Society*, has described this last method in detail, and it is the one which I have employed to produce the specimen before you.

Sodium Succinate.—Succinic acid is more easily obtainable than its salts, and we therefore use it as the starting point. Four hundred and fifty grams succinic acid are dissolved in 1 litre of boiling water and the solution is gradually and carefully neutralized with dry sodium carbonate. On cooling, about 800 grams of well formed colourless crystals of sodium succinate separate, and these are drained at the pump. On concentrating the mother liquid a further crop of crystals separates. The salt is placed in a large porcelain basin and dried, first in the steam oven and then at 110°C. until the whole of the six molecules of water of crystallization is expelled. The crystals, which are now quite white, are powdered finely and put in a well stoppered bottle. The powdering is best done in the fume chamber, since the salt spreads a very irritating dust.

Phosphorus trisulphide, P_2S_3.—Sixty-two parts amorphous phosphorus and ninety-six parts flowers of sulphur, the proportions necessary for the above formula, are intimately mixed, care being taken to crush all lumps, and then fused.

The fusion is done in a porcelain crucible (2 inches deep, 3½ inches upper, and 1½ inches lower diameter) and is carried out under the hood. A little of the mixture is put in the crucible, which is then heated over a small free flame. In a few minutes a flame becomes visible through the walls of the crucible and a slight explosion is heard; the flame is now removed. Combination has taken place between the phosphorus and sulphur, and when no spontaneous combustion occurs on removing the lid of the crucible, more of the mixture is added, and this is carried on till the crucible is nearly full of the gently flowing liquid trisulphide.

When cool the mass is removed by tapping the crucible, and the dark grayish-yellow cone of P_2S_3 is broken into large pieces and put in a well stoppered bottle.

The loss of material on burning only amounts to from 6–8 per cent.

Thiophene.—The distillation is carried on in a large retort (2 litres in capacity and higher than broad) connected with a good Liebig condenser. One hundred and fifty-five grams of the sodium succinate are weighed and carefully mixed with 310 grams well crushed trisulphide; the trisulphide is more easily powdered by the addition of a little dry succinate powder.

The mixture, which nearly half fills the retort, is heated uniformly by the flame from a broad round burner, the retort resting free in a ring.

The mass swells and soon becomes dark brown in parts, when the flame may be removed. Much sulphuretted hydrogen is given off and a liquid collects in the receiver, small amounts of a yellow solid being also deposited.

Heat is renewed when the reaction slows and is continued till the distillate comes over very slowly.

This process is repeated several times (3 or 4) with fresh quantities of material.

The liquid distillate is redistilled, giving an easy flowing almost colourless oil, which still contains some sulphuretted hydrogen. The thiopene is now washed with dilute caustic soda solution (which turns brown) twice and then several times with water. It is then run from the separating funnel into a dried flask and completely freed from moisture and SH_2 by thin strips of metallic sodium. The thiophene is then distilled from off the sodium, which has become golden brown in colour, on a water bath, yielding by this means a perfectly pure product.

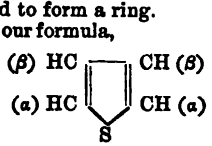
The yield amounts to nearly 50 per cent. of the theoretical when the liquid from 4 or 5 distillations of succinate and sulphide is used, but such a high percentage is not obtained when smaller quantities are employed.

The black residue in the retort breaks up on the addition of water and evolves much sulphuretted hydrogen, it seems to contain phosphorus and phosphites, or both.

Properties of Thiophene.—Thiophene is, as you see, a colourless and very refractive liquid, possessing only a very faint odour. It has a specific gravity of 1·062 at 23° C., boils at 84° C. (benzene boils at 80°·4), and remains liquid at a low temperature.

It behaves very like benzene in most of its reactions, and from this we conclude that, as in benzene, the atoms are united to form a ring.

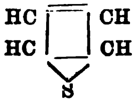
According to our formula,



we see that two mono-substitution products are possible; in one the substituting atom or group replaces a hydrogen in the α position, and in the other we have the hydrogen atom at β replaced. The monosulphonic acids have been thoroughly examined and only two are found to exist, a supposed third form on investigation being proved to be a mixture of the α and β acids.

α-thiophene-sulphonic acid, $C_4H_3S{\cdot}SO_2OH$, yields a liquid acid chloride, $C_4H_3S{\cdot}SO_2Cl$; while β-thiophene-sulphonic acid yields a solid crystalline chloride. Further, α-thiophene-sulphonic acid yields a sulphamide, $C_4H_3S{\cdot}SO_2NH_2$, melting at 142°, while β-thiophene sulphonic acid yields a sulphamide, $C_4H_3S{\cdot}SO_2NH_2$, melting at 148°.

From the molecular refraction value C. Knops has recently proposed the formula



But the true manner of linkage cannot be settled by physical data, and I think it is better to retain the formula previously given. The homologues of thiophene are obtained by replacing the hydrogen atoms by alkyls, exactly as with benzene, *e.g.*, $C_4H_3{\cdot}CH_3{\cdot}S$, thiotolene, and $C_6H_5CH_3$ toluene; and in fact all the derivatives are very similar to the corresponding benzene derivatives, but differ in giving the indophenin reaction.

Thiophene yields halogen substitution products and nitro derivatives as benzene does, but the action of nitric acid on thiophene is much more violent than on benzene, complete oxidation occurring in the case of thiophene.

The nitro group can, however, be introduced if a negative group is already present in the molecule, or the nitro-compound can be formed directly by passing air saturated with thiophene vapour through fuming nitric acid, the liquid separating into two layers on standing, when the nitrothiophene can be removed.

Nitrobenzene is readily reduced to aniline, whilst nitrothiophene only yields the amido compound if special precautions are taken. Thiophene gives sulphonic acids, nitriles and carboxylic acids, just as benzene does, and on passing through a red hot tube just as benzene yields diphenyl, so does thiophene give dithienyl.

Diphenyl.

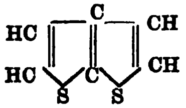
$$\begin{array}{c} C_6H_5 \\ | \\ C_6H_5 \end{array}$$

Dithienyl.

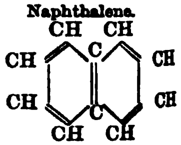
$$\begin{array}{c} C_4H_3S \\ | \\ C_4H_3S \end{array}$$

On theoretical grounds we should expect the body $C_6H_4S_2$ analogous to naphthalene $C_{10}H_8$. Such a body has been obtained in small quantity and has been called thiopten.

Thiopten.



Naphthalene.



Thiophene yields condensation products with chloral and acetal which very closely resemble those formed by benzene with these substances, and it also undergoes Friedel and Craft's reaction, forming the ketone $C_4H_3S{\cdot}CO{\cdot}C_6H_5$ from benzene, and the acid chloride in presence $AlCl_3$. L. E. Levi has described a colour which he calls thiophene green, perfectly analogous to malachite green, both in its method of formation and in its constitution.

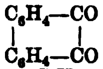
The leuco base of malachite green (victoria green) is obtained by heating benzaldehyde ($C_6H_5{\cdot}COH$) with dimethylaniline and zinc chloride. The leuco base of thiophene green is obtained in a similar way by substituting thiophenaldehyde for benzaldehyde. On oxidation with MnO_2 and dilute sulphuric acid the leuco base yields the colour basis, and this forms the colour by uniting with acid or salts.

Leuco base of malachite green.	Leuco base of thiophene gre
$C_6H_5CH[C_6H_4N(CH_3)_2]_2$	$C_4H_3S{\cdot}CH[C_6H_4N(CH$
Tetramethyl-diamido-triphenyl-methane.	Tetramethyl-diamido-di thienyl-methane.

The zinc double salt, $3(C_{21}H_{22}N_2S)ZnCl_2 + 2H$ crystallizes in scales and is well adapted for stai microscopical sections, especially as a compliment colour to carmine.

As regards the reactions of thiophene mention has already been made of the colour with isatin, the so-called indophenin reaction. The colour is due to the formation of indophenin $C_{12}H_7NOS$, and it was only after the discovery of thiophene that indophenin was found to contain sulphur, this element having been previously overlooked by Baeyer. A second reaction is with Liebermann's reagent (a 5 per cent. solution of sodium nitrite in concentrated H_2SO_4) which gives with thiophene a bluish green mass and a blue coloration with coal-tar benzene.

Bluish green colours are given by the action of thiophene on diketones, bodies containing the group —CO—CO—, as, for example, in Laubenheimer's reaction, the colour is produced by mixing thiophene, strong sulphonic acid, and a chloroform solution of phenanthraquinone—



$$\begin{array}{l} C_6H_4\text{—}CO \\ \;\;|\qquad\;\; | \\ C_6H_4\text{—}CO \end{array}$$

Benzil, or benzophenone, C_6H_5—CO—CO—C_6H_5, gives a similar colour.

In conclusion I think that the specimen of a comparatively rare and very interesting body, coupled with the recent publication in detail of its method of preparation, are sufficient reasons for my bringing this notice before you to-night.

The President, in opening the discussion, said the paper was an excellent one, upon which Mr. Conroy, Junr., must be congratulated. It was his first paper, and he (the President) was sure the Association was deeply indebted to him for the amount of original information it conveyed.

The discussion was continued by Messrs. R. Parkinson, E. Davies, A. C. Abraham and J. S. Ward, and a vote of thanks, proposed by Mr. Parkinson, and seconded by Mr. Davies, was carried with acclamation.

Mr. Conroy thanked the meeting for the manner in which the paper had been received, and replied to the remarks made in the discussion.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The first students' night of the present session was eld on Wednesday, December 10. The President, Mr. J. H. Bradwall, occupied the chair. There was a good attendance of students. The minutes of he last meeting having been read and confirmed, five ew members and twelve associates were elected. The ollowing papers were read:—"Notes on Plant Loca-ity," Mr. J. Austen; "Electricity and Its Uses," Mr. E. F. Peet; "Poisons and Their Antidotes," Mr. E. F. W. horp. After the reading of the papers a short dis-ssion followed, in which the President and Messrs. T. W. Newsholme, G. A. Grierson, C. H. Twelves nd Q. Dixon took part. A vote of thanks to the ssayists terminated the meeting.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eleventh meeting of the second session of this ssociation was held in the rooms, 74, Commercial reet, Dundee, on Thursday evening last, December , when a paper was read on "Insectivorous Plants," William Mair, which was illustrated by numerous ecimens, including *Nepenthes phyllamphora, Sarra-nia purpurea* and other "Pitcher Plants;" *Drosera tundifolia* (Sundew); *Dionæa muscipula* (Venus' Fly ap), and others specially obtained from the Botanic rdens, Edinburgh, through the courtesy of the cura-r, Mr. Lindsay. The paper was also illustrated by eans of diagrams, drawings and dried specimens. e subject was treated in a popular and interesting yle, and although not intimately associated with the requirements of pharmaceutical students, it was commended as a recreative study of the most fascinating description, and an excellent introduction to the intelligent study of botany. The curious adaptations of the various carnivorous plants in capturing insects and subsequently assimilating them by a process of actual digestion, and in one or two cases by the absorption of decomposition products was fully described. A historical sketch was given from 1768, when Linnæus could not believe that the plants benefited by their carnivorous diet, but that the capture of the insects was merely an accidental circumstance. Darwin's elaborate experiments with *Drosera rotundifolia* were recapitulated; the extraordinary sensitiveness of the tentacles to minute particles, and to extremely homœopathic doses of nitrogenous substances was particularly interesting. It had recently been stated (*Pharm. Journ.*, Aug. 30, 1890) that the nepenthes were not carnivorous, but that decomposition took place within the pitcher, rather than actual digestion, due to the activity of micro-organisms from outside, and not to a secretion of the plant. In the case of the droseras and others actual digestion had been proved beyond all question, and it was quite as possible as that grass should become beef. The paper was listened to by an attentive and appreciative audience, and at the close Mr. Mair was awarded a hearty vote of thanks.

Mr. J. W. Russell complimented the author on the successful nature of the paper, followed by Messrs. Smith, Lindsay, Little, Macdonald, Forsyth and Kinnear.

Mr. Mair then drew attention to some specimens he had placed on the table, including specimens of ortho-, meta- and para-cresotic acids which he had received through the kindness of Mr. H. Helbing, F.C.S., London, and a parcel of materia medica specimens from Messrs. Raimes, Clark and Co., Edinburgh.

Mr. James Petrie, A.P.S., who has been recently appointed to a position in Edinburgh, was, on the motion of Mr. W. Mair, seconded by Mr. Lindsay, secretary, unanimously elected an honorary member in recognition of valuable services rendered to the Association.

Review.

A Text-Book of Organic Chemistry. By Dr. A. Bernthsen. Translated by George M'Gowan, Ph.D.*

In its German original this book has long been known and valued by students of organic chemistry. An English translation is very welcome. It may perhaps be said that we have already a sufficient number of English text-books on this subject. This is true, but at the same time it must be admitted that none of them is wholly satisfactory from the standpoint of the elementary student who, without being encumbered with a mass of detail, wishes to obtain an accurate and comprehensive idea of the subject. We are quite familiar with the "extract," frequently inaccurate, always unreadable, which appears in some text-books not unknown to the pharmaceutical student, whose authors are obviously unacquainted with and therefore unsympathetic with the subject. Such books entirely fail to communicate to the student that interest and enthusiasm which organic chemistry never fails to kindle in those who have learnt it from a master hand. Then we know the compilation of the narrow specialist, who overcrowds his book with facts to such an extent that the beginner is lost in the maze. Finally we have the treatise, the more or less exhaustive account of the subject, most useful for reference, but quite unsuitable for the beginner. With the exception of a well-known German text-book, a translation of which appeared some years ago, there has been no book which could be profitably read by the student who wished to travel beyond the limits of Professor Remsen's admirable introduction to the subject. This translation contained, however, a great deal which, while it made the volume serviceable as a book of reference, rendered it somewhat formidable to the elementary student. Dr. Bernthsen's book fills this gap, and we strongly recommend it to those who wish to possess an exact and comprehensive knowledge of the outlines of the subject. Its author is a perfect master of the science and a well-known explorer in its unknown domains. Formerly Professor in the University of Heidelberg and now Director of the Scientific Department of the Baden Aniline and Alkali Factory, he is alive at once to the scientific aspects and the technical applications of the subject.

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* London: Blackie and Son. Pp. 1-544.

The introduction contains short accounts of the qualitative and quantitative analysis of organic compounds, determination of molecular weights, rational formulæ and a useful summary of the physical properties of organic compounds. The book is divided in the usual fashion into two departments, one relating to the paraffinoid compounds, considered as derivatives of methane, and the other with the aromatic or benzenoid compounds, considered as derivatives of benzene. References are given to original papers, so that the processes and reactions described may be actually conducted in the laboratory after the details have been ascertained. By this means Dr. Bernthsen has been enabled to include in his treatment nearly all the known varieties of carbon compounds, without overloading his book with facts.

The book contains a few curious mistakes which are also to be found in the German edition. One or two of these are of sufficient importance to draw attention to here. In describing (on p. 11) the various methods of determining the specific gravity of gases and vapours, the following much too condensed account is given of Dumas' method: "10 to 20 grams of the substance are heated to boiling in a round glass balloon with a narrow neck, immersed, *e.g.*, in an oil bath. After the temperature has remained constant for a considerable time the point of the neck is closed by the blowpipe, and the balloon weighed; *it is then opened over mercury and weighed again.*" The italics are ours. The balloon usually has a capacity of about a quarter of a litre, and its weight when full of mercury would be between three and four thousand grams, a quantity with which no chemical balance could possibly deal, even if the unfortunate student had contrived to safely carry to it the thin flask containing this enormous weight of mercury. These directions call to mind a method, recommended in a manual of applied chemistry, for ascertaining whether a litre flask has been properly calibrated, the operator being directed to carefully fill it to the mark on the neck with mercury and then to ascertain its weight. It is stated on p. 280 that xanthine and hypoxanthine may be obtained by the action of sodium amalgam on uric acid. The truth of this assertion of Strecker has long since been disproved by Emil Fischer.

With respect to the translation of Dr. M'Gowan it can only be called indifferent, for little regard has been paid either to English grammar or consistent nomenclature. Some sentences are worth quoting. "The melting point of a mixture of two substances alters with its composition in this way, that, with a definite composition, a minimum of melting point is attained, which lies below that of the lower melting constituent" (p. 29). "Aqueous alcohol can be deprived of the greater part of its water by the addition of strongly heated carbonate of potash" (p. 81). "The aldehydes combine with ammonia to aldehyde-ammonias" (p. 132). This form of sentence, in which the second verb is omitted, occurs throughout the book. "Tertiary alcohol combine with baryta and lime to alcoholates at 130" (p. 78), and many other similar instances might be quoted. Active amyl alcohol is called "methyl-ethyl-carbinol" (p. 86), a name which strictly belongs to one of the butyl alcohols. It is to be regretted that the nomenclature has not been brought into conformity with the suggestions of the Chemical Society, which may be found appended to the last volume of their Journal. Uniformity in this matter is essential, at any rate in elementary text-books. It is bewildering to the student to find a different system of names in each text-book he consults.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PHARMACEUTICAL EDUCATION IN IRELAND.

Sir,—It is to be regretted that when Mr. Evans saw fit to introduce my name into his letter in your last issue that he did not restrict himself to absolutely accurate facts. As for the correspondence published in the *Chemist and Druggist*, May 17, 1890, it can speak for itself, and does not require Mr. Evans to misrepresent it.

Mr. Evans states that owing to the failure to secure a quorum in January last a resolution could not have been submitted to the Privy Council. I will ask him, Is not that excuse for not applying to the Privy Council quite out of harmony with fact? Seeing that in December, at a *special* meeting (*vide* letter of Registrar, Pharmaceutical Society of Ireland, in correspondence above referred to), which I had so much trouble to obtain a report of, the Council passed a resolution to establish an evening class, why was not the resolution then sent to the Privy Council? and what reason was there to await a meeting in January? And, as to that, can an agenda be produced now for the abortive January meeting, which contains a resolution affecting the establishment of a school? Was not the December resolution sufficient?

I still hold that the School should be conducted on independent lines, after the model of that at Bloomsbury Square, and that the examination room, chemical benches, etc., should not be used for school purposes. I am, however, glad to see any little improvement in the way of properly constituting and regulating the school as now accepted by the Privy Council. I quite feel that no action would have been taken in that direction by the present Council had not attention been directed to the matter originally by me. WILLIAM N. ALLEN.

A CORRECTION.

Sir,—Allow me, as a personal matter, to correct two slight errors in your otherwise fair notice of the 'Additions' to the British Pharmacopœia, 1885, on p. 540.

1. *Unguentum Hamamelidis* is identical with that in the last edition of the 'Extra Pharmacopœia.' Prepared with the tincture (originally a homœopathic formula), it was, I was told, absurdly weak. When, therefore, the liquid extract was inserted into the B.P.C. Formulary, I substituted this for the tincture in preparing the ointment.

(2) The modification of keeping Fehling's test in two solutions, requiring equal volumes of each to be used when required, thus preventing its being hypersensitive, was originally suggested by me, yet the formula adopted differs from what I publish in directing the use of Rochelle salt in place of neutral tartrate of potassium.

I infer from the first edition of Watts' 'Dictionary,' vol. ii., p. 865, that Fehling originally used tartrate of potassium only, and that Rochelle salt was an after modification. The inconvenience of using soda ley of sp. gr. 1·12, a strength not found in commerce, I overcame by employing a weighed quantity of caustic soda. The 'Additions' formula directs a little more caustic soda than mine does. W. MARTINDALE.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hooper, Hill, Wright, Grierson, Robb.

The Pharmaceutical Journal,

SATURDAY, JANUARY 3, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

1890.

IN commencing a review of the events of the past year, it may be assumed that some of the important questions which were at this time last year awaiting a settlement have since then been disposed of, though others are still unsettled. Among the latter, the questions relating to the proposed Pharmacy Act Amendment Bill are at the present moment of especial interest, since they affect the future of pharmacy and will probably furnish material for the work of the coming year. But before referring more particularly to the circumstances by which these various subjects have been advanced to their present position, it will be proper to recall the facts connected with the annual reconstitution of the Society's Council last May. The election of members of Council which then took place was characterized by unusual activity on the part of a section of the Society professing to disapprove of the policy and action of the Council, chiefly in regard to matters of trade interest. The grounds upon which this disapproval was based were never very clearly stated, and in many instances it arose from complete misconception of the powers of the Society and of the fact that its capability to exercise a general protective influence over the interests of the trade can only be the result of a much more extended support of the Society by the members of the trade than has ever yet been given. These views were represented at the annual meeting in May by some of the speakers, but they did not meet with any support proportionate to the declamation which had been launched against the Society and its Council. The result of the election, moreover, was a most conclusive demonstration that the opinions of the intending reformers were not shared by the majority of the Society's members. The voting power of the Society at the time was somewhat in excess of what it had been in the previous year, and the interest taken in the election was evidenced by the fact that the number of voting papers returned was nearly fifty per cent. above the number of those sent in on the former occasion, representing altogether nearly three-fourths of the voters. The issue of the election was an emphatic and indisputable proof that the majority of the Society's members approved of and endorsed the policy and action of the Council. As regards the PRESIDENT, against whom a large part of the opposition had been directed, the evidence of a desire to support him was even greater, as he was returned at the head of the poll by a number of votes representing nearly three-fourths of the total votes registered, showing that his labours were so much appreciated as to have secured for him the active support of more than half of the Society's members. All the other members of Council who stood for re-election were also returned, and the large number of votes given in their favour indicated a sound appreciation of their fitness for the position and of the services they had rendered. The only new member of Council elected was Mr. STORRAR, who filled the vacancy that had been created by the retirement of Mr. ROBBINS, who had been a member of Council since 1873, and had for ten years occupied the position of Treasurer. This election may therefore be taken as showing that the Council is supported by the intelligent judgment of the members of the Society as their proper representative, and that if there be any ground for the assertion sometimes made that the Council does not represent the trade the responsibility for any deficiency in that respect rests with those who abstain from connecting themselves with the Society and sharing in its work for the general good.

In the election of officers of the Society, at the first meeting of the new Council in June, Mr. CARTEIGHE was again placed in the position of President, in accordance with the unmistakable indication of the general election. Mr. ALEXANDER BOTTLE was again elected Vice-President, and Mr. HAMPSON was elected to fill the office of Treasurer left vacant by the resignation of Mr. ROBBINS. In moving that the Council should give a formal expression of regret at Mr. ROBBINS' retirement, the PRESIDENT referred to the services that gentleman had rendered as a member of Council and as Treasurer, as well as in connection with the Benevolent Fund, in the promotion of which he always took an active interest, and the motion, seconded by the VICE-PRESIDENT, was naturally carried unanimously.

Passing now to the details of the work of the Society during the past year, the proceedings relating to a Pharmacy Bill claim first consideration. In February, the Committee appointed in pursuance of Mr. HAMPSON'S motion in December, 1889, to consider the introduction of a Bill, presented to the Council the draft of a Bill by which it was proposed to provide for the establishment of a systematic course of education for pharmaceutical students, and for alterations of the Society's bye-laws with that object; also for extending the privileges of membership of the Society to every person registered and in business on his own account, while reserving the title of pharmaceutical chemist, as hitherto, for those who pass the Major examination. As a provision for the due protection of chemists' interests this Bill also provided for restricting to registered persons the compounding of medical prescriptions, subject to such exceptions as now obtain by law. This draft Bill was the outcome of a consideration of the subject from the various points of view put forward at the Council meeting in the previous December, and of the instruction to the Committee as to additions to the merely educational provisions of former draft Bills, the proposed alteration in the constitution of the Society, and the restriction of dispensing to registered persons, constituting the additions that had been deemed desirable. It was thought that the one would provide for removing a disability under which many laboured who did not take the Major qualification, but desired to take part in the work of the Society, while the other would secure to chemists special protection of the kind they are entitled to look for. In the course of a long discussion of the proposed draft that took place at the February Council meeting, Mr. Hampson pointed out that since consideration for the public interest was the only ground on which chemists could hope to obtain any protective privileges, it was therefore the more necessary that in seeking to obtain for registered persons a restriction of dispensing, the Council should have the support of a strong Society holding the position of an organization representing the entire body.

The amendment moved by Mr. Abraham in reference to the dispensing clause had for its object to prevent companies consisting of unregistered persons, but trading as chemists, from dispensing medicine, and to recognize the right of *bonâ fide* co-operative societies to do so through the hands of registered persons by extending to these latter the existing exemption in favour of executors. This suggestion was supported by Mr. Harrison mainly upon the ground that co-operative societies have now become so firmly established that it is impossible to ignore them, but Mr. Atkins objected to the inference that there is therefore any necessity for the Society to recognize or even to regulate dispensing by co-operative societies. He protested against any step being taken by the Council with that object as distinctly opposed to the traditions of the Society, and Mr. Cross also contended that the proper attitude for the Society was to leave co-operative societies alone altogether and that chemists should trust to the ultimate recognition of the principle that individual qualification, though good in itself, is not sufficient, but that a chemist's business should be conducted by a man personally responsible in the capacity of proprietor. When put to the vote the amendment was lost by a large majority. Another amendment, moved by Mr. Schacht and seconded *pro formâ* by Mr. Harrison, had reference to the definition of "the seller" and to the dispensing of medicine containing scheduled poisons by unregistered persons. It led to a discussion as to the legality of employing unregistered persons in dispensing, and as to the meaning of "supervision" as applied to such occupation and to the sale of poisons. The amendment was not carried, and as the decision in the Wheeldon case has since furnished an authoritative settlement of these questions, it is unnecessary to refer further to them here. With the exception of these two objections to the draft Bill the Council was unanimous in approving of it. Most of those who spoke dwelt upon the necessity that the trade should unite in supporting the Bill and that the Society should be rendered a true representative of the entire trade if it was to exercise any political influence for the benefit of chemists generally. Notwithstanding the recommendation of the draft Bill by the committee to which its consideration had been referred, and its adoption by the Council, it soon became apparent that it was received with such strong opposition from a part of the trade, that at the March meeting of the Council the Law and Parliamentary Committee recommended that it should not then be proceeded with. The President, in asking the Council to adopt this recommendation, said that in endeavouring to get the Bill introduced he had found no direct sympathy or support for any single clause, and he complained that, while seeking to do public work of the kind and having to face opposition from without, he should have been left without any support from those he was supposed to represent. After many expressions of regret that a Bill so much in the interest of chemists, as well as of the public, could not be proceeded with, it was decided that it should be withdrawn for a time. At the June meeting of Council the subject was resumed on a motion of the Vice-President, seconded by Mr. Allen, that the Law and Parliamentary Committee be requested to draft a Bill and report to the Council. This was agreed to, and at the October meeting a draft was presented with a recommendation that it should be adopted. In moving its adoption the President mentioned that while various suggestions had received careful consideration, with the view of embodying in the Bill anything practicable, the recommendation of the Committee was influenced by a business-like calculation of the forces that would have to be dealt with when the Bill came before Parliament. For that reason the Bill did not contain provisions which some desired to see incorporated, and their omission was justified on the ground that the Council of the Society is responsible for the practicability and reasonable character of its proposals. In its general character this Bill differed but little from the previous one. The first two clauses relate to the establishment of an educational system, giving the Council power to separate the qualifying examination into parts; also to require a certain lapse of time between the passing of these and of the Preliminary examination, and attendance at a specified course of study either during or after apprenticeship, in addition to the evidence of having been engaged for a certain period in the practical routine of a chemist's business. These provisions, constituting what is commonly spoken of as the "curriculum," would necessitate attention to the scientific studies which are held to be essential for the education of chemists. They would facilitate the passing of the examination required for legal qualification, both by its separation into parts and by securing a more appropriate preparation for it than is now commonly had recourse to. They might also be expected to enable chemists to obtain apprentices of a higher and more educated class, and to provide more efficiently for a supply of thoroughly competent assistants. For those who occupy this latter position the provisions contemplated by the Bill would also offer the prospect of better remuneration for their services, arising from absence of the competition of less competent persons. The next three clauses relate to the proposed alteration in the constitution of the Society, by which all persons passing the legal qualifying examination would become eligible as members of the Society, with all the privileges appertaining to that position. The seventh clause of the Bill is in principle the same as that relating to dispensing in the previous Bill, but it contains an addition indicating that the employment of unregistered persons in dispensing must be subject to immediate supervision by a registered person. This addition was made at the suggestion of some members of Council, but it has already given rise to misconception, and it is doubtful whether the requirements of the case have been made plainer or more explicit than they were in the former Bill or than they have been decided to be in regard to poisons in the present Act.

This Bill is still before the members of the Society as a subject of consideration and discussion. In the expounding of its intention and of the reasons for what it contains as well for its omissions, the PRESIDENT has already devoted a considerable amount of time, by attending meetings of chemists held both in London and various provincial towns, and further visits of the same nature are now being arranged for in Scotland.

At the January meeting of the Council attention was directed to a letter from Dr. QUAIN, acknowledging, as Chairman of the Pharmacopœia Committee of the General Medical Council, the intimation that had been sent by the Council in reply to his request that the Council should assist in the preparation of an Addendum to the British Pharmacopœia (1885) and that a Committee of members of the Society should be appointed for that purpose. At the next meeting of the Council a resolution was passed, on the motion of the PRESIDENT, that Messrs. INGLIS CLARK, EKIN, GALE, H. G. GREENISH, MARTIN, MARTINDALE and UMNEY be invited to co-operate with himself and the VICE-PRESIDENT to form a committee for the purpose. It was mentioned that the necessity of the committee being a working one, as well as other considerations, rendered it inevitable to leave out the names of many whose assistance might have been of great value, but it was hoped that pharmacists throughout the country would assist in the work. In the month of June a further communication was received from Dr. QUAIN, accompanied by a list of medicines and compounds that had been selected to form the proposed Addendum, requesting the Council to consider how best to define and prepare them and to report to the Pharmacopœia Committee of the Medical Council. At the November meeting of the Council the PRESIDENT stated that the Pharmacopœia Committee had nearly completed its work, and that the report would be presented to the Medical Council in the course of that month. At the next Council meeting a report of the Committee was presented by the PRESIDENT, stating that it had completed its labours and submitted the results to the Pharmacopœia Committee of the Medical Council. By the courtesy of the Medical Council an early copy of the Addendum, as well as a copy of the minutes of that body relating to it, were at the same meeting placed in the hands of each member of the Council of the Society and of its Pharmacopœia Committee. The President also stated that he had received from Dr. QUAIN a letter expressing the high satisfaction with which the communications of the Society's Committee had been received by the Medical Council. At a meeting of the Medical Council on November 30, Dr. QUAIN had presented a report of the Pharmacopœia Committee of that body, in which it was recommended that the best thanks of the Medical Council be presented to the Council of the Pharmaceutical Society of Great Britain for the valuable assistance rendered in the preparation of the Addendum. It was further added that the Committee viewed with satisfaction the conjunction of medical and pharmaceutical work that had been effected, and considered that this combination, initiated and organized by Professor ATTFIELD, the annual reporter on the Pharmacopœia to the Medical Council, could not but be productive of future as well as of immediate benefit to both medicine and pharmacy. At the same meeting Dr. QUAIN moved a vote of thanks to the Council and Pharmacopœia Committee of the Society for their assistance, without which, he remarked, the labours of his colleagues would have been n vain. This motion was seconded by Dr. MITCHELL BRUCE and agreed to. As the President remarked at the December Council meeting, these records speak for themselves, and they furnish gratifying evidence of the satisfactory promotion of good relations between medicine and pharmacy. For the achievement of this result every pharmacist in the country is indebted to the Pharmaceutical Society for its persistent efforts to improve the position of the calling and of its followers. To those who are in the habit of asking what the Society has done for them, while refusing to take part in its work, this successful realization of the desire so long entertained by British pharmacists may well be commended as a fitting answer..

At the January meeting of the Council the Library and Museum Committee reported upon the proposal of Mr. LEIGH, to grant prizes and certificates to registered apprentices as a stimulus to study, the opinion arrived at being that the scheme was at present inexpedient and impracticable. Apparently the consideration that weighed most with the Committee was the undesirability of the Society giving any certificates implying competency in any of the subjects that form part of the legal examinations, other than those granted by the Boards of Examiners. On the same occasion the Committee reported in favour of changing the time of the appointment of Local Secretaries, recommending that the nomination papers should be sent out in October, at which time it was thought they might receive fuller consideration than when delivered together with the voting papers for members of Council. The alteration was carried out in the following October, and the expectation that it would evoke a greater interest in nominations to the office was fully confirmed, a larger number of papers having been returned, whilst in some places meetings of members and associates were held to agree upon a selection.

At the February meeting of the Council the report of the Research Committee for the year 1889 was presented, giving an account of the work completed by the Research Laboratory up to that time, with which the Committee considered it had every reason to be satisfied. After a short discussion, in which the PRESIDENT remarked that the probable co-operation of pharmacists in the preparation of the Addendum to the Pharmacopœia was perhaps not unconnected with the work of this Research Committee, the report was received and ordered to be entered on the minutes.

In considering the statistics of the examinations conducted under the superintendence of the Pharmaceutical Society on behalf of the public it is found that the slight diminution in the number of entries which occurred in 1889 has not been continued in the year just closed; in fact there has been a sufficient reaction to carry the figures beyond those of 1888. The total number of the entries for all the examinations is 2662 against 2507 in 1889 and 2604 in 1888. The Major examination, however, have no part in the recovery, since the entries for it had numbered only 105, with 64, or 61 per cent. of passes, against 138 with 82 passes in the previous year. For the Minor or qualifying examination there have been 1157 entries against 1013 in 1889; of these 524 or 45·2 per cent. were by persons who satisfied the examiners against 439 or 43·3 per cent. In addition 5 candidates out of 8 succeeded in passing the Modified examination, so that the total number of persons who became entitled during last year to be registered as chemists and druggists was 529. For the Preliminary examination there were 1392 entries, with 617 or 44·3 per cent. of passes, against 1351 with 650 passes in 1889. To this number must be added 84 certificates of other examining bodies accepted in lieu of this examination, bringing the number of persons who last year took the initiatory step in obtaining qualification as chemists and druggists to 701.

It is satisfactory to observe from the foregoing figures that the past year shows an improvement—though still a small one—in the proportion of passes to failures in the qualifying examination. Further advance in this direction will be welcome on all sides, notwithstanding an impression prevailing in some minds to the contrary. What is commonly known as the "curriculum scheme" is doubtless looked upon with suspicion by many who think they see in it the prospect of an unnecessary barrier arbitrarily raised at the threshold of the qualifying examination. Such barrier, however, as the "curriculum scheme" might raise would occur at a much earlier stage, blocking to unsuitable persons the very entry to the calling, whilst those who were able to pass the obstacle would find in the proposed arrangements the safest guide for their course. The desirability of checking the entrance of unsuitable persons into the pupillary stage, rather than of allowing them to waste valuable years before finally demonstrating their incompetence, is recognized in the last report of the Privy Council Visitor to the examinations held in London, where Dr. STEVENSON, in referring to the many imperfectly educated candidates who present themselves for the Preliminary examination, expresses the hope that the large proportion of rejections will not produce any desire on the part of the Society to lower the standard of this test. In respect also to the Minor or qualifying examination, Dr. STEVEN-

son, considering it from the point of view of the public interest, says that he has observed no instance in which a candidate was rejected except on quite sufficient grounds. Further in commenting upon an increase in the number of rejections following a modification in the manner of examining, he says he is of opinion that benefit has thereby accrued. In fact, such suggestions as are made by Dr. **Stevenson** still tend towards extending the scope of the examination, so as to include the use of the microscope and an elementary knowledge of the law as to the sale of poisons. In Edinburgh the Visitor to the examinations, Sir **Douglas Maclagan**, again attributes the constantly high proportion of failures to the bad state of pharmaceutical education in Great Britain, and reiterates the opinion that it will not be better until candidates are made to go through a regular curriculum of some kind. Before this can be done the Society must obtain further parliamentary powers; but meanwhile, in the absence of such a curriculum, an important step in the direction of indicating more explicitly the scope of the knowledge in which a candidate may expect to be tested in the examination room, was taken last October in the adoption by the Council and publication of a much fuller schedule of the subjects of examination, which also represents the views of the Board of Examiners. Whilst writing upon the subject of the examinations it is due that reference should be made to the recent retirement from the Board for England and Wales of Mr. **Samuel Gale**, after valuable service as an examiner for the long period of twenty-six years.

The Evening Meetings of the Pharmaceutical Society in London have, as a rule, been only moderately well sustained during the year; although some of the papers read, especially those contributed from the Research Laboratory, have been of considerable interest. No lack of interest was however manifest at the meeting in London in October, when the theatre was crowded from floor to ceiling with friends gathered to see the prizes distributed to the successful students of the past session—among whom Mr. **Edward Birchall Sherlock** carried off the blue ribbon in the Pereira medal—and to listen to an address inaugurating the new session by Sir **Henry Sieveking**, M.D., F.R.C.P. At succeeding meetings the papers read were :—"On the So-called Double Cyanide of Zinc and Mercury," by Professor W. R. **Dunstan**; "Notes on Recent Researches on the Oil of Betel Leaves," by Mr. D. S. **Kemp**; "Resin Soap as an Emulsifying Agent," by Mr. H. **Collier**; "The Estimation of Ethyl Nitrite in Spirit of Nitrous Ether," by Dr. J. C. **Thresh**; "Review of Recent Work on Spirit of Nitrous Ether and Ethyl Nitrite," by Mr. T. S. **Dymond**; "An Investigation of the Constituents of the Artificial Salicylic Acid of Commerce," by Professor **Dunstan** and Mr. **Bloch**; "The Physiological Action of the Constituents of the Artificial Salicylic Acid of Commerce," by Professor **Charteris**; "On the So-Called Eucalyptus Honey," by Professor **Anderson Stuart**; and three Reports on Recent Donations to the Museum, by the Curator, Mr. E. M. **Holmes**. In Edinburgh the papers read have been entitled :—"Notes on Some Gum Samples," by Mr. T. **Maben**; "Detection and Separation of Sodium from Lithium," by Mr. J. W. **Thomson**; "A Simple Method for Estimating the Acidity of Milk," by Mr. J. W. **Thomson**; "Note on Adulterated Anise Fruit," by Mr. W. **Lawson**; "The Igniting Point of Sulphur," by Mr. J. R. **Hill**; "The Estimation of Urea," by Mr. D. B. **Dott**; "Litmus," by Mr. D. B. **Dott**; "Note on Uralium or Ural," by Mr. D. B. **Dott**; "Tinctura Quininæ Ammoniata," by Mr. G. **Lunan**; "The Future of Pharmacy as a Trade and as a Profession," by Mr. D. **Storrar**; "Arsenic in Sulphuric Acid," by Mr. D. B. **Dott**; "Solubility of Lead Sulphide in Hydrochloric Acid," by Mr. D. B. **Dott**; "Blue Glass," by Mr. D. B. **Dott**; "Determination of Melting Points in the Air Bath," by Mr. D. B. **Dott**; "Note on the Assay of Scammony," by Mr. P. **Boa**; "Note on the Pharmacy of Exalgine," by Mr. P. **Boa**; and a "Note on Salicylic Acid," by Mr. J. R. **Hill**.

In the Museum considerable alterations have been made during the past year. The room in which the Animal Materia Medica and part of the **Hanbury** collection were placed has been added to the Secretary's residence, and the whole of the **Hanbury** collection and Herbarium has now been removed to a special room to be devoted to them on the first floor, in which the Society's Herbarium is already placed. A catalogue of the **Hanbury** Herbarium as well as of the Society's Herbarium has been prepared, and it is proposed that the two should form one volume having a general index, so as to facilitate reference to any specimen in the two collections. During the last few months Dr. **Augustine Henry**, from Ichay, in the north of China (who is at present on a visit to this country), has examined the large collections of Chinese drugs in the Society's Museum, including the type specimens of Dr. F. **Porter Smith**, the very complete collection presented a few years ago by Dr. **Hokai**, of Hongkong, and the Chinese drugs presented by **Hanbury** and others. Dr. **Henry**, who is well versed in the botany of the north of China and is besides well acquainted with the Chinese language, has been able to add from the rare Chinese herbals in his possession and from a personal knowledge of many of the plants yielding Chinese drugs, much new and valuable information, which he has placed, in the form of manuscript notes, at the disposal of the Society. The specimens of Chinese plants, numbering, it is believed, several thousands of specimens, are now being examined at Kew, and already several species new to science have been discovered, including the plant yielding the singular Tu-Chung bark. Many interesting additions to the Museums of the Society in London and Edinburgh have been made during the past year from various parts of the world, including specimens from the Director of the Royal Gardens at Kew; Dr. M. Treub, of Java; Mr. J. Medley Wood, of Natal; Mr. D. Hooper, of Ootacamund; Mr. J. G. Prebble, of Bombay; Mr. H. Humphreys, of Hongkong; Consul W. Carles, of Chintsiang; Professor Van Eeden, of Haarlem; Mr. Andrew Ferrein, of Moscow; Dr. Schuckardt, of Goerlitz; Professor Max Cornu, of Paris; Dr. Anderson Stuart, of Sydney, and Professor T. R. Fraser, of Edinburgh, and many of the leading wholesale chemical and drug firms in this country. Among the most interesting donations are those of the plant yielding Curaçao aloes, the rhizome of *Podophyllum Emodi*, the apparatus used in collecting cassia bark and in preparing dragon's blood, the lign-aloes tree, hitherto unknown, of the Isle of Hainan, ouabain wood and leaves, ouabaine and the plant from the seeds of which it is now prepared. The Herbarium has been enriched by specimens of the cubeb, pepper, and other medicinal plants, and the British Herbarium by the rare *Carex tomentosa*, presented by Mr. G. C. Druce, and *Althæa hirsuta*, from Mr. G. W. Watts, of Rochester. The Silver Medallist of 1889, Mr. W. F. E. Horrell, has also generously presented his herbarium to the Society. The attendance in the Museum has been 5553 in the morning and 785 in the evening.

The Library of the Society in Bloomsbury Square continues to be utilized largely by the members, associates and apprentices. The attendances during 1890, namely 8005, have been practically the same as in the previous year, a slight falling off in the evening having been nearly compensated for by an increase in the day attendance. The circulation of books shows a decrease from 3275 volumes to 2599, a falling off having occurred in both the town and country circulation. During the year, the additions to the Library by donation and purchase numbered 223.

The Benevolent Fund, it is satisfactory to say, has continued to receive a considerable amount of support during the past year, although the income, apart from that derived from interest on invested property, was less than in 1889, being £1,629 10*s*. 6*d*., as compared with £1,833 14*s*. 9*d*. The important item of annual subscriptions shows, however, a slight increase, amounting to £1,527 18*s*. 6*d*., against £1,477 15*s*. 9*d*., the falling off having been in respect to the legacies and donations, which in 1889 amounted to £355 19*s*. 0*d*., but in 1890 to only £101 12*s*. 0*d*. On the other hand, the expenditure has also decreased from £2,080 5*s*. 0*d*. to £1,918 5*s*. 0*d*., for notwithstanding the election of six annuitants in December the expenditure in annuities, in consequence of several deaths having occurred among the annuitants, fell from £1696 5*s*. 0*d*. to £1556 5*s*. 0*d*.; the casual grants also, amounting to £362, were a few pounds less than in 1889. It is worthy of mention that the whole of the business connected with the collection and paying out of these large sums of money and the conduct of the election was transacted at a cost to the Fund of £40, or less than 1¾ per cent. of the receipts, a fact probably unique in the history of benevolent institutions.

The report of the Executive of the North British Branch, which was presented to the Council in May, showed that the provision made in Edinburgh especially for the convenience of members and associates resident in Scotland continues to be largely made use of. It stated that the attendance of visitors had been slightly less than the previous year, but still numbered upwards of three thousand, the falling off having been entirely in the day visitors. The circulation of books from the Library had increased considerably and the Museum had been enriched by a good number of specimens. The examinations continued to be conducted as before, and the favourable opinion expressed in the previous report as to the alterations in the dispensing department had been confirmed by experience. The only change resulting from the election of members of the Executive, held in June, was that Mr. Thompson was replaced by Mr. Kermath. At the first meeting of the new Executive, Mr. William Gilmour, of Edinburgh, was re-elected as Chairman and Mr. David Storrar, of Kirkcaldy, as Vice-Chairman.

The proceedings in the law courts during the year have presented several points of considerable interest to chemists and druggists. In performing the duty of carrying out the provisions of the Pharmacy Acts, the Council of the Pharmaceutical Society has been compelled to institute proceedings against a large number of offenders, but in the majority of cases the object is attained without going into court. Of primary importance is the judgment of Baron Pollock and Mr. Justice Hawkins in the appeal from the decision of the county court judge at Wandsworth in the case of the Pharmaceutical Society *v.* Wheeldon. Unless this judgment is reversed the Pharmacy Act will be construed in the courts to enact that the qualified master cannot depute his authority to sell poison to his unqualified servant, who can only legally transact such business under the immediate supervision of a qualified person. The decision caused considerable excitement in some quarters on account of the inconvenience it was thought likely to entail in cases where a qualified assistant could not be kept; but the other side of the question has found illustrations in the result of a prosecution in Birmingham, where the unqualified manager of a limited company was mulcted in two penalties, and of another in Glasgow, where an unqualified person who was carrying on the dispensing of poisons under the nominal cover of a medical man, was adjudged to pay four penalties, the decisions in both cases being avowedly based upon the judgment in the superior court. Another case of nearly equal importance was a prosecution instituted by the Treasury, involving the decision that the use of a medicine stamp does not exempt the seller of a nostrum containing poison from the necessity of using a poison label.

Among the legislative measures affecting chemists, one that for a time excited considerable apprehension was the Customs and Inland Revenue Bill, which contained a provision that a licensed retailer of methylated spirit should not sell less than one quart of the spirit. If this had been made law great inconvenience would have been caused. At the meeting of the General Purposes Committee of the Council on the 8th of May the PRESIDENT represented that the matter was urgent, as the Bill might probably be passed the next day, and he was therefore authorized to take such steps as he found necessary for dealing with it. At the same time a circular was sent to all local and divisional Secretaries, requesting their prompt assistance in opposing the restriction on the sale of methylated spirit. This was very actively responded to; but in consequence of the PRESIDENT'S representation of the matter to the Chancellor of the Exchequer, the influence thus exercised was anticipated, and the objectionable restriction was withdrawn from the Bill. The interference of the Excise authorities with the sale of medicated wine by chemists was also satisfactorily prevented by the PRESIDENT'S communication with that department, and a letter was received from the SECRETARY stating that the Commissioners of Inland Revenue would not interfere with the sale of *bonâ fide* medicated wine, such as those mentioned in the British Pharmacopœia, nor with the sale of any other wine, which in the opinion of the Board was so far medicated as to be unfitted for use as a beverage.

The Annual Meeting of the Society was as usual associated with a Dinner of the members and friends, as well as with a Conversazione that was made the opportunity of throwing open the new premises in Bloomsbury Square and was largely attended. Among the other meetings of the year of more or less interest to pharmacists were those of the Society of Chemical Industry, at Nottingham, and the British Medical Association, at Birmingham, in July; the German Pharmaceutical Association, at Rostock, in August; and the British Pharmaceutical Conference and the British Association, at Leeds, and the American Pharmaceutical Association, at Old Point Comfort, in September. In addition, the proceedings of various provincial associations have been marked by special addresses by prominent pharmacists, as, for instance, those of Mr. MARTINDALE at Sheffield, Mr. STORRAR at Dundee, Mr. SOUTHALL at Birmingham and Mr. MARTIN at Newcastle.

On several occasions during the year there have been complimentary expressions of appreciation of the services of officers of the Society. Last October a meeting was held in the Society's Examination Hall for the purpose of formally presenting to the Council a portrait of Mr. CARTEIGHE, painted by Mr. FOSTER and exhibited at the Royal Academy. The chair was taken on that occasion by the Vice-President, and Mr. WALTER HILLS stated that he had been deputed by a few personal friends of the President to ask the Council to accept the portrait for the Council Chamber of the Society, intimating also that a replica was being painted for presentation to Mrs. CARTEIGHE. The Vice-President, Mr. BOTTLE, has on two occasions been the object of similar complimentary demonstrations, to celebrate the completion of the fiftieth year of his career as a pharmaceutical chemist. In the first instance he was entertained at a dinner organized by the Dover Chemists' Association, and subsequently at a dinner given in Edinburgh by the members of the Scotch Board of Examiners and some of his former colleagues and friends. The retirement of Mr. SAMUEL GALE from the position of an examiner has also been taken advantage of by his colleagues on the Board, who, with a similar object, presented him with a pair of silver candelabra and a silver salver to celebrate the twenty-fifth anniversary of his wedding.

Ireland was much more successful during the past year than England in moving Parliament to legislate for the chemist and druggist, but whether more fortunate remains to be proved. In this case the party which was instrumental in producing the collapse of the Bill introduced in 1889 by the Irish Pharmaceutical Council, took the initiative, and in May introduced a Bill more sweeping even than the terms of the compromise that had previously been repudiated. The Bill quickly ran through the stages of the lower House and did not really meet with any effective opposition until the motion for its second reading in the House of Lords. From that time, however, it was stubbornly contested in the interest of the "pharmaceutical chemists," until a compromise was effected that modified its provisions materially. The Act as passed provides compulsorily for the registration as "chemists and druggists" of persons who were in business as such before 1875, whose rights were reserved by the Act of that year, and of other persons, under certain conditions as to examination, etc., as "registered druggists." It gives to both these classes the right to keep open shop for the sale, retailing, or mixing of poisons, but restrains them from compounding medical prescriptions. They have also the right to become connected with the Pharmaceutical Society of Ireland as "associate druggists," with practically the privileges of members, and they are eligible to seven seats on the Council. The annual meeting of the Irish Society was held in Dublin in October, when it was stated that the total income from examinations had risen from £229 10*s.* 0*d.*, in the previous year, to £289 15*s.* 6*d.*, but that the income from subscriptions had decreased from £94 10*s.* 0*d.* to £80. The opportunity was taken to present the President (Mr. EVANS) and the Vice-President (Mr. WELLS) each with an illuminated address testifying warmly to the services they had rendered in connection with the recent legislation. At the succeeding meeting of the Council Mr. CHARLES EVANS was re-elected as President, Mr. W. F. WELLS as Vice-President, and Mr. HODGSON as Treasurer.

In turning from the political to the scientific events of the year it must be admitted at once that the profusion of chemical literature almost baffles human effort to keep abreast of it. Many of the discoveries have practical application far away from pharmacy, and many more remain as yet without useful application. But others are of great interest from the light they promise to throw upon the principles underlying the whole science of chemistry. For instance, within the year two new compounds have been prepared that promise to be of the utmost importance in the extension of knowledge regarding the periodic system of the elements, a derivative of nickel $Ni(CO)_4$, by Messrs. MOND, LANGE and QUINCKE, and the imidazoic acid, N_3H, by Professor CURTIUS. With respect to the latter, the eminent Russian chemist, MENDELEJEFF, had already, upon theoretical grounds, suggested the possibility of the preparation of such nitrogenous compounds as have now been discovered by CURTIUS, and in a recent communication to the German Chemical Society, he has not only shown that the facts recorded are in accord with present theory, but he has foreshadowed results that may be attained by the further investigation of the azo-imides. The deduction made from experimental evidence that the greatest amount of hydrogen occurring in salt-building hydroxides never exceeds the amount of hydrogen in the hydrogen compounds of the same element, provided the latter forms a gaseous compound with hydrogen, leads to the following conclusions. An element that, like nitrogen, forms at the utmost the compound NH_3, cannot give a salt-building hydroxide of the formula of $N(OH)_5$, although $N(OH)_3$ is capable of existence, while even the highest form of hydroxide $NO(OH)_3$ readily loses water and forms incomplete hydroxides. This is also illustrated in the ortho-, pyro- and meta-phosphoric acids, represented by the formulæ $PO(OH)_3$, $[PO(OH)_2]_2O$ and $PO_2(OH)$ respectively. Further the forms of the normal ammonium salts must correspond to those of the hydroxides of the element N, and therefore they will contain oxygen other than that which connects the ammonium group with the element, as in $NO_2(ONH_4)$. Such ammonia compounds form amides and nitriles by loss of water, amides resulting when the loss is confined to the conversion of the residue ONH_4 into NH_2, as in formamide $H \cdot CO(NH_2)$ from ammonium formate $H \cdot CO(ONH_4)$. But if oxygen and hydrogen separate from the amides in the form of water, which can only occur when excess of oxygen is present in the molecule, as in the acids above cited, nitriles are produced, as formo-nitrile, or prussic acid, HCN, from formamide $HCO(NH_2)$. Similarly, the ammonium salt of ordinary or meta-nitric acid, $NO_2(ONH_4)$, yields the nitrile, nitrous oxide N_2O, by loss of two molecules of water, a hypothetical amide intervening. Applying the same principle to a di-ammonium salt of ortho-nitric acid, $NO(OH)(ONH_4)(ONH_4)$, by the loss of four molecules of water a nitrile, N_3H, the imidazoic acid of CURTIUS, would result, in which two of the nitrogen atoms would be derived from the ammonium, whilst the third nitrogen atom and the single hydrogen atom would constitute the remaining elements of the nitric acid radicle. The acid character of the hydrogen atom in this recently discovered compound is thus explained; and, indeed, since nitrogen from its position in the periodic system and from actual comparison of nitric and nitrous acids with carbonic acid, appears to form stronger acids than carbon, it might be expected that imidazoic acid would prove to be a stronger acid than—though similar in its properties to—prussic acid, the nitrile of formic acid. MENDELEJEFF puts forward the further hypothesis that if CURTIUS' compound be really a nitrile of nitric acid, certain peculiarities that research has shown to be associated with all the analogous cyanogen compounds, may also be assumed to be the property of imidazoic acid and its derivatives. Polymerization, as exhibited in cyanuric acid, formation of double salts like the double cyanides of iron, and isomerization, as illustrated by the formation of urea from ammonium cyanate, are the three characteristic peculiarities of the cyanogen compounds. It is therefore probable that the asymmetrical ammonium salt of imidazoic acid, $N_3H \cdot NH_3$ may under certain conditions be converted into its symmetrical isomeride, $N \cdot NH_2 \cdot NH_2 \cdot N$, the nitrile of triammonium orthonitrate, $NO(ONH_4)(ONH_4)(ONH_4)$.

As the salts of imidazoic acid, for instance the insoluble silver salt, recall in their properties the metallic cyanides, Mendelejeff asserts that if double salts, as of potassium and iron, are formed, a series of characteristic coloured salts analogous to the ferrocyanides would obtain, and that also a series of compounds similar in molecular constitution to Berlin blue, but with strongly explosive properties in the dry state, will be met with. The tendency of the azoimides to form polymerides may be regarded as already expressed by analogous phosphorus compounds, as chlorphosphamide $P_3N_3Cl_3$ and phospham $(PHN_2)_n$, though the property of polymerization is more highly developed in phosphorus than in its analogue nitrogen, as may be seen in the existence of the ordinary and "red" modifications of that element, as well as in the fact that the molecules of phosphorus vapour contain four atoms even at high temperatures, whereas the nitrogen molecule only contains two atoms in any known condition.

Another important research in the domain of pure chemistry, undertaken by Professor Emil Fischer and his pupils, has led to such enlightenment concerning the constitution of the sugars, that this year's results will involve the complete revision of the chapter on carbohydrates in textbooks. The total synthesis of more than a score of sugars, a class of bodies to which synthesis had not yet been extended, the establishment of the chemical and physical relations existing between these sugars and also between the corresponding alcohols and mono- and dibasic acids, the circumstantial support given to Le Bel and van t'Hoff's theory of physical isomerism, and the recognition of the importance of the physiological questions involved, have attracted the universal admiration of scientific men, as is attested by the recent presentation of the Davy Medal by the Royal Society to Professor Fischer. Henceforth, dextro-, lævo-, and inactive "glucose," and dextro-, lævo-, and inactive "mannose," will replace "dextrose" as types of the aldoses or aldehyde sugars, and the term "lævulose" will give way to the more scientific appellations of dextro-, lævo-, and inactive "fructose," the typical representative of the ketoses or ketone-sugars. Sugars and fully oxidized alcohols and acids containing seven, eight and nine atoms of carbon in the molecule, instead of the conventional six, have also been prepared, and received the systematic names of heptose, heptitol, heptonic acid, etc.

The chemical laboratories show no sign at present of having exhausted their capabilities in elaborating compounds to compete with the products of Nature for a place in the materia medica. Many of these compounds, it is true, enjoy only a transitory notoriety, but others have evidently "come to stay," at least seven of them having now been accorded a place in the national pharmacopœia. Of these, antipyrin has shown itself capable of combining with other substances to form fresh products that may be useful in therapeutics. It forms with chloral hydrate two compounds that no longer give the reactions of either constituent, one of which has been introduced as a hypnotic under the name "hypnal." It has also been reported to form compounds with caffeine and with quinine, the solubility of both of which it increases, and probably with phenol, besides which a "salicylate" (otherwise known as "salipyrin"), a "valerianate" and a "double valerianate of antipyrin and quinine" have been described. The incompatibilities of antipyrin formed the subject of a practical communication to the Assistants' Association by Messrs. Millard and Stark. The admixture of acetanilide (antifebrin) with the more costly phenacetin has come under the notice of a legal tribunal and incidentally added to the tests for distinguishing the two compounds. "Artificial" salicylic acid has been the subject of considerable interest, in consequence of statements that the commercial article was contaminated with a poisonous impurity having been followed by the prosecution of a chemist and druggist for supplying an article that corresponded fairly well with the Pharmacopœia requirements. The subject was taken up in the Research Laboratory, and at the November evening meeting Professor Dunstan read a paper, by himself and Mr. Bloch, in which the authors confirmed the melting point 156·8° C., given by Fischer for the pure acid,—the B.P. only requiring that it should melt at about 155° C.,—and expressed the opinion that determination of the melting point furnishes the only trustworthy evidence of the purity of a specimen of salicylic acid. They also described a method of separating pure salicylic acid from an impure sample, based upon its conversion into a lead salt, and recommended that in the then forthcoming Additions to the Pharmacopœia a requirement should be introduced that the purified acid should "exist in separate well-defined prismatic crystals, melting between 156·5° C. and 157° C." Two different acids that had been separated from commercial salicylic acid some years since by the late Mr. John Williams were identified as orthocresotic and metacresotic acids, and an impurity separated from acid now met with in commerce was stated to be paracresotic acid. In the discussion that followed Mr. Hodgkin mentioned that he had observed "natural" salicylic acid, prepared from oil of wintergreen, to melt at a rather lower temperature than the purified artificial acid, which he suggested might be due to some persistent impurity, and this is consistent with the fact, pointed out by Mr. Henry, that the natural acid induces a more pronounced coloration than the artificial acid in mixtures containing sweet spirit of nitre or spirit of sal volatile. In a succeeding paper Professor Charteris described the results of physiological experiments made with these three foreign acids, from which he concluded that ortho- and paracresotic acids are slow but certain poisons, a conclusion, it has been pointed out, hardly in accord with the recommendation by Professor Demme, earlier in the year, of sodium paracresotate, as a safe and active antipyretic. As bearing upon this point mention may be made of an investigation by Messrs. Carnelly and Frew on the relative antiseptic powers of isomeric compounds, more particularly of di-derivatives of benzene. The results indicated that with the exception of the hydroxybenzoic acids —of which the ortho compound, salicylic acid, is the most active—para compounds are more antiseptic than the corresponding ortho or meta compounds; but that on the whole compounds containing the carboxyl group are comparatively weak, while phenols and nitro-compounds are relatively strong antiseptics. Guaiacolcarboxylic acid and anisic acids are allied compounds that have been recommended as antipyretics during the year. The name "benzosol" has been given to a benzoyl ester of guaiacol, and "euphorin" has been applied to phenylurethan, and among other compounds that have been mentioned as useful in the same direction are acetylethylenephenylhydrazine, ethylenephenylhydrazinesuccinic acid and phenylmethane. Some of the foregoing have also been represented as possessed of analgæsic properties, and a similar statement has been made respecting the substance known as methylene blue. Among the new hypnotics that have been the subject of communications are "uralium," a compound of chloral and urethane; chloralimide, a product of the action of heat upon chloral ammonia; methylphenacetin, in which a methyl group introduced into phenacetin plays the same part as the methyl group in the corresponding acetanilide derivative known as exalgine; and sulphaldehyde, obtained by the action of sulphuretted hydrogen upon ethylic aldehyde. Among the antiseptics introduced are "aristol," a compound of iodine with thymol, and the corresponding compound of iodine with carvacrol; "antiseptol," an iodosulphate of cinchonine; "sulphaminol," or thioxydiphenylamine; "pyoktanine," being the fancy name for certain undefined aniline compounds; and zinc sulphite. In addition, Professor Dunstan has made a chemical study of the so-called double cyanide of zinc and mercury, introduced by Sir Joseph Lister, and described a process for preparing a more stable compound, containing a larger proportion of the cyanide required. Other new compounds brought forward have been "orexin," or phenyldihydrochinazolin, claimed to act as a stomachic and appetite producer; hydrastinine, an oxidation product of hydrastine, put forward as a hæmostatic; "diuretin," a compound of sodium theobromine and sodium salicylate, said to be a diuretic; piperazidine, introduced as identical with spermine and afterwards recommended as a solvent of uric acid; and a new preparation of mercury represented as a "glutin-peptone-sublimate hydrochloride." A useful paper describing the constitution of most of this class of compounds and their chemical relations to each other was read by Mr. J. Hodgkin before the Conference at Leeds.

In addition to this *résumé* of chemical work may be mentioned the isolation of fluoroform and fluoral, the fluorine analogues of chloroform and chloral. The preparation of the salts of an orthoplumbic acid, H_4PbO_4, capable of acting as oxygen carriers, is likely to become of industrial importance in the "prussiate" manufacture, whilst a convenient source of oxygen has been suggested in a mixture of the red prussiate and barium peroxide in molecular proportions, the reaction taking place in the presence of water. A process for the industrial production of chlorine has also been devised, depending upon the alternate oxidation and chlorination at different temperatures of a mixture of manganese and magnesium chlorides. In other directions chemical research has touched more nearly pharmaceutical interests. The appearance in commerce of a synthetically prepared carbolic acid suggests a possible removal of certain difficulties. The manufacture of glycerine free from arsenic has been the topic of several papers, and Mr. Dott has called attention to the extent to which arsenic is sometimes present in oil of vitriol. The occurrence of nitrous compounds in oil of vitriol used in the aerated beverage industry is known to lead to inconvenient results, and Mr. Wilson has pointed out that resorcin acts as a delicate test for their presence. In a process for the estimation of ethyl nitrite in spirit of nitrous ether, based upon the estimation of iodine liberated by the interaction of nitrous and hydriodic acids, Dr. Thresh has utilized a current of coal gas to avoid the disturbing influence of atmospheric and dissolved oxygen, a device that he had already adopted in the estimation of oxygen dissolved in water. Dr. Thresh has also improved the potassium iodide test for nitrites in water. Messrs. Millard and Stark have published a useful review of the tests for methylated spirit, indicating a preference for Cazeneuve's test, which depends upon the reduction of permanganate. There have also been numerous interesting papers on the analysis of urine.

The literature of the vegetable materia medica that has appeared in the past year has not perhaps been so extensive as in some recent years. Several papers upon aloes that have appeared have, however, illustrated afresh how imperfect existing knowledge still is as to the origin of some of the most valued of vegetable drugs. In 'Pharmacographia' and the British Pharmacopœia *Aloe vulgaris* is given without reserve as the source of Barbadoes and Curaçao aloes, notwithstanding the known difference in odour between the two kinds. The reception from the Dutch West Indies of a sample of aloes prepared from *A. spicata* appears to have created a suspicion in the mind of Mr. Holmes that the distinctive odour of the Curaçao variety might be attributable to an admixture of juice from that or some other species differing from *A. vulgaris*. But some interesting information supplied by Professor Van Eeden, in reply to a query, failed to give support to this theory, it being to the effect that only *A. vulgaris* is cultivated in Curaçao, Aruba, or Bonaire, *A. spicata* being rather rare, and *A. succotrina*, which had been introduced, having disappeared. When, however, a few months later flowering specimens of the cultivated plant were received from Curaçao they were unhesitatingly identified by Mr. J. G. Baker as derived from *A. chinensis*, a nearly allied, but distinct species mentioned as growing in the island as far back as the year 1650. In the next place, Socotrine aloes is now stated officially to be derived from the leaves of *A. Perryi*, but the results of some chemical experiments made by Messrs. Bainbridge and Morrow led them to the conclusion that while "hepatic aloes" is probably derived from that species, the article at present sold in commerce as Socotrine aloes is not obtained from *Aloe Perryi*, but probably from some variety of *A. vulgaris* or allied species. Cape aloes, too, has been attributed to *A. ferox* and several other species, but in comparing the reactions of juices from the leaves of several species of aloe grown at Kew, Messrs. Bainbridge and Morrow found only those of the juice from *A. Africana* to agree with those given by the samples of Cape aloes examined by them. To complete the range of the confusion, in a recent visit to the district from which Natal aloes used to be exported in quantity, Mr. J. M. Wood met with no other species than *A. ferox*, although that variety of aloes is stated by the authors of 'Pharmacographia' to contain a crystalline principle met with in no other sort. The value of the observation of Messrs. Dymock and Hooper, as to the roots of the Indian *Podophyllum Emodi* becoming a possibly profitable source of podophyllin, has been confirmed by Mr. Thompson, who found that the crude resin present in those roots in such large proportion is very rich in podophyllotoxin, the active constituent. Jalap is another drug towards which some little attention has been directed, in consequence of the opinion expressed by Professor Flückiger, that the tubers no longer come into commerce containing a normal quantity of resin, and of his suggestion that experiments in the cultivation of the plant should be made in Europe, or that sources of resin should be sought in other non-Mexican species of *Ipomœa*. Mr. Suess also has stated that in the United States only one out of four commercial samples of jalap examined came up to the official standard as to resin. Commercial assafœtida, too, is not so free from reproach as it might be, since notwithstanding the official limitation of ash to 10 per cent. five samples examined by Mr. Puckner left upon ignition from 19 to 56 per cent., whilst only two of them at all approximated to the requirement of yielding 50 to 60 per cent. to rectified spirit. One sample, bought as of extra quality, gave 56 per cent. of ash, principally calcic sulphate and carbonate and less than 28 per cent. soluble in alcohol. A new source of glycyrrhizin has been pointed out in *Glycyrrhiza lepidota*, Nutt., by Mr. McCulloch, in whose hands it yielded a quantity approximating closely to that given by *G. glabra*. Under the name "liquid kino" Mr. Maiden has described an exudation from the "narrow-leaved apple tree" of Victoria (*Angophora intermedia*, D.C.), but it appears to have little in common with the products usually known as "kinos," since it contains from 96 to 98 per cent. of water.

The Solanaceous plants yielding the so-called mydriatic alkaloids continue to attract the attention of investigators. It will be remembered that the observation that hyoscyamine is under certain conditions readily convertible into atropine raised the question whether atropine ever exists as such in the plant organism. The question has now been answered in the affirmative by Professor Schmidt, who found that while young belladonna roots of one or two years' growth contain only hyoscyamine, roots eight years old and upwards always contain some atropine, whether collected in spring, summer or autumn. It was also ascertained that the leaves of the wild plant contain in spring and autumn hyoscyamine and some atropine, whilst the ripe fruit contains only atropine. Dr. Siebert similarly obtained from the flowering plant of *Anisodus luridus*, only hyoscyamine, but from the ripe seeds only atropine. The alkaloid of stramonium seeds is said by Professor Schmidt to consist essentially of hyoscyamine, with small quantities of atropine and hyoscine or oxyatropine, whilst one sample of duboisia leaves yielded only hyoscyamine and another only atropine. No evidence was obtained however that long storage has any influence upon the alkaloids. It may be mentioned here also that conflicting statements render the identity of the substance sent out under the name "duboisine" somewhat doubtful. A statement, more than once repeated, that crystalline hyoscine had been obtained from the roots of *Scopola atropoides*, has proved to be founded upon a mistake, the crystalline base being found upon analysis to correspond in composition with the formula $C_{17}H_{21}NO_4$, that of hyoscine being $C_{17}H_{23}NO_3$. The new base has also been obtained in small quantities from belladonna, duboisia and stramonium, and was also recognized as a constituent of some commercial samples of "hyoscine hydrobromide." Another new base, having however no mydriatic property, has been separated from belladonna root by Dr. Hesse, who has named it "atropamine," and represented it by the formula $C_{17}H_{21}NO_2$. In a paper read before the Pharmaceutical Conference Mr. Gerrard gave the results of experiments made with a view to determine the relative alkaloidal value of annual and biennial henbane, from which he drew the inference that the preference shown for the latter over the former is founded on prejudice. At any rate he found that annual henbane leaf and biennial henbane first year's leaf and second year's tops yield practically the same percentage of alkaloid, and that biennial first year's root yield a percentage two and a half times more than that given by the leaves or tops of either variety. He also reported that the biennial root yields with rectified spirit an extract which is comparatively free from objection able taste and odour and could easily be standardized. Commenting upon this Miss Squire pointed out that the first year's roots must necessarily be an expensive material in consequence of the smallness of the crop and the loss of the second year's leaves and flowers. Subsequently Mr. Grierson gave reason for supposing that sometimes, at least, the foreign henbane consists of the leaves and tops of the annual plant, and that the purple striation of the corolla is not, as is generally supposed, characteristic only of the flowers of biennial henbane. At the same meeting Mr. Holmes drew attention to the characters of the variety of strophanthus seeds used by Professor Fraser in his experiments, and urged that other varieties should not be used for pharmaceutical purposes until their physiological action was better known. From white hellebore root (*Veratrum album*), besides the jervine, rubijervine and pseudojervine of Messrs. Wright and Luff, Herr Salzberger has separated two other crystalline alkaloids, protoveratrine and protoveratridine, the former of which, from its intensely toxic properties, he considers to be the active constituent of the root. The introduction of the slightest particle of protoveratrine into the nostril provokes violent sneezing and the formula attributed to it, $C_{32}H_{51}NO_{11}$, suggests a near relationship to veratrine. Experiments by Herr Aweng upon pomegranate root bark seem in their results to indicate that not only does the total amount of alkaloid vary widely in different samples, but also the relative proportion of the active to the inert alkaloid; further, that when the bark is kept a change may take place in which the alkaloid becomes less readily removable by water. Herr Stoeder has reported upon three varieties of pomegranate root bark, received from Java, where the plants yielding them are distinguished as red, white and black flowered; the bark from the red flowered plant gave the largest yield of alkaloid. An Indian bark from *Oroxylum Indicum*, reported to possess powerful sudorific properties, has been examined by Messrs. Naylor and Chaplin, who separated from it a characteristic principle having apparently the characters of a quinone derivative, which they have named "oroxylin." The leaves of *Strychnos Nux-Vomica* have been found by Mr. Hooper to be free from strychnine, but to contain sufficient brucine to make them poisonous to cattle. Mr. Hooper has also examined a Persian drug imported into Bombay under a designation meaning "sweet pellitory" (*Tanacetum umbelliferum*, Boiss.), and found it to contain a minute quantity of pyrethrin. Further, he has examined the fruit of *Luffa echinata*, Roxb., reputed to be violently cathartic and emetic, and separated from it a poisonous glucoside identical with, or allied to, colocynthitin. The fruit of *Erythroxylon Coca*, grown in India, has also been examined by Professor Warden, who found in it traces of an alkaloid that appeared to be cocaine. A "cream of tartar" fruit received from Pretoria, probably derived from *Adansonia madagascariensis*, failed in the hands of Mr. Millard to quite justify its cognomen, since its characteristic salt proved to be acid-malate of potassium. Mr. Thompson has reported that he finds the leaves of *Barosma serratifolia* to yield less essential oil and mucilage than those of either *B. betulina* or *B. crenulata*, from which he infers that they are of less medicinal value. Another item has been added to the long list of adulterants of saffron by Mr. Kirkby, who found in a sample fibrous particles that appeared to have been derived from one of the sedges. Honey has been the subject of an interesting paper by Dr. Haenle, who recognized in the occurrence of a dextrorotatory "coniferous" honey a reason for revising existing views as to using the polariscope for detecting admixtures; in addition Professor Anderson Stuart has afresh called attention to some peculiarities in the commercial history of "eucalyptus honey."

A considerable amount of other work has been done in respect to the constituents of vegetable drugs. Opium has been made to yield still one more alkaloid, tritopine, represented by the formula $C_{42}H_{54}N_2O_7$, while codeine has been shown to be "incompatible" with morphine sulphate, throwing the morphine out of solution so completely as to allow of the reaction being used as a means of estimation. Dr. Hesse has contributed further to the history of the little-known isomers of quinine and cinchonine. Mr. J. C. Umney has pointed out a flaw in the official test for physostigmine. Messrs.

Thorpe and Robinson have attributed to frangulin, the glucoside of *Rhamnus frangula* bark, the formula $C_{22}H_{23}O_9$, and by hydrolysis have obtained from it a product that they consider to be identical with the emodin of rhubarb. Mr. Blunt has suggested the determination of emetine by alkalimetric titration. But probably the most interesting work has been accomplished in connection with cocaine. It has been observed by Messrs. Ladenburg and Hundt that by the action of potash on ecgonine, the decomposition product of cocaine, it is converted into a dextro-rotatory base from which can be built up a compound differing from ordinary cocaine in being dextro-rotatory; the ethyl, propyl, butyl and amyl homologues have also been prepared, and all proved to possess the anæsthetic property. Another investigation has established an interesting relationship between the alkaloids cocaine and atropine. Consideration of the probable constitution of ecgonine and tropine, the basic decomposition products of these two alkaloids, suggested that their respective anhydrides, anhydroecgonine and tropidine, differed only in the former being a carboxylic derivative of the latter, and Dr. Einhorn confirmed this by splitting off the carboxylic group from anhydroecgonine and converting it into tropidine. Of less chemical importance, but still of pharmaceutical interest, is the observation that borax in dilute solution is capable of decomposing cocaine hydrochloride, the reaction being preventible by the addition of a little boric acid.

Essential oils have again contributed their quota of papers. Mr. Sawer has given interesting information as to the cultivation in Sussex of rosemary and lavender, and the distillation of their respective oils, whilst Dr. Blondel has published details as to rose cultivation in the Balkans, and the production of otto of rose. Oil of betel leaves has been the subject of a communication from Mr. Kemp, though its history has not yet been made clear. Norwegian carraways have been found by Dr. Nicolaysen to yield a high percentage of oil of rather inferior quality. A very large amount of information respecting essential oils has also again come from the laboratory of Messrs. Schimmel and Co., including not only contributions to the chemical history of known oils, but details as to several distillates rarely or never before prepared. Of the fixed oils, croton oil has been the subject of more than one investigation, the tendency of which has been to show that the violently irritating properties of the oil are due to the presence of free crotonoleic acid gradually liberated from a glyceride present in the seeds, and to suggest that for medicinal purposes only a neutral oil should be used, which can be obtained by treating crushed seeds first with absolute alcohol to remove free crotonoleic acid and then with petroleum ether. Cod liver oil has also been the subject of an exhaustive investigation by Messrs. Gautier and Mourgues, whose results show that the oil, as might be expected, has a very complex composition.

The enormously increased cost of gum arabic continues naturally to be provocative of search for possible substitutes. At the first evening meeting in the year at Edinburgh, Mr. Maben presented a useful summary of the information available in respect to twenty-one commercial gum samples. Many of these were judged inadmissible for pharmaceutical purposes on account of their colour, if for no other reason; but picked samples of Cape, Senegal, and Barbary gums, and the paler varieties of Indian amrad and ghatti gums, were considered to be of relative value in the order they are named. Mr. Mander is, however, inclined to give a higher place to ghatti gum, an opinion that is shared by Mr. Henry. In March Mr. Holmes called attention to a "white Mogador gum," which he suspected to be a Soudan gum finding a fresh outlet at Mogador. But the most useful contribution to the literature of gums has been made by Mr. J. H. Maiden, the Curator of the Technological Museum of New South Wales. In a paper on the "Chemistry and Commercial Possibilities of Wattle Gum," Mr. Maiden has dealt with the different varieties of gum passing under that name in Australia and yielded by species of *Acacia*. These he divides into three groups, the "arabin" group, the "connecting" group and the "metarabin" group. The first group contains the products of *Acacia holophylla*, *A. pendula*, and *A. sentis*, which are described as having arabin for their main constituent, dissolving readily and entirely in cold water and forming excellent substitutes for gum arabic, if obtainable in sufficient quantity. The "connecting" group includes the products of five species, containing more or less metarabin, and proportionally less soluble in water; whilst the "metarabin" group of four, as their name indicates, contain metarabin as their characteristic constituent, and are of little use at present, except, perhaps, as a material for "chewing gum." But Mr. Maiden admits that most kinds of wattle gum fall far below the standard required, and he does not think there is much commercial future for Australian gum, except in the few cases where it is abundant and of sufficiently good quality to compensate for the high price of labour. Other gums that have been the subject of communications by Mr. Maiden are the so-called "cedar gum," from *Cedrela australis*, which contains principally arabin, little metarabin and no resin, and gives a colourless, faintly cloudy mucilage, much like good gum arabic, and one from the "leopard tree" (*Flindersia maculosa*), belonging to the neighbouring natural order Meliaceæ, which is described as being "to all intents and purposes a good gum arabic." Incidentally to another paper Mr. Maiden questions the propriety of retaining the name "bassorin" as distinct from "metarabin." Another exudation, apparently identical with African sandarach, appears to be yielded plentifully by various species of *Callitris* in different parts of Australia and Tasmania.

A large majority of the communications already referred to have an application more or less close to pharmacy, but still there remain many unmentioned representing the practical aspect of the art. Ether having proved an advantageous solvent for substances intended for application to the skin, Sir J. Sawyer has recommended an ethereal tincture of capsicum as a rubefacient, and ethereal preparations of belladonna, iodine, and menthol as liniments. As a sequence to the observation that the carbonic acid gas in aerated water acts as a powerful solvent on quinine, Mr. Lunan has proposed to modify the formula for ammoniated tincture of quinine by using ammonium carbonate instead of solution of ammonia. In respect to the same tincture, Mr. Lothian has made the observation that a deposit formed in it consisted of cinchonidine. The subject of the most suitable menstrua for tinctures was brought before the Conference at Leeds in separate papers by Messrs. Wright and Farr, who are now understood to be continuing the investigation jointly. Mr. Hawkins has called attention to the variability in the strength of liquor ammonii acetatis fortior, and suggested that there should be an official formula for a "concentrated" preparation. A formula for glycerine of belladonna has been suggested by Mr. Johnston; Mr. Boa has recommended the use of kaolin or tragacanth in compound colocynth pill, to prevent "pitting;" and Mr. Collier has called attention to the value of resin soap as an emulsifying agent. Liquid malt extract was dealt with in a very interesting paper read at the Conference by Mr. J. C. Umney, and at the same meeting Mr. Martindale did his best to rehabilitate the character of green iodide of mercury. In conclusion, there have been a number of other communications on pharmaceutical subjects, such as those on the "nychtemerum" process, by Mr. Ince; concentrated infusions and decoctions, by Mr. Moffat; ointments, by Mr. Hyslop; oleates and liquid and medicated soaps; plaster and plaster spreading, by Mr. Wokes; and suppositories by Messrs. Hocking and Brooke.

The story of the year would not be complete without a reference to some who during the past twelve months have been called to join the majority. George Kerner, formerly director of the celebrated quinine factory at Frankfort; Karl Jacob Löwig, at one time an assistant to Gmelin and afterwards successor to Bunsen in the chair of chemistry at Breslau; and Heinrich Will, the colleague and successor of Liebig at Giessen, were men of more than continental reputation; while in Thomas Carnelly death snatched away an English chemist who had done good work, but at an age when more might have been expected from him. In William Kitchen Parker science lost a man who left the dispensing counter to become Hunterian Professor of Anatomy. Aquilla Smith, of Dublin, took an active part in the early history of the Pharmaceutical Society of Ireland, whilst William Hodgkinson served as an Auditor and was a staunch supporter of the sister society in Great Britain. Among the other losses sustained by the latter society may be mentioned William Valentine Radley, for several years a member of the Council; Alfred Badger, of Barnsley, William W. Broom, of Exeter, Edward Waller Martin, of Guildford, John Reed, of Montrose, and William Willan, of Preston, Local Secretaries; William Smeeton, of Leeds, Deputy Superintendent of Examinations and Vice-President of the British Pharmaceutical Conference; and George Balls and Thomas Oliver Sandell, London Divisional Secretaries.

SIR RICHARD QUAIN, BART.

Among the list of recipients of New Year Honours conferred by Her Majesty we notice with much pleasure that Dr. Richard Quain, M.D., F.R.S., has been raised to the dignity of a Baronetcy of the United Kingdom. Those who are acquainted with the services rendered by Dr. Quain to medicine will appreciate in that relation the fitness of the honour that has thus been conferred upon him by Her Majesty. But we may remind our readers that the services Dr. Quain has rendered to pharmacy have also been considerable. He has long been an Honorary member of the Pharmaceutical Society, and in the capacity of Chairman of the Pharmacopœia Committee of the General Medical Council, he has quite lately been instrumental in the arrangement of a co-operation of pharmaceutical with medical authorities which entitles him to the grateful appreciation of all connected with British pharmacy, as having thus given effect to a desire which has so long been entertained by them. The graceful compliment paid to the Pharmaceutical Society by the Chairman of the Pharmacopœia Committee of the Medical Council, in moving a vote of thanks for the assistance rendered in preparation of the Addendum to the Pharmacopœia, must be fresh in the memory of the readers of this journal, and we feel sure that they will rejoice to think that among the friends of the Society and in the roll of its honorary members will stand the name of Sir Richard Quain.

We have great pleasure in stating that Mr. William Gowen Cross, pharmaceutical chemist and member of the Council of the Pharmaceutical Society, has been appointed a Justice of the Peace for the borough of Shrewsbury.

* * *

We are informed that Mr. Carteighe has accepted an invitation from the Aberdeen and North of Scotland Society of Chemists and Druggists to a conference to be held in their rooms on Monday, January 19, at 12 o'clock noon. On behalf of the Society we are requested to express the hope that the chemists in the north and north-east of Scotland will make an endeavour to be present.

* * *

The second annual Conversazione of the Dundee Chemists' Assistants and Apprentices' Association will be held on the evening of Tuesday, January 20, in Gray's Rooms, Dundee. It is proposed that the chemists of Dundee and district should meet on the afternoon of the same day in conference with the President of the Pharmaceutical Society.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, January 8, when a paper will be read on "The Separation of Calcium and Strontium," by Mr. W. B. Haile, and Mr. E. C. Boucher will give a report on "Organic Chemistry."

* * *

The first meeting of the second part of the fourteenth session of the Chemists' Assistants' Association, which will be held at 103, Great Russell Street, on Thursday next, the 8th inst., will take the form of a "musical and social" meeting, under the chairmanship of Mr. Henry S. Wellcome.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Thursday, December 18, at 4·30 p.m.

Present: Mr. Martindale, President, in the chair. Messrs. Carteighe and Gerrard, Mr. Davies, Hon. Treasurer, Messrs. Naylor and Ransom, Hon. Gen. Secs., and Mr. J. C. Nightingale, Asst. Sec.

The minutes of the previous meeting were read and confirmed.

A proof copy of the portrait group of the Executive, by the Meisenbach process, was laid on the table and approved.

It was moved by Mr. Carteighe, seconded by Mr. Davies and carried, that the Hon. Gen. Secs. be authorized to order the required number of copies.

The Chairman informed the meeting that the Unofficial Formulary was out of print, and that it would be necessary for the Committee charged with its preparation to take in hand at once the revision of the 1889 issue.

An application for the post of Assistant Secretary, about to be vacated by Mr. J. C. Nightingale, was read from Mr. M. K. Johnson, of 30, Morval Road, Brixton, S.W. Mr. Naylor stated that this was the only application that had been received.

It was proposed by Mr. Carteighe, seconded by Mr. Gerrard and carried, that Mr. M. K. Johnson be appointed Assistant Secretary to the British Pharmaceutical Conference, at a salary of £40 per annum, with an additional £10 per annum for attending the annual meeting, and £10 per annum for rent of room for warehousing the Conference property.

A communication from the printers of the 'Year Book of Pharmacy' stated that the 1890 edition would be ready for distribution amongst members at the end of December.

The President read portions of a letter from Mr. A. Coleman, Local Secretary, Cardiff, in which it was intimated that preliminary arrangements for the reception of the Conference were in active operation and progressing satisfactorily.

It was announced that the following donation had been received, for which the thanks of the Committee were duly accorded:—A paper on "The Natural Mineral Waters and Spa of Leamington," by R. E. Wilmot, M.B.

At an adjourned meeting held the following day sixteen gentlemen were elected to membership.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The meeting held at 103, Great Russell Street, on Thursday, November 20, Mr. A. Campbell Stark, President, in the chair, was devoted to the reading of the following short papers by members:—

The Sale of Milk of Sulphur.

BY C. E. PICKERING.

I desire to draw the attention of the members of this Association and assistants generally to the sale of milk of sulphur, a subject which has attracted considerable attention and discussion formerly, and which has again arisen in connection with the prosecution of two chemists in Pimlico quite recently. For the benefit of those who are not acquainted with the facts of these particular cases, I will briefly relate them.

The defendants were summoned at the instance of the St. George's, Hanover Square, Vestry for selling a drug not of the nature and substance demanded.

The inspector on these respective occasions asked for precipitated sulphur, a B.P. preparation.

The public analyst certified that one chemist supplied an article containing 43·8 per cent. of sulphate of calcium (plaster of paris), the other an article containing 39·5 per cent. Such a quantity of lime sulphate, he added, which is a non-volatile mineral matter, is decidedly injurious to health if taken internally, and if the sulphur is used externally for skin disease its beneficial action would be lessened by the addition, even if the foreign substance did not have an irritating effect.

In reply to the magistrate he said that there was no such thing as milk of sulphur recognized in the British Pharmacopœia, and what is perhaps more remarkable said, when people asked for it they should be supplied with pure sublimed sulphur or with precipitated sulphur.

In the case of one of the chemists his temporary manager admittedly made a mistake. In that of the other, the proprietor himself believing it to be genuine sold it in good faith. But, unfortunately for him, it was in the business when bought, and he had not tested it.

The magistrate in dealing with the matter remarked that it was of the utmost importance that the public should be supplied with pure drugs, and fined each of the defendants £5 and one guinea costs.[*]

These facts were very widely circulated at the time in most of the London newspapers and commented on in some, being reported also in our representative weeklies; and, as I have thought our collective and individual interests and reputations are affected by the opinions expressed by the press and public, I have thought it necessary to bring it before you that your discretion may direct you how to act, in case at any time you may be unfortunate enough to be placed in a similar predicament.

Of course, you will not follow the analyst's advice and supply sublimed sulphur when either precipitated or milk of sulphur is inquired for, or the consequences may be disastrous from other than his point of view.

Nor will it always do to label the article usually sold "milk of sulphur," for the inspector might expect the old lac sulphuris, in which case you may still be trapped into "selling a drug not of the nature and substance demanded." The introduction of the word best, seeing that there is still another preparation, before the words "milk of sulphur" would temporarily overcome the difficulty, but there is a better way.

Let me first point out the public analyst's errors. As reported, he appears to have represented sulphate of calcium as the same thing as plaster of paris. Well, it is not so, though there is a close analogy. The chemical formula for the former is $CaSO_4, 2H_2O$, that of the latter being $CaSO_4 + H_2O$.

In other words plaster of paris is nearly anhydrous $CaSO_4$; sulphate of calcium, as used in the testing solution of the British Pharmacopœia, contains two molecules of water of composition. However, this is a comparatively small matter.

With regard to his statement that milk of sulphur is not recognized in the British Pharmacopœia, permit me to say that if under the heading of sulphur præcipitatum, milk of sulphur were inserted officially as a synonym, it would help to prevent further prosecutions of this kind.

Let us see what the editors and other authority say. Professor Redwood, as long ago as 1857, gave sulphur præcipitatum, lac sulphuris, precipitated sulphur and milk of sulphur as all synonymous.[†]

Professor Attfield does the same more recently, except that he does not mention the term lac sulphuris.[‡]

Professor Bentley, of course, is silent on the subject, as it is obviously outside his department.

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[*] *Pharmaceutical Journal*, Oct. 25, 1890, p. 351.

[†] Redwood's 'Supplement to the Pharmacopœia,' 1857, p. 949.

[‡] Attfield's 'Chemistry,' edit. p. 1889.

Then there is that greatest of all authorities, Dr. Pereira. He informs us, after also agreeing with the above, that milk of sulphur was known as long ago as 1682. It appears to have been prepared then as now, HCl being used. We learn, however, that since about 1842, on account of the extensive adulteration of this preparation, it has been omitted from all the British Pharmacopœias; and that in the preparation of nearly the whole of the precipitated sulphur of the shops, sulphuric acid is substituted for hydrochloric acid, by which the product contains about two-thirds of its weight of sulphate of lime. A sample analysed gave of—

Sulphate of lime	50
Water of crystallization	13·1
Sulphur	36·9
Lac sulphuris of the shops	100·0[*]

From this evidence it is pretty certain that the preparation containing so large a percentage of so sparingly soluble a salt as we know sulphate of calcium to be, cannot, to say the least, be an article likely to assist nature in restoring the proper functions of certain parts of the human economy. Why should chemists wish, as some have done, to further the sale of so doubtful a remedy? Rather should we desire to relegate a past apparent impurity to oblivion, like witchcraft and quackery, than by retarding recovery of health in supplying a probable remedy contaminated with the nearest approach to plaster of paris, endanger the public health and our reputation.

The object of this communication will have been attained if it assists, however little, in inducing the General Medical Council to put the matter of the sale of milk of sulphur beyond doubt in the next reprint of the British Pharmacopœia, by informing us officially that it is, or it is not, sulphur præcipitatum that should be supplied, and thus effectually aid in preventing what cannot but be exceedingly annoying, somewhat frivolous, and certainly injurious prosecutions to us as a body, and particularly to the individual chemist or assistant concerned.

The President observed that the question of the sale of milk of sulphur was a very vexed one, and although he could agree with Mr. Pickering, there still seemed to be a doubt as to what milk of sulphur really was. He thought it depended upon the discoverer of the article. When it was first manufactured was HCl or H_2SO_4 used for precipitation? When he was an apprentice the pure milk of sulphur was regarded as more or less a curiosity, but he believed that all chemists should now sell precipitated sulphur, B.P., when milk of sulphur was asked for.

Mr. McDiarmid understood that in the cases Mr. Pickering had referred to the inspector did distinctly inquire for precipitated sulphur.

Mr. Ellwood said that the chemist was only justified in selling the article demanded and that alone. If the examinations were of any use at all, surely they should enable the pharmacist to test so simple a drug as precipitated sulphur, and for a chemist to plead ignorance as to the nature of his stock, as many had done who had acquired the stock and fixtures of old businesses, showed gross carelessness. If the pharmacist were not capable of testing his drugs for himself he had two alternatives, either get some one else to do it for him or throw them away. He thought that the synonym "lac sulphuris" ought to be inserted in the Pharmacopœia under "precipitated sulphur." He entirely disagreed with the opinion expressed in the *Pharmaceutical Journal* (Nov. 15, p. 402), that the pharmacist who sold "precipitated sulphur" when "milk of sulphur" was asked for was equally to blame with the man who retailed the old "milk of sulphur" when "precipitated sulphur" was demanded. His views on pharmaceutical progress were well known to the members of the Association, and he should always maintain that the pharmacist should keep progress with the times. Laudanum, paregoric, etc., were included as synonyms in the Pharmacopœia, to ensure the product being identical in all parts of the country. Redwood and Pereira, to whom Mr. Pickering had referred, were getting old fashioned. He hoped they should not go back to these nor to the animal materia medica of the past.

Mr. Mason, who said he had had much to do with milk of sulphur prosecutions, thought the matter was one which the public should decide. In some parts of the country people had got into the habit of using milk of sulphur which contained 50 per cent. of calcium sulphate, and they would have no other; whilst in other parts precipitated sulphur was asked for under the name of "cream of sulphur," because the article formed a cream which floated near the top of the water with which it was mixed.

Mr. Pickering, in reply, said he agreed with Mr. Ellwood and Mr. Mason that the prosecutions were perfectly just. It was possible that other impurities besides calcium sulphate might be present, as was the case with some black sulphur in which he had found traces of arsenic. He had mentioned the older authorities because years ago the article was known to be of varying composition. His object in bringing the matter forward was to show the necessity of deciding what really should be sold as "milk of sulphur."

A CHEMICAL PROBLEM.

BY W. LLOYD WILLIAMS, A.I.C.

In September of the present year a friend wrote me as follows:—

℞ Ammonii chlorid.	ʒj.
Sodii bibor.	℥ij.
Sodii bicarb.	℥ij.
Acid carbolici.	24 grs.
Aquæ	ad ℥ vj.

The above is the form for a lotion which always goes black on being kept, even when put in a glass stoppered bottle. Can you explain it?

The reply to this query forms the subject matter of this short note.

It has probably been noticed by each one present that when solutions of salicylate of sodium and an alkaline bicarbonate are mixed and kept for some time a blackening occurs, and reasoning by the letter of the inquiry and the light of experience I conjectured that the coloration might be traced to some action of the sodium bicarbonate upon the phenol. To test the value of this conjecture I made up the lotion according to the prescription and watched its behaviour.

I was speedily undeceived; in the course of some four and twenty hours a distinct change was perceptible, but the direction of the change was not in accordance with the symptoms exhibited by the salicylate mixture.

The tint gradually assumed by the lotion is of a bluish-purple colour, that of the salicylate mixture proceeds through yellow and brown to inky black.

Besides, it is stated that there is no reaction between alkaline carbonates and phenol, and I find no coloration attends an admixture of sodium bicarbonate and phenol, nor yet of borax and phenol.

I next put together the borax, soda, phenol and water. Beyond the development of a faint yellow tint no change was observed. The passage of a considerable volume of air did not intensify the tint, and no change in colour attended the passage of carbon dioxide through a solution of borax and phenol, whence I concluded that CO_2 was in no way answerable for the phenomenon.

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[*] Pereira's 'Materia Medica,' 1842, vol. 1, p. 462.

Having to a certain extent disposed of the soda salts, I felt free to introduce the chloride of ammonium, and my next step was to make a solution containing that compound, bicarbonate of sodium and phenol. No change was noticeable here for a fortnight, but at the expiration of that time a faint difference in tint could be detected, and it has gradually increased in intensity. Meanwhile I was pursuing my inquiry, and amongst other things I tried the effect of passing free ammonia into an aqueous solution of phenol. Here I observed the change in colour which I was seeking; the solution commenced to darken two days after I had conducted the experiment, and behaved in a fashion corresponding with the development of colour in the original prescription. I repeated the experiment and kept the solution in the dark; the only difference was that the coloration was slightly retarded.

I had now arrived within measurable distance of an explanation of the phenomenon, the coloration is caused by the action of free ammonia upon the phenol.

The origin of the ammonia is sufficiently obvious. We all know that it is set free from its salts by the action of an alkali, and sodium bicarbonate and borax, I need hardly remind you, are both alkaline.

I had not anticipated that ammonia would be more freely developed by the action of borax upon sal-ammoniac, than by the action of sodium bicarbonate upon that salt, but the ammoniacal odour is much more marked, and the action upon phenol is more prompt in the former than in the latter case.

In conclusion, I formulate the proposition that the darkening in colour is due to the action upon phenol of the ammonia liberated from the ammonium chloride by the joint action of borax and sodium carbonate.

One word as to the colour. It is not black. It appears black after long standing when viewed by reflected light, but by transmitted light the bluish-purple tint is readily seen.

The mechanical part of these experiments was carried out for me by Mr. A. Gunn, in the experimental laboratory at Galen Works, New Cross.

The President, in congratulating Mr. Williams on the success of his experiments, said that the blackening produced on mixing ammonia with carbolic acid was not new to him. He had frequently made an alkarum by adding ammonia and carbolic acid to sawdust. Could Mr. Williams inform him what the compound formed really was?

Mr. Strother asked if the colour had any relation to the change of colour observed in carbolic acid on keeping; carbolic acid lozenges, for instance, frequently discoloured.

Mr. Richards remarked that the blackening observed in an alkaline solution of salicylate of sodium would not occur if the natural product were used.

Mr. Williams, in reply, remarked that the subject of the colours of phenol and its derivatives was too wide to dwell upon on that occasion. He noticed that it acted like litmus, turning acids red and alkali blue. In answer to Mr. Richards he did not think it had been definitely proved that if the natural product were used the darkening would not occur. It was curious that mixtures of bicarbonate and salicylate of sodium did not change colour so rapidly when the salts themselves were weighed out and dispensed as when stock solutions were used. Replying to Mr. Strother, Mr. Williams said that pure carbolic acid should not darken in colour, and the discoloration of the lozenges was probably due to some such impurity as rosolic acid.

In the unavoidable absence of the author, the President called upon the Hon. Sec., Mr. Seccombe, to read the following paper:—

SUPPOSITORIA MORPHINÆ C SAPONE.

BY FREDERICK DAVIS, B.SC.

Complaints having been made to me by a leading consulting physician, relative to the varying sizes of these suppositories as dispensed by pharmacists in different parts of the country, I deemed it expedient to obtain samples from dispensing chemists and estimate the amounts of morphia hydrochlorate, at the same time comparing their sizes. One suppository was examined in each case from each batch received, and repeated a second time for verification.

It will be seen from the following table the proportion of the active ingredients, namely, the hydrochlorate of morphia, is fairly regular, and pharmacists may be complimented upon the accuracy of the preparation compared with the standard formula of the Pharmacopœia; one point, however, is particularly noticeable, the variability in size. This may possibly be accounted for by the lack of concise directions upon the point in the Pharmacopœia. To obviate this the idea suggests itself to slightly alter the directions of the Pharmacopœia and order that each suppository shall weigh exactly a given weight, the most convenient being probably fifteen grains. This might easily be arrived at by ordering the mass to be made previous to adding the morphia hydrochlorate, and not as at present by adding the morphia to the soap and glycerine of starch and making to the proper consistency with starch.

It will be observed in the appended table the proportion of the soap is fairly accurate as compared with the Pharmacopœia. It is therefore evident the larger sizes must be produced by the starch.

I have reason to believe castile soap was employed in several instances in place of curd soap.

Example.	Weight in grains.	Morphia hydrochlorate. Grains.	Consistence.	Soap. Grains.
1 . . .	17	½	soft	8¼
2 . . .	17½	⅘	soft	8⅖
3 . . .	19	½	firm	8½
4 . . .	18	½	soft	8⅕
5 . . .	15½	½	very soft	8
6 . . .	17	½	soft	8½
7 . . .	16	½	soft	8¼
8 . . .	15	½	very soft	7½
9 . . .	21	½	firm	8
10 . . .	20½	½	firm	8⅓
11 . . .	15	½	very soft	8
12 . . .	16½	⅗	soft	8½
13 . . .	17	½	soft	9¼
14 . . .	17½	½	soft	8
15 . . .	17	½	soft	8
16 . . .	16	½	soft	8
17 . . .	15½	½	very soft	8¼
18 . . .	18	½	firm	8½
19 . . .	18½	⅔	firm	8½
20 . . .	22	½	very firm	12
21 . . .	20	½	very firm	12½
22 . . .	15	½	soft	8
23 . . .	15	½	soft	7¼
24 . . .	22½	¾	very firm	10

The President said it was gratifying to note that pharmacists were fairly accurate in the making of suppositories. He did not think that the soap and glycerine bases of the Pharmacopœia were very serviceable. Medical men as a rule did not prescribe them, as they were not absorbed by the intestine.

Mr. Strother thought that, as was the case with lozenges, so with suppositories a standard weight was very desirable.

Mr. Pickering thought that something definite should be inserted in the Pharmacopœia as to the size of the moulds. In reference to the basis, he remarked that it was now customary to use oleum theobromæ, unless otherwise ordered.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting, being the second open meeting of the thirteenth session, was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, December 17, at 9.15 p.m., Mr. Donald McEwan, President, in the chair.

The minutes of last meeting having been read and approved, the following communications were read:—

SOLUTION OF LITMUS.

BY WILLIAM DUNCAN.

It is well known that solution of litmus, made with plain water in the usual way, soon begins to lose its colour and its value as an indicator in alkalimetry. This bleaching of the litmus solution is not due, as has been alleged, to the absorption of gases from the atmosphere. From the method of its production it will readily be understood that litmus dissolved in water forms an excellent *nidus* for the development of micro-organisms, and it is to the presence and growth of these organisms that the loss of colour is to be attributed. They require for their growth a supply of oxygen, and this is obtained from the colouring matter of the litmus, which is thereby reduced to a colourless body. By exposure to the atmosphere oxygen is again absorbed and the solution becomes blue. Hence the common expedient of preserving solution of litmus by keeping it in an open or loosely stoppered bottle.

I have recently made some experiments with various antiseptics with a view to discover some simple means of overcoming the deterioration to which this solution is liable. I find this object is most satisfactorily attained by substituting chloroform water for distilled water in making the solution. I have here two samples of the solution. The one is made with distilled water, and you will observe that the characteristic litmus colour has, to a considerable extent, disappeared. The other has been made with chloroform water and is practically as good and as deep coloured as when it was made. Both samples have been kept upwards of seven weeks. The use of chloroform water thus secures a permanent solution of litmus and does not in any way interfere with its use as an indicator.

ESTIMATION OF IRON IN PRESENCE OF GLYCERINE.

BY WILLIAM DUNCAN.

About six years ago, when workingon Blaud's pills, I noticed that, when massed with glycerine, they invariably gave a very high reading for ferrous carbonate. I was reminded of this the other day, when estimating some ferri carb. sacch., the ferrous carbonate for which had been precipitated in presence of glycerine. I found the yield of $FeCO_3$ to be almost 100 per cent. The reducing action of the glycerine being suspected, a 2 per cent. solution of ferrous sulphate was prepared, and also a second solution of the same strength to which 2 per cent. of glycerine was added. The first solution, on estimation, indicated 1·989 or practically 2 per cent., while the second, containing glycerine, indicated 2·61 per cent. of ferrous sulphate. The experiment was repeated several times with concordant results, thus proving that the presence of the glycerine gave rise to an error amounting to 33 per cent. in excess of ferrous sulphate actually present. It is evident therefore that glycerine is quite as liable to lead one astray as sugar in estimating a ferrous salt, and, where accuracy is required, it must either be got rid of before the estimation is proceeded with or be allowed for in calculating the results.

The President then described a collection of thirty-one local plants recently added to the Association's Herbarium giving many interesting details as to the history, nomenclature, structure, and uses of the various specimens which were exhibited.

PILL EXCIPIENTS.

BY JOHN FINDLAY.

The object of this note is merely to suggest an alteration in the excipient ordered by the Pharmacopœia for the following pills:—(1) Pil. aloes barb.; (2) Pil. aloes et myrrhæ; (3) Pil. aloes socot.; (4) Pil. plumbi c. opio; and (5) Pil. rhei comp.

The official excipient for all these, with the exception of pil. aloes et myrrhæ and pil. rhei co., is confection of roses, which gives a mass with difficulty, and is open to the objection that the pills soon become crumbly. The two exceptions are massed with treacle and glycerine, which give a mass rather too tough and doughy, so that the pills are apt to lose the rounded shape when cut. My experiments were undertaken with a view to overcome these difficulties, and the results lead me to suggest the following alterations. In the case of pil. aloes barb and pil. aloes socot., for 1 ounce of confection of roses in the official formula I would substitute 1 fluid drachm of either compound decoction of aloes or fluid extract of liquorice. Four grains of such a mass would be equal to 5 grains of the official mass. From the pil. aloes et myrrhæ I would omit the glycerine and use 1¼ ounce of treacle only. For the 6 grains of confection of roses in pil. plumbi c. opio I would substitute 3 grains of fluid extract of liquorice. For pil. rhei co. I would use 3 ounces of treacle and omit the glycerine entirely. Working according to the above suggestions, I have obtained satisfactory results.

The reading of the papers was followed by a discussion taken part in by Messrs. Cowie, Duncan, Findlay, Hill, Hoseason, McEwan, Macpherson and Petrie. and on the motion of the Chairman a hearty vote of thanks was awarded to the authors of papers, and to Mr. Duncan, who had charge of the arrangements.

It was intimated that the next meeting would take place on January 7, when papers on "Extractum Belladonnæ," by W. B. Cowie, and "Tinctura Nucis Vomicæ," by A. J. Dey, will be read.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

This Association held its usual meeting on Wednesday evening, December 17. Mr. James Robb, President, occupied the chair, and after approval of minutes called upon Mr. William Bowie to deliver his lecture, the subject being "Notes on the Grasses."

The lecturer began by remarking that the order Gramineæ, although by far the largest and most important in the vegetable kingdom, had hitherto been a somewhat neglected field in the study of botanical science, and that most people applied the word grass indiscriminately to that which, growing in the meadow, was green and had no conspicuous flowers. It was noticed that the principal external characteristic which favours the growth of the grasses in their competition with other plants is their dense root growth, monopolizing as it were all the soil within reach, and affording little power to the roots of other plants to permeate the mass. To an extent variable in different species this root growth is superficial as well as deep, and in addition many of them are aided in their struggle for life by their stout tufted habit, and specially by the power of producing above and below the ground creeping offshoots which insinuate themselves in between other plants and occupy any vacant territory. Mr. Bowie also remarked that while in human communities we are in the habit of saying, "That there is no family without a rogue in it," the grass family was an exception, as there are no hurtful nor poisonous plants in the whole order; and were it for nothing else, they are of the greatest value in binding together loose sandy shores with their long creeping roots, and thus forming a natural bulwark against the inroads of the sea. The subject was then treated under five departments, ornamentation, fodder, food, manufactures and medicine. In speaking of ornamental grasses the lecturer noticed that recently a trade in these had sprung up in our midst, home and foreign grasses, dried and sometimes dyed by aniline colours, finding a ready sale in the shops of florists, and furnishing an inexpensive means of parlour and table ornamentation. The Glasgow district is peculiarly rich in specimens of the order Gramineæ, and Hennedy, in his 'Clydesdale Flora,' mentions about thirty genera. An almost complete collection of these, nicely mounted, was shown at the meeting, some of the specimens of rare beauty, such as the spreading millet grass (*Millium effusum*), the wood melic grass (*Melica uniflora*), the waved hair grass (*Aira flexuosa*), the quaking grass (*Briza media*), etc. In dealing with the foreign grasses used for decorative purposes a large collection was also shown and described, notably:—The pampas (*Pampas Synereum*), the fairy grass (*Agrostis pulchella*), the German millet (*Setaria Germanica*), (*Uniola paniculata*), the awns of *Stipa pinnata* and many others. Mr. Bowie then passed on to the consideration of fodder-grasses, and stated that this subject was of great importance in scientific farming, and that the teaching of agricultural colleges dealt to a great extent with the adaptability to soil, and the use of certain grasses in cattle feeding. Timothy grass (*Phleum pratense*), so named after Mr. Timothy Hansom, perennial and Italian rye grasses (*Lolium perenne* and *Italicum*), the cock's foot grass (*Dactylis glomerata*), were shown and described, all of which made good hay and possessed highly nutritive qualities. The lecturer then took up for consideration the food grains of the world and expressed surprise that in such a large order only some eight or nine species were used for food. A history of the origin and habit of cultivated grains was given (*Triticum vulgare*) wheat, (*Oryza sativa*) rice, (*Zea mays*) maize, (*Avena sativa*) oats, etc., was given, and it was regretted that oatmeal, which at one time formed the staple food of Scotland, was now quickly passing into disuse. In dealing with the subject in its relation to manufactures the use of grass fibre in mat, brush, and broom making was discussed, and a lengthened explanation given of the introduction by Mr. Routledge and the great value of esparto grass in the preparation of pulp for paper making; several good specimens of esparto (Spanish and Tripoli) and (Bahri) India grass from a local factory were shown. In the closing part of the lecture the medicinal grasses were considered, the lecturer explaining the action of the fungus (*Cordiceps purpurea*) on *Secale cereale*, and the use of creeping couch grass (*Triticum repens*) and the pistils of maize (*Zea mays*) in the treatment of disease. In concluding a most interesting lecture, Mr. Bowie stated that a study of the subject illustrated the great law of compensation, for although the grasses had no striking perfume nor brilliant coloured flowers, they proved of estimable value to the human race. So the lesson ould be drawn that every man, no matter how humble is talents or obscure his sphere might be, was able to ake his life useful and helpful to those around him.

Mr. Gilmour, while complimenting Mr. Bowie, wished point out that the tendency of modern research was show that the extreme north (where evidences of a gone tropical climate were multiplying) rather than e east, was the source of animal and vegetable life. also referred to the influence of a plentiful supply food on the progress of civilization, mentioning the vanced culture of ancient Egypt as referable to the fertility of the Delta. The diminished use of oatmeal, he thought, in Scotland, was a sign of progress; greater variety in diet having removed one reason for the Englishman's former epithet of "scurvy Scot." Mr. Gilmour drew attention to the extensive use of alcohol in medicine, which had been overlooked by the essayist in enumerating the contribution of the grasses to medicine.

The President, in proposing a vote of thanks, referred to Mr. Bowie's sympathy with his subject and his delight in nature, manifested by reference throughout his paper to the effects of sunshine and gentle breezes on grasses in fields, on the hillside or by purling burns. The essay seemed to be the result of no effort, but the outcome of intimate acquaintance with a subject which was somewhat dry, but which Mr. Bowie had done much to clothe with life and interest. The vote of thanks was cordially awarded.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the present session was held in the Silver Street Hall on Friday evening, December 19. It was well attended, and Mr. G. Cowie, President, occupied the chair. The "Draft Pharmacy Act Amendment Bill" was under consideration, and was introduced to the meeting by papers read by Messrs. R. Leslie and C. Sangster, in which the various clauses were clearly set forth and criticized. The former spoke in favour of the Bill, while the latter upheld the negative side, chiefly because he did not consider that such an anomaly as an enforced curriculum without better protection should be legalized. An animated discussion followed, which was taken part in by the Chairman, and Messrs. Falconer, Forbes, Macdonald, Seivwright and Spence. The almost unanimous finding of the meeting was that the Bill on the whole was worthy of support. A hearty vote of thanks having been awarded to the authors of the papers, Mr. Falconer then tendered his resignation as Secretary, in consequence of his leaving town. It was unanimously agreed to enter in the minutes the loss which the Association thereby sustains, coupled with the wish that all success may attend him in his new situation. Mr. C. Gray was appointed to the Secretaryship.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The Annual Supper of the Midland Counties' Association was held at the Midland Hotel, New Street, Tuesday, December 23, 1890, at 7.30. Members and their friends brought their songs on this occasion, and a demonstration of hypnotism by Mr. Maynard, proprietor of the hotel, greatly amused those present.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Education in Ireland.

Sir,—Mr. Brunker appeals to me. What can I say? The Irish Pharmaceutical Society, more fortunate than the British, possesses powers of Home Rule in pharmacy under which the Society has the opportunity of compelling the future followers of the calling to go through sound courses of education—money-making, power-conferring pharmaceutical education. Will the Irish rise to the occasion?

I tell my friends in Ireland now, as I have told those in Great Britain in the past, that compulsory examination alone will never produce compulsory education; it will only give rise to that false, evanescent, useless and even mischievous form of instruction commonly termed "cram," and cram, by dwarfing the mental powers of the crammed and by encouraging the entrance of men of inferior mental calibre into pharmacy, will lead to the destruction of much of the general retail business of the pharmacist altogether and to the dispersion of what may remain amongst the grocers, drysalters and others on the one hand and the medical practitioners with a few voluntarily educated pharmacists on the other. British followers of our avocation are doing their best to avert such a catastrophe by reorganizing, or rather re-basing compulsory examination upon a sound and lasting, publicly conducted, publicly supervised compulsory curriculum of education, to be adapted from time to time to the needs and requirements of a not too remunerative calling. Have the Irish similar aims? If so, *pace* Mr. Brunker. If not, the sooner they adopt such a policy the better; the better for their duty to pharmacy and to the public and the better for their pockets.

I say that sound pharmaceutical education will fill the pocket. For I see no good reason why the future pharmacist should not be the vendor of most of the articles of food and drink, as well as drugs and all chemical substances, respecting the character or quality of which the purchaser cannot be a judge. But to win this commercial and professional position he must acquire and retain adequate education. At present, as a bread-winner and moneymaker, he is not infrequently the inferior of the traders around him. Why should not he become their superior?

Mr. Brunker must not be disheartened. I also once stood almost alone in the crusade against cram. But as soon as the subject was fairly brought before them, every British pharmacist of authority agreed in denouncing sham and supporting sound education. The cart-before-the-horse wisdom of those who object to compulsion without protection is not worthy of Mr. Brunker's serious notice. As well cry out for customers before stocking your shop. In these days brain culture must precede pocket filling.

Sound and lasting pharmaceutical education will be found to lie at the bottom of nearly every desirable pharmaceutical reform, if the searcher only search deeply enough. The few understand this, and, as regards their own interests, discover their reward in the results of a sound curriculum voluntarily prosecuted. But for the welfare of the majority, if we may judge of the future pharmacist by the present, to say nothing of the welfare of the public, compulsion is necessary.

Put education in the first place, examination in the second. Let the Council of the Society not only draw up a sound practical syllabus of education, but, which is far more important and more difficult, see that it is followed. Allow no candidate to enter the examination hall unless he can show by schedules signed by trustworthy teachers that he has had proper instruction in pharmacy and has properly attended schools periodically visited by the Council or their deputies, where the classes, to quote John Bright, "will stand the fierce light of public attention." Then look to the examiners, by questions strictly limited to the defined area of the education, to ascertain that the candidate shows reasonable evidence that he has acquired the sound and lasting training that he is already known to have had the time and opportunity to acquire. It is useless any longer to endeavour to compel education by examination. As well try to build a pyramid on its apex.

A few years ago I printed, for private gratuitous distribution, a 100-page pamphlet "on the relation to each other of education and examination, especially with regard to pharmacy, with an introduction, opinions of the highest authorities on education generally, letters from leaders in pharmacy, appendices, and an index." I have some copies left, and shall be happy to forward one to any friend in Ireland or elsewhere, who will send to me, at 17, Bloomsbury Square, London, an addressed wrapper stamped for three halfpence.

No doubt the higher the educational attainments and general position of our future pharmacists, Irish or British, the fewer their number in proportion to total population. So much the better for the pharmacists. And, broadly, so much the better for the public. But what about the satisfactory public supply of good drugs in sparsely populated districts? I treated this subject in my Conference Addresses on "The Relation of Pharmacy to the State" and "The Relation of the State to Pharmacy," printed in the journals of pharmacy and the 'Year-Book of Pharmacy' some ten years ago. Of these I have but few reprints remaining, but they are at the disposal of my friends. The selling of goods in packets, the ordering of them by wire as well as by letter, and their distribution by the parcel post, have already removed any important public disadvantages apparently involved in any future relative diminution in the number of pharmacists, urban or provincial.

JOHN ATTFIELD.

Sir,—The Council of the Pharmaceutical Society of Ireland appears to be singularly sensitive to criticism, judging by the letter of its spokesman, Mr. Charles Evans, "*de omnibus rebus*," in your last issue. I must remind the members of that body that, though they do not admit any independent critic into their ranks at present, their proceedings are public property, and that they cannot expect perfect immunity from external criticism.

I pass over a good deal of ancient history in Mr. Evans's letter and come to his admission that possibly there may be defects in the School of Pharmacy as it exists. That is precisely my case. I say it has radical defects, and I presume that the Council will now proceed to investigate them and remove them as soon as possible.

As Mr. Evans has thought fit to introduce personalities, I ask permission to deal with the last clause of his letter which conveys an unjust and injurious imputation.

I admit no reproach for being mainly instrumental in the introduction of the Amendment Act, and I claim that I have done a man's share in having pharmacy law placed on a liberal and permanent basis in this country. Mr. Evans knows perfectly well that the Bill to which I wished *bon voyage* was the draft Bill agreed upon in 1888 between the representatives of the Pharmaceutical Society and of the chemists and druggists.

That Bill I was unable to persuade the chemists and druggists to introduce on their own account; until the Council by its legal action forced them to do so in self-defence.

Mr. Evans knows perfectly well that when the Bill was printed in a mutilated form I at once protested against the changes: and that the promoters agreed to restore in committee the provisions upon which I insisted.

He knows, too, that the Bill was further battered out of shape in committee of the House of Commons, owing to the blind opposition of the representatives of the Pharmaceutical Society; and the ignominious retreat of their Parliamentary champions after firing a blank cartridge or two.

And he knows that the representatives of the Society would have sadly failed in their duty if they had not procured Lord Waterford or some other peer to restore the Bill as nearly as might be to the form in which it was originally drafted.

I only regret that the defects which remain were not removed at an earlier stage by a rational agreement between the rival factions, by which a liberal expenditure of time, money and temper would have been saved.

With reference to the 100 hours question, Mr. Evans is beating the air. No one ever said that 100 hours at a chemical bench would be sufficient to make an analytical chemist; but Mr. Evans did say that they were of "doubtful utility" in the education of a pharmaceutical chemist.

Dublin. J. E. BRUNKER.

⁂ This correspondence must now be closed.—ED. PHARM. JOURN.

Errata.—Through an unfortunate oversight the following corrections have become necessary:—On page 562, col. ii., lines 11 and 4 from bottom, and on page 563, col. i., lines 21, 22, and 24 from top, *for* "urine" *read* "brine;" on page 563, col. i., line 3, *for* "function" *read* "junction;" on page 574, col. i., line 48, *for* "phosphorus and phosphites" *read* "phosphorous acid or phosphites."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Clague, Linford, Yewdall, Britten, Hutchinson, Buck, Pharmakos, Drug Traveller.

PILL COATING.

BY D. HUGHES DAVIES.

Although the process of pill coating is not of a very remote date, the demand for coated pills is far greater at present than for the uncoated ones, and I consider that chemists would be doing rightly in giving this subject more attention than it has as yet received.

There may be various objections to having pills coated, but now the age of elegant pharmacy is getting ripe, anything of a nice outward appearance, and not of an unpleasant taste, is of far greater value in the eyes of the public than the old fashioned article, and I think that the remark, "A white cloak covereth a multitude of sins," holds good in this instance.

I am not prepared to state that pill coating is such an easy matter as some have volunteered it to be, but regard the turning out of a pill with a thorough good polish on it, as a difficult task, until the process has been thoroughly mastered, but after that it is comparatively easy to supply the customer with a pill having quite as beautiful a polish as any machinery can turn out. When a batch does not turn out properly and the culprit is taxed, a remark often heard behind the dispensing department is, "Oh! but there's a lot of knack in coating pills, you know," and I may say that there is a lot of truth in that. However with a little practice everything is overcome. The inability of chemists in some instances where pills are directed in prescriptions to be coated has been the cause of losing good customers. One may try his utmost to explain that the coating has nothing to do with the pill; it is very seldom the customer is enlightened to his own satisfaction.

There are various ways of coating pills, but the first I was ever able to perform was the tolut. and creta gall., which consists in dissolving ʒiij. of residue from making syrup tolut. in ℥iss. of ether, varnish the pills with this solution, and when dry rub over with a little powdered French chalk; there are, however, improvements upon that process which I will try and define.

1st. *The Gelatine Process.*—I will not make any comments upon the many methods of gelatine coating I have tried, but will simply define the one with which I have obtained by far the best results, viz., make the solution from

Gelatine	1 oz.
Water	8 ozs.

Dissolve at a gentle heat, then add the white of an egg, and heat until the albumen coagulates, strain through flannel into a water bath kept at a low temperature, add ʒij. glycerine, ʒij. S.V.R., and acid. boric. gr. vi.

A beautifully clear solution is thus obtained; the clearer the solution the better the polish. When gelatine coating is carried out on a small scale, it is the usual custom to coat the pills singly, but I have adopted another plan and find it answer equally well and occupy considerably less time.

I have a rounded piece of thin wood with a thick layer of cork stuck round the edge, and in the centre a small hole, through which I have a little ferrule, which enables me to place the concern on a small iron peg fastened in a wooden stand.

The cost of making the whole turn out would amount to about ninepence. It is convenient to have three or four boards at hand; the stand, of course, would be adaptable to any of them. I have the boards with good needles firmly fastened in the cork to the number of six, twelve, twenty-four, and forty-eight. Now attach the pills to be coated to the points of the needles and dip in the solution, taking care not to keep them in too long, as a thick coating is undesirable. Place the board with the pills on back on the peg, revolve in a gentle manner to render the coating even, and give it an occasional turn round. By doing the coating in the evening the pills are ready to be taken off the needles and stored away in bottles the next morning.

2nd. *Pearl Coating.*—To do this successfully several conditions are of great importance, without attention to which the French chalk will fail to shine. Care must be taken in the selection of a proper excipient for working the mass, for although pills when pearl coated are not within view of the naked eye, they nevertheless must be properly made to be properly coated.

Glycerine being hygroscopic is not an excipient that should be used.

The pills ought to be as nearly round as possible and moderately hard and dry; it is best to keep them exposed on trays for at least a day before the coating is proceeded with. Should the mass be crumbly the condition may be considered to be one of the most bitter enemies of successful coating; the operation will necessarily be a failure, as the pills will most likely crack, and when that takes place the attempt may be given up. Another difficulty that has to be overcome is with pills containing essential oils. Unless these are varnished previous to the coating the oil will work through and spoil the appearance. It is best to dilute the pill varnish in common use to half strength and allow the pills a day's rest before clothing in white.

I use two covered gallipots and a round tin box in the process. The pots should be perfectly smooth, and have well-fitting lids, and should be large enough to hold double the quantity of pills for coating. The tin corresponds in size to the pots.

Place some French chalk in the tin and the pills in one of the pots, damp with a solution. The one I use is equal parts of mucilago acaciæ, syr. simp. and aqua; too much solution should not be used. A 2 drachm measure is convenient for the purpose. The pills should all be damped, but if too much solution be used too much chalk is taken up. Now turn them out of the pot into the tin containing the chalk, shake sharply and empty out on to a proper receptacle (I use the lid of a cardboard box), keep moving and separate the loose chalk. They are now ready for the polishing pot, being the second gallipot, which should be kept as polisher only.

Repeat the operation, but this time removing as much of the loose chalk as possible before using the polisher, never forgetting that these small things are the tedious puzzles of pill coating. Repeat the operation once again and it is complete. It is necessary to give particular attention to the washing of the pots between each course, and to keep the polisher perfectly dry. I generally after washing and wiping the pot hold it over a spirit lamp and polish out with a soft cloth.

With close attention to the preceding remarks pill coating can be mastered after a few experiments.

I had intended to dwell upon sugar and keratine coating but will not at present trespass on the valuable space of the Journal, but sincerely trust that these few lines may act as a stimulus for further papers in this direction, viz., the practical part of the trade.

THE PHARMACOPŒIA ADDITIONS.

BY G. A. GRIERSON, F.L.S.

It will be seen from the list published recently that the representatives of British therapeutics have deemed it necessary to endorse and to fix standards of purity for many of the drugs which during the last five years have acquired prominence and reputation. The need for such an authoritative publication was undeniable, and the task of selecting from the host of new remedies constantly being forced on the attention of therapeutists such as have justified their existence appears, from a pharmaceutical point of view, to have been accomplished with discretion. The number of synthetic remedies, such as *Acetanilide* (antifebrin), *Gluside* (saccharin), *Phenazone* (antipyrin), which it has been thought necessary to introduce is a tribute to the important services rendered by organic chemistry to therapeutics during recent years. The concise descriptions of the physical and chemical properties of these will prove of great value to the busy pharmacist who can never find the journal or pamphlet containing the information he wants just at the moment when he wants it, and which is often after all only the opinion of some irresponsible authority.

Without any desire to carp at the pharmacy of the book—an amusement which was recently much in vogue in circles pharmaceutical—I must sound one or two notes of dissent, with due deference to the committee of pharmacists who are, I presume, responsible for the pharmaceutical processes. The emulsification of castor oil—or any other oil which is to be used internally—with an alkali, as practised in *Mistura Olei Ricini*, is bad pharmacy. Gum would have been better, but better still is a small quantity of a *perfectly neutral* soap. Lemon and orange flower flavours are a mistake in oil emulsions; if the oil of cloves had been used with vanilla or benzoin, or even a trace of cinnamon introduced, the result would have been much more satisfactory. If a method once obtains authoritative recognition it is wonderful how much writing down it takes. Examples of this are to be found in some of the tinctures and in *Acetum Ipecacuanhæ*. Apart altogether from the fact that the active principle of ipecacuanha resides in the cortical portion of the root, and that the exhaustion of the inner tissues loads the preparation unnecessarily with albuminous matter and produces a tendency to precipitate, it is manifestly unpractical to percolate 1 ounce of drug with 20 ounces of menstruum. Simple maceration is much more convenient and quite as accurate, and this applies much more forcibly in the case of the tinctures, where percolation, in spite of precautions as to exposure, always means great waste of spirit. I am aware that this argument applies also to the older work, but would not this have been a good opportunity for authoritative recognition of the methods so long recognised by manufacturers as best. The argument which has sometimes been brought forward that the Pharmacopœia is not meant as a handbook for manufacturers, but as a guide to retail pharmacists, is worthless here, for the small quantity of marc in the tinctures of *Hamamelis*, *Hydrastis* and *Strophanthus* can be enclosed in muslin and pressed by hand almost as well proportionately as the large quantities operated on by manufacturers with their hydraulic presses. The uses of salicylic acid as a preservative in solution of cocaine I cannot altogether endorse; possibly the quantity present is not enough to exert any irritating action, but the principle of using it is recognised and it is against this I would protest. The fact that atropine is always prescribed with boric acid by a well-known British oculist is strongly in favour of the non-irritating properties of the latter, and speaking generally it is quite as effective as salicylic acid if used in sufficient quantity, and is much safer.

The introduction of two granular effervescing preparations is interesting as showing the progress of what may be called "elegant pharmacy," and the official recognition of seidlitz powders although slow in coming is no less welcome. I fear, however, that this recognition will have little effect on the spurious powders generally supposed to be supplied by "cutters," as the term "seidlitz powder" is only used in what might be called an explanatory foot-note. *Extractum Euonymi Siccum* and *Syrupus Ferri Subchloridi* are likely to prove two of the most useful pharmaceutical preparations in the book. The former represents what has hitherto been known as *Euonymin*, and is evidently the outcome of what has been recognized by the wholesale trade for some time— that the euonymins of commerce were simply dried extracts manipulated according to the fancy of the maker. The latter should supply the growing demand for a cheap and stable preparation of ferrous iron. In spite of the fact that they have not been able altogether to free themselves from some of the old dogmas, the pharmacopœial committee and its editor deserve commendation and much gratitude from pharmacists for their latest production.

SHORT METHODS FOR ASSAYING GALENICAL PREPARATIONS OF OPIUM.

And a review of Flückiger's Method for Opium Assay compared with Squibb's and Stillwell's.[*]

BY J. B. NAGELVOORT.

"The presence of sugar makes the estimation of alkaloids more difficult."—*Dieterich and others.*

"To separate in one operation the whole of the morphine in a perfectly pure state is an impossibility."—*Digest of Criticisms on the U.S.P.*, 1890, iii., p. 319.

Opium assays are always interesting, inasmuch as opium is one of our few reliable remedies, and inasmuch as a large amount of capital may be involved in morphine determinations. A successful experiment to shorten the time of assay is a benefit for the manufacturing chemist as well as for the analyst. It is scientifically just as valuable to test recently-published methods as to devise new ones.

Before proceeding with the descriptive part of this article, the writer desires to state that he is indebted to Professor Flückiger's method for opium-assay, published in the *Archiv der Pharmacie*, 1889, for the general principles of a process which yielded very satisfactory results when *properly* applied to various galenical preparations of opium; satisfactory to such an extent that the two important quotations heading this contribution will need revision. A series of experiments, given below, furnish evidence that the sugar contained in vinegar of opium, U.S.P., does not increase to any extent the difficulty of estimating its percentage of morphine, and that it is possible for the chemist to obtain satisfactorily, in one short assay, 100 per cent. *pure** morphine from the same opium, which yielded a morphine, loaded with impurities varying from ± 20 to ± 10 per cent.† by following the somewhat tedious methods of Squibb and of Stillwell.

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[*] From the *American Journal of Pharmacy*.

Assay of Opium.—It should be remembered that in the assaying of opium the same accuracy cannot be obtained as, for instance, in a water analysis, nor is this the case with the determinations of many other alkaloids. Thus we find the quantitative determination of atropine generally unsatisfactory; in some processes of assay strychnine splits up to some extent; coniine determinations vary, not unfrequently; assays of quinine are unreliable in the second decimal, etc. It is also known that absolute reliance should not be placed on a single morphine determination, since good chemists, experts in opium assaying, may obtain differences amounting to 0·4, 0·5 or 0·6 per cent.

If Flückiger's recent process be somewhat modified and conscientiously followed, I think it is destined to supersede the methods of the U. S. Pharmacopœia, Wainwright, Squibb, Stillwell, Cornwall, Dieterich, and of Pergers. The following embodies directions for thus modifying Flückiger's process for practical analytical work, and is used in the determinations given below:

Dry 10 gm. crude opium in a porcelain dish, at 100° C., for three hours, transfer to a dry mortar and pulverize. Put the powder, guarding against loss, into a filter of 2 inches diameter, pour slowly over the powder a mixture of 10 c.c. ether and 10 c.c. chloroform, cover well, and after the liquid has drained off, add 10 c.c. chloroform. Drain the liquid, spread out the filter and dry its contents; then carefully transfer the washed and dried opium powder to a vial holding about 120 c.c. (4 ounces); add 100 c.c. water; cork and frequently shake the vial during two hours. Now filter off 50 c.c. into a small salt-mouth bottle, which is not as liable to break as an Erlenmeyer flask. Shake with a mixture of 10 c.c. alcohol, of 94 per cent., 20 c.c. pure ether, and 1 c.c ammonia water, of 10 per cent., for six hours.* Collect the morphine on a tared filter, wash with as little cold water as possible, or with a saturated solution of morphine, press the filter between blotting paper, afterwards dry at 100° to constant weight, and weigh between watch glasses. The weight multiplied by twenty gives the percentage of pure morphine.

Squibb's manner of removing the ether from the morphine is an improvement on Flückiger's method. If this be done by means of filtering paper, care must be taken that fine crystals are not taken up by capillary attraction; or the ether may be diluted with fresh ether, and removed with a pipette, which is more satisfactory than decanting the ethereal liquid from a salt-mouth bottle. This manipulation has the advantage of preventing the formation of a resinous layer of narcotine along the edge of the filter during the filtration.

The following are fair examples selected from a large number of comparative assays:—

Number of Experiment.	Different lot Crude Opium.	Actual yield of Morphine in grams.	Calculated to per cent. pure morphine.	Corrections.	With lime-water, 1 : 100	Method.
1	A. 10 grams	1·33	10·4	17·9	Partly insoluble.	*Squibb*, 4 days.
2	5 grams.	0·53	10·6	None	Clear, colourless, solution.	*Flückiger*, 1 day.
3	B. 10 grams.	1·11 1·08	9·3	1·66 14·2	Partly insoluble.	*Squibb.*
4	5 grams powdered . . . 6 „ crude	0·577 0·571	9·5	None		*Flückiger.*
5	C. 5 grams powdered . . . 6 „ crude	0·542 0540.	9	None		*Flückiger.*
6	C. 10 grams crude	1·22	10·7	12		*Stillwell.*
7	D. 5 grams powdered . . . 6 „ crude	0·592 0·591	9·81	None	Clear, colourless, soluble.	*Flückiger.*
8	10 grams crude.	1·308 1·302	11·2	11·2		*Squibb.*

Squibb's process (a modification of Flückiger's former one). Exhaustion with water rejects the resinous substances, and concentration to a small volume, with subsequent addition of alcohol, rejects starch, gum, sugar, etc. Squibb uses water slightly acidulated with diluted sulphuric acid (1 or 2 drops to 10 gm. opium), exhausting thoroughly. He differs from Flückiger in not using a fractional part of the filtrate, but all of it, and evaporates to a weight equal to that of the opium, and never to more than one and a half times the opium. His further directions are: Transfer to a flask and rinse with the washings of the residue till the contents of the flask weigh not less than

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* It is perhaps not superfluous to here state that it seems to be of very little consequence in pharmaceutical assaying of opium whether or not the morphine contains minute traces of other opium alkaloids (codeine, thebaine, even narcotine) *when the balance is not capable of detecting their presence.*

† *Corrections in Opium Assaying.*—How tenaciously impurities adhere to the morphine in Squibb's process is well known and convincingly shown in Notes I. and II. below. I copy the extremes observed thus far from my notes.—J. B. N. I. *Crude Opium.*—Corrections in the crude morphine for impurities to be deducted: 19, 16, 14 and eleven per cent. II. *Opium Preparations.*—Corrections on morphine to be deducted: 16, 14, 13, 12, 10, 7, 6, 5, 4, 3 and 2 per cent.

* Dieterich's unfavourable results are unfairly obtained. He exhibits in the *Helfenberger Annalen*, for 1889, a brilliant array of fifty-four comparative assays, of which not a single one is made according to Flückiger. The interested reader is referred to said *Annale n*, pages 94–96.

1·6 nor more than 2·2 of the weight of the opium. Add half its weight of alcohol, shake, add ether (1·5 of the opium weight), shake, add ammonia (0·4 of the opium weight), and shake vigorously till morphine begins to crystallize. After twelve hours pour off the ethereal layer, wash the morphine with ether and dry.

Stillwell follows, in the main, Flückiger-Squibb, washing, however, with morphine-saturated alcohol and similar water. He uses hot alcohol to purify the morphine.

The sampling of opium, as now done by different chemists, varies considerably. Since uniformity in this operation would result in preventing much annoyance, I propose the following plan, which I have followed for some time and which yields good results: Take, with a knife, a small piece from the inside of every lump in the lot, usually one hundred, mix these pieces together, take 10 gm. for the moisture determination, dry the remainder, pulverize, and then take from this homogeneous mixture 5 gm. for another moisture determination (of the powder), and 10 gm. for the determination of morphine. Calculate the percentage of morphine in the crude opium, taking into consideration the amount of moisture contained therein less the moisture contained in the powder. For example: Crude opium contains 23·58 per cent., and the powder 3 per cent. of moisture. Five gm. of the powder yielded 0·577 gm. morphine. Hence 5 gm. powder = 6·025 gm. crude opium, and 6·025 : 0·577 :: 100 : 9·5 per cent. of morphine. (Experiment 4).

Assay of Galenical Preparations of Opium.—The percentage of active principle is calculated by weight. But liquid medicines are, in the United States, usually dispensed by measure, and always are, and will be so administered. Hence, I prefer measuring galenical preparations to weighing them, for analytical purposes.

In the subjoined table I give the *average* percentage of morphine as obtained from the preparation and compared with that found in the opium used. In such assays differences are sometimes found, either an excess or deficiency. Such a difference cannot actually exist, if the opium used for the preparation had been thoroughly exhausted and the dregs were free from morphine; but it must be remembered that no sample taken from opium fully represents the whole. However, I think that my method of sampling means a step nearer to the truth. When working on a large scale it would be considered a waste of labour, time and money, to subject a large lot of opium to powdering and then work up this powder into liquid preparations, and it is preferable, considered economically, that a slight discrepancy in the figures be allowed to appear on paper.

No. of expts. 21 in all.	Name of preparation and quantity taken.	Actual yield morphine. Gm.	Percentage.	Average p. c. of morphine found in the opium used.	Assayed according to Squibb.		No. of expts. 21 in all.
					Correction required.	Result calculated to per cent.	
1	Acetum opii, 25 c.c. . „ „ . .	0·314 0·306	1·25 1·22	100 100		Failure.	15 16
2	„ „ . .	0·314	1·25	100			
3	Fluid extract, 25 c.c. .	0·382 0·400	1·6	100	Not done	Not done	
4	„ 50 c.c. .	0·700	1·4		5 p. c.	1·42 p. c.	17
5	„ „ . .	0·869	1·73	100	2·4 „	1·74 „	18
6	„ „ . .	0·699	1·39		3 „	1·29 „	19
7	„ 25 c.c. .	0·562 0·579	2·24 2·31	?	Not done	Not done	
8	Tincture, 50 c.c. . .	0·534	1·06		12 p. c.	1·00 p. c.	20
9	„ „ . .	0·638	1·27	100	13 „	1·22 „	21
10	Laudanum, 50 c.c. . .	0·562 0·579	2·24 2·31	?		Discontinued.	
11	Extract, 2 gram . . .	0·43	21·5				
12	„ „ . . .	0·364 0·358	18·2 18·				
13	„ „ . . .	0·415 0·409	20·75 20·45	100			
14	„ „ . . .	0·365 0·357	18·25	?			

Flückiger's Process, for the Determination of Morphine in crude opium, 1889, *applied to acetum opii, solid and fluid extracts, tinctures and wine of opium.*—When Professor Flückiger published his method for the determination of morphine in crude opium, it appeared to the writer that it could be applied successfully to the commercial so-called solid and fluid extracts of opium.

To obtain pure morphine as a result of an analysis of fluid extract of opium, was one of the *pia vota* of pharmaceutical assaying. I suppose that the interested reader is familiar with the disappointments of the older processes, the time they absorb, etc. (Compare Lyon's 'Manual of Pharmaceutical Assaying,' 1886, and the admirable Digest of Criticisms on the 'U.S.P.,' i. and ii., pages 116 and 245.)

Flückiger's process, modified properly for fluid extracts, etc., will be a delight to the analyst and a considerable saving of time. The short time in which crystallization is effected, is decidedly in favour of obtaining pure morphine, while processes with slow crystallization yield the alkaloid impure; if, when following Flückiger's process, crystallization be delayed the morphine will be impure.

I am of the opinion that a dilute fluid and the least possible quantity of ammonia is to be preferred to a concentrated fluid and an excess of ammonia as used in other processes of morphine assaying. This process compares favourably with the Helfenberger method, *and with its many weighings* (*Helfenberger Annalen*). No second assay is required of the morphine itself. The simplicity of operation and the satisfactory quantitative results are especially to be commended. The acidity of the wine, used in vinum opii, has to regulate the amount of ammonia, which must be slightly in excess; usually 2 c.c. answered the purpose.

The Pharmaceutical Journal,

SATURDAY, JANUARY 10, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

THE first Council meeting of the year, held last Wednesday, was attended by fifteen members. It was announced that a letter had been received from Mr. MARTIN, of Newcastle, stating that owing to pressure of business matters he would be unable to devote the time necessary for the discharge of the duty of a member of Council, and that he must therefore resign his seat at the Board. The fact that Mr. MARTIN is warmly interested in the advancement of pharmacy and the welfare of the Society is sufficiently well known to justify the deep feeling of regret at his resignation, which was expressed by the PRESIDENT and reciprocated by the other members of Council, as we have no doubt it will be by many others. A formal vote of recognition of Mr. MARTIN's past services was entered on the minutes, and a hope was expressed that at some future time the Society might have the advantage of his resuming the duties of a member of Council.

Attention was again directed to the work of the Pharmacopœia Committee by the PRESIDENT, who supplemented the observations made at the last Council meeting, when moving a vote of thanks to Professor ATTFIELD, by mentioning that though the terms of the resolution only referred to the services of Professor ATTFIELD as Secretary of the Society's Pharmacopœia Committee, it was only right to acknowledge publicly that the great service he had been able to render in his position of Reporter to the Medical Council had been mainly instrumental in bringing about the long desired union of pharmacy with medicine.

The receipt from the Privy Council of a formal approval of the appointments of examiners made last month was notified by the Secretary. Fourteen persons were elected Pharmaceutical Chemist Members of the Society; five persons were elected chemist and druggist members; sixty-five persons were elected associates, and seventy-five persons were elected apprentices or students.

The report of the Finance Committee referred chiefly to the account of the Benevolent Fund, and announced the receipt of a legacy of fifty pounds left by the late Mr. SHARPE, of Notting Hill, which with the eighty-four pounds in hand allowed the investment of one hundred pounds, and left a balance to go forward. On the recommendation of the Benevolent Fund Committee two grants of ten pounds, one of twelve pounds, and two of five pounds were adopted. The VICE-PRESIDENT pointed out that among the applications for relief those coming from persons not connected with the Society were the more numerous, and Mr. RICHARDSON suggested that a special collection of subscriptions to the Fund might be made in connection with the approaching Jubilee of the Society.

On the recommendation of the Library, etc., Committee, it was decided that the annual meeting of the Society should be held on the fourth Wednesday in May next, the date having been altered to avoid interference with the Whitsuntide holidays. The report of this Committee also referred to the scheme submitted by Mr. SCHACHT in connection with meetings of the Society in provincial centres, and stated that after discussion of the subject its further consideration had been adjourned to the October meeting. It is thought that more time should be taken for the purpose, as it is anticipated by some that the proposed meetings might clash with those of the Conference, and that possibly some arrangement might be devised that would be advantageous to the Conference, as well as the Society. Mr. SCHACHT concurred in this view, and in the discussion of this subject Mr. HAMPSON expressed a hope that the Committee of the Pharmaceutical Conference would consider whether some kind of coalition between the two bodies would not be the most satisfactory arrangement, a suggestion that Mr. MARTINDALE, who is President of the Conference, said would no doubt be attended to.

In reference to the position of the draft Pharmacy Act Amendment Bill, the PRESIDENT reported that resolutions in favour of the Bill have been received from several provincial associations and from the North Kensington Pharmaceutical Association, pledging the members of those bodies to do all in their power to secure the passing of the Bill. In some instances a desire was expressed that the Bill might be strengthened in committee, and in one or two cases a wish to abolish the widows' clause of the present Act. These communications are satisfactory evidence of the Bill having been thoroughly considered, and they were referred to the Law and Parliamentary Committee, which has prepared the Draft Bill. On the motion of the PRESIDENT it was decided to refer to the Library, etc., Committee, the consideration of the question as to the best way of celebrating the Fiftieth Anniversary of the Society's foundation, which will fall on the 15th of February next. The report of the General Purposes Committee stated that penalties and costs to the amount of £30 5*s.* 0*d.* had been paid before action by two persons who had been proceeded against. In six other cases considered by the Committee proceedings were directed to be instituted in accordance with the recommendations of the Committee.

THE USEFULNESS OF THE PHARMACY BILL.

Mr. Yewdall's letter, which appears in the present number, appears to demonstrate the existence on his part of a difference from the views expressed in the Journal three weeks since, without any recognizable distinction between those views and the opinions expressed in Mr. Yewdall's previous letter in the number for the 13th December on the subject of pharmaceutical education. If we are correct in thinking that there is an absence of any such distinction, it would of course follow that in the argument he then put forward as to systematic education there is not any real ground for the opposition which he considered it might be his duty to offer to the Pharmacy Act Amendment Bill. In order to remove any possible doubt in regard to this matter, and, as we hope, to show that the opinions expressed by Mr. Yewdall on the subject of pharmaceutical education should make him a supporter of the Bill rather than a possible opponent of it, we purpose recapitulating the alterations which he particularized as being desirable for ensuring the thorough and practical education of youths intending to take up the business of pharmacy. Mr. Yewdall fully recognizes the necessity of good education, and he declares himself to be an advocate of sound teaching, so that in the matter of principle he and the framers of the Bill are in full accord. The means by which he would provide for the educational training of apprentices and, what is of equal importance, for the selection of proper material to undergo that training are, in the first place, an apprenticeship of not less than five years, and the necessity of passing a Preliminary examination before the age of sixteen, or in other words, before being admitted as an apprentice. Mr. Yewdall would further impose the necessity of attendance at courses of instruction in chemistry, botany and materia medica during the earlier years of apprenticeship, so that an apprentice might, after the lapse of two or three years from the date of the indenture, and on production of the requisite certificates, present himself for an examination to be held once a year in various provincial centres. So far these proposals are identical with the main features of the contemplated educational scheme or curriculum which the Council has been endeavouring to establish. They point to requirements somewhat in excess of those suggested by the Council, and affording less option for the convenience of the student; but there is no other particular in which there is any distinction.

The letter which appears in this week's Journal shows, however, that although Mr. Yewdall's objections to the "curriculum" were only apparent, it is in regard to the "usefulness" of the educational system contemplated by the Bill that he is disposed to take a position antagonistic to it. In fact, while urging from the educational point of view that there is need for an apprenticeship of not less than five years, in addition to other requirements, Mr. Yewdall now suggests that in regard to the most important and onerous work the pharmacist has to perform, youths of 18 or 19 years of age, who cannot therefore have been at the utmost more than two or three years engaged in the business, become so proficient in that work that they may be entrusted to carry it out independently and even in the absence of their masters. We confess that this declaration is somewhat startling, and we would not have ventured on the basis of Mr. Yewdall's first letter to credit him with having really meant to take that position. But it is now clearly apparent that this is what he means, and that the deficiency in "usefulness" which he regards as involving the necessity of opposing the Pharmacy Act Amendment Bill, consists in its not providing that youths of 18 or 19 years of age shall possess the same privileges of dispensing medicines that it is one object of the Bill to restrict to fully qualified and duly registered persons. It would not, therefore, be on account of ensuring the educational training in subjects which pharmaceutical apprentices require to study that Mr. Yewdall approves of the intermediate examination, but for the sake of making the passing of that examination a means of practically forestalling the privileges attaching to full qualification and registration. We venture to think that such a course would be eminently detrimental to the best interests of pharmacists, and that its adoption would directly negative all the claims which they have, as duly authorized persons, to be considered on a different footing from ordinary tradesmen. The dispensing of medicine is a part of the pharmacist's business which ought to be jealously guarded, and to whatever extent an apprentice may enjoy the opportunity of gaining practical experience in its exercise, this should always be carried out under such strict supervision by a duly registered person that it may be taken as practically the registered person's own work.

Mr. Yewdall is peculiarly unfortunate in the illustrations he gives to show that if the present Bill became law the results would be disadvantageous to the trade and to the public. He appears to overlook the fact that the instances he mentions of the dispensing of a prescription ordering a preparation of ergot, or of one ordering some opium compound, are covered by the existing Pharmacy Act, and that any apprentice or other unqualified person dispensing such medicines would be liable to a penalty unless he acted under the direct supervision of a duly registered person. That is now the light in which the courts would construe the Pharmacy Act, and it is therefore imperative that chemists should recognize this fact and take due precautions to avoid inconvenience to themselves and to the public. When a business is left without a registered person in charge, the necessary consequence is inability to satisfy any demands for medicines containing scheduled poisons just as much as there would be, under the same condition, inability to sell any one of those poisons. As it is held to be the object of the Act to afford protection to the public by restricting the sale of those poisons and the dispensing of medicines containing them to duly registered persons, so we think it should be, on the other hand, the special endeavour of registered persons to uphold the privileges thus conferred upon them, and the principle that registration is the only criterion of competence so as to protect their own interests and those of the body to which they belong. If apprentices of two or three years' standing are, upon passing an intermediate examination, to be granted the privileges which now belong to registered persons exclusively, the result must be to lower the value of those privileges to registered persons, just as the adoption of the former assistant qualification as the legal standard has had the effect of practically effacing the idea that the proprietor of every business should possess the higher qualification of pharmaceutical chemist, and also of inducing the public to disregard to a great extent the importance of proprietary qualification. In view of these considerations we think that any annoyance chemists may individually experience from the illegality of selling poisons or dispensing medicine in the absence of a registered person must be viewed in the light of an inevitable consequence of the provision that has been made by law for the protection of their interests, and not by any means as a disadvantage to them.

An Evening Meeting in Edinburgh of the Pharmaceutical Society will be held at 36, York Place, on Wednesday next, the 14th inst., when papers will be read entitled "Test for Detection of Sesame Oil in Olive Oil," by Mr. J. F. Tocher; "Isolation of Another Substance from Sesame Oil," by Mr. J. F. Tocher; and a "Note on Iron Wine," by Mr. J. A. Forret. There will also be a discussion on the B.P. Addendum, and attention will be called to recent additions to the Museum. The chair will be taken at half-past eight o'clock.

* * *

We learn from Mr. Hill, the Assistant Secretary of the Society in Edinburgh, that the dates fixed for the meetings in Scotland at which the President will address the chemists of the several districts are Aberdeen, Monday, the 19th inst.; Dundee, Tuesday, the 20th inst.; Glasgow, Thursday, the 22nd inst.; and Edinburgh, Friday, the 23rd inst. We hope next week to be able to furnish further particulars as to the times and places of meeting, which have not yet come to hand.

* * *

We have much pleasure in calling attention to a letter, at page 615, from the Honorary Secretary of the Exeter Association of Chemists and Druggists, in which he states that this Association has lately been formed with the object of promoting cordial relations between members of the craft in that neighbourhood. A meeting is to be held next Wednesday to discuss the Pharmacy Act Amendment Bill, at which the local chemists are invited to attend and take part in the consideration of its provisions.

We regret to have to announce that the Genera Medical Council has lost its President through the death of Mr. John Marshall, F.R.S., on the 1st inst., on his seventy-second year. Mr. Marshall at the time of his death held the office of Professor of Anatomy to the Royal Academy, and was a past President of the Royal College of Surgeons and of the Royal Medical and Chirurgical Society. He succeeded Sir Henry Acland in the chair of the General Medical Council, and in that position showed his interest in the Pharmaceutical Society by preparing an address for the opening of the session of 1889, which, however, he was prevented by indisposition from delivering.

* * *

We have pleasure in reminding our readers that the Twenty-fifth Chemists' Annual Ball is to take place at the Portman Rooms, Baker Street, on Wednesday next, January 14. Full particulars will be found in an advertisement on another page, so that here it is only necessary to say that tickets may be obtained from the Honorary Secretary, Mr. H. A. Thomas, 78, Gracechurch Street.

* * *

On Monday afternoon last a meeting was held in the lecture theatre of the Chemical Society for the presentation to Mr. Thomas Tyrer of a testimonial in recognition of the valuable services he has rendered to the advancement of industrial chemistry. The chair was taken by Sir Frederick Abel, F.R.S., and among those present were Sir Henry E. Roscoe, M.P., F.R.S., and the Presidents of the Pharmaceutical Society and the Society of Chemical Industry. Sir Frederick Abel in opening the proceedings referred to the good and successful work done by Mr. Tyrer in the direction indicated, and was followed in a similar strain by Mr. E. Rider Cook. Mr. David Howard, as Chairman of the Committee, then presented to Mr. Tyrer the testimonial, which consisted of an illuminated address, a purse containing £200 and a silver salver bearing an inscription stating that it had been subscribed for by members of the Institute of Chemistry, Chemical Society, Pharmaceutical Society, Society of Chemical Industry and the London Chamber of Commerce. Mr. Tyrer acknowledged the presentation in feeling terms. The proceedings terminated with a vote of thanks to the Committee, acknowledged on behalf of the Committee by Sir Henry Roscoe, and a vote of thanks to Sir Frederick Abel for presiding.

* * *

A meeting of the Midland Counties Chemists' Association will be held at the Mason College on Tuesday next, the 13th inst., when papers will be read on "Ambulance Work," by Dr. W. B. Featherstone, and "The Pharmacy of the B.P. Addendum," by Mr. H. W. Jones.

* * *

The Aberdeen and North of Scotland Society of Chemists and Druggists have arranged for their annual social meeting to be held in the Music Hall Buildings on Wednesday, February 4.

* * *

The next meeting of the Chemists' Assistants' Association will take place at 103, Great Russell Street, W.C., on Thursday, January 15, when the evening will be devoted to the reading of short papers by members of the Association.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 7, 1891.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Evans, Greenish, Hampson, Hills, Leigh, Martindale, Newsholme, Richardson, Schacht and Southall.

The minutes of the previous meeting were read and confirmed.

THE PHARMACOPŒIA COMMITTEE.

The PRESIDENT said he wished shortly to supplement the observations which he made on the last occasion in moving the vote of thanks to Professor Attfield in connection with the Additions to the Pharmacopœia. The terms of the resolution only referred to the value of Professor Attfield's services as Secretary to the Pharmacopœia Committee of the Society. It was only right to acknowledge publicly the great services which he had been able to render to the Council and the Society in the position which he had occupied for some years as Reporter to the Medical Council, services which had been mainly instrumental in bringing about the long desired union of medicine and pharmacy.

APPOINTMENT OF EXAMINERS.

The Secretary reported that he had received from the Privy Council a formal approval of the appointment of examiners made last month.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Andrew, John Herbert.
Bell, Robert Henry.
Haigh, Walter.
Hillman, Charles Edward.
Mawer, William Fred.
Metcalfe, Henry Theodore.
Mountain, John Thomas.
Sleath, Edmund Watson.
Wrench, Frederick William.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

George Bell, 20, Crystal Street, Spring Bank, Hull.
William James Flanagan, 1, Somerford Grove, Stoke Newington, London, N.
Joseph Hutchinson, 26, Greenhow Street, Sheffield.
John McConachy, 3, Thorburn Square, Bermondsey, London, S.E.
Thomas Edmunds Morris, 110, Mill Street, Crewe.
Percy Pearce, 170, Upper Fore Street, Edmonton.
Frederick John Richards, 157, Dudley Road, Birmingham.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Andrew, John Herbert	Oldham.
Bell, Robert Henry	Sunderland.
Franklin, John Henry	Manchester.
Haigh, Walter	Halifax.
Harris, Herbert	Blyborough.
Hocking, Francis Almond	London.
Jenson, Alexander B.	Birmingham.
Metcalfe, Henry Theodore	Manchester.
Mountain, John Thomas	South Ormsby.
Phillips, Wilfred Charles	Stevenage.
Riding, William John	Ormskirk.
Sleath, Edmund Watson	Manchester.
Williams, William George	Hirwain.
Woodward, Moses Mellor	London.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Briggs, William	London.
Hewlett, John Cooke	London.
Hogwood, Edward	London.
Knock, Walter T. N.	London.
Owen, Roger Jones	London.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Alexander, John	Aberdeen.
Aplin, Isaac Weston	Chislehurst.
Baxter, James	Grangemouth.
Beck, Nathan George	Burgess Hill.
Black, Robert	Aberdeen.
Borland, John, junr.	Kilmarnock.
Carpenter, Frederick Ernest	Burnham, Somerset.
Chaloner, Henry	Great Bridge.
Dale, John	Manchester.
Dawson, William Thorndick	Norwich.
France, Joseph	Rotherham.
Gratton, George Edwin	Blaenau Festiniog.
Hulme, Thomas	Bury.
Isaac, James Griffith	Neath.
Jacklin, Alfred	Manchester.
Lincolne, William	Ely.
Mason, Hubert Huxley	Parson's Green.
Richards, Frederick Johnson	Birmingham.
Robeson, Charles Brunting	London.
Smyth, Thomas Spring	London.
Wilson, Abel Ernest	Stockport.

Modified.

Davis, Richard Rhys	Merthyr Tydvil.
Rees, Richard Posthumous	Dowlais.

ASSOCIATES.

The following, having passed their respective examinations, and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Arthur, Arthur	Carmarthen.
Atkinson, Joseph Andrew	Spilsby.
Birch, John	Heywood.
Birkett, Frederic Joseph	Workington.
Blissett, Francis Howman	Bristol.
Boorne, Herbert Edward	Frome.
Churchyard, Arthur Ernest I.	Norwich.
Cope, Edward James	Reading.
Darroll, George	Thame.
Dewey, Thomas Henry	Merton.
Dudderidge, Frank Rawlinson	Blandford.
Ferguson, John Eustace	Birmingham.
Galloway, William Hearfield	Harrogate.
Hannah, Henry	Paisley.
Kinnear, James Arthur	Dundee.
Littlefield, William Henry	Ventnor.
Lobbett, James Godfrey	Hingham.
Long, Fred. James Towell	Dover.

Mitchell, Walter Richard	London.
Morley, Charles	Lelant.
Oakeley, Thomas James	Newton.
Petter, Edward Arthur	Folkestone.
Raper, Edward	London.
Rees, Joseph	Brynamman.
Reynolds, William Colebrook	Harrogate.
Robinson, Geo. Walton Gibson	Keswick.
Saunders, Charles Edward	Highgate.
Smith, Robert	Dundee.
Southam, Stanley	Manchester.
Stephens, Albert Francis H.	Falmouth.
Sumners, Henry Tindale	Heckington.
Swift, Arthur Hayball	York.
Tottle, Samuel Harpham	London.
Trickey, Robert Harding	Weston-super-Mare.
Turney, Edward Genge	Plymouth.
Underwood, George	Whitby.
Waddy, Ernest Alfred	Bristol.
Walker, James	Aberdeen.
West, Joseph Arthur	Peckham.
Whittle, George	London.
Windmill, William Henry	Barking.

Modified.

Moore, David George	Manchester.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Aitken, John Downie	Southsea.
Ashby, Charles Edmund	Weston-super-Mare.
Ault, Percy	Mansfield.
Bowker, John Taylor	Farnworth.
Branch, George Thomas	Cambridge.
Bray, George Robert	Launceston.
Brookes, John Humphrey	Chesterfield.
Bryce, James	Lauriston.
Carter, James Charles	Hastings.
Colley, Herbert William	Bridlington Quay.
Cordiner, George Galloway	Montrose.
Cowan, Hugh	Ayr.
Davis, Walter Frederick	Cotham.
Davison, John Lyle	Bidford.
De la Rue, Frank Herbert	Guernsey.
Dimbleby, James Orlando	Attercliffe.
Dupont, John Monro	Grantham.
Ellis, Frederic Richard	Liverpool.
Ellis, Hugh Edward	Aberystwith.
Evans, Edwyn Holmes	Llanfyllin.
Evans, Griffith William	Aberayron.
Evans, John David	Carmarthen.
Fairbairn, James Hume	Edinburgh.
Frith, Henry Edward	Colchester.
Gane, Eustace Harold	London.
Gard, John	Camelford.
George, Henry Attwood	Pontypridd.
Gerrard, William Henry	Manchester.
Green, John Hugh Homer	Old Swindon.
Green, Joseph William	Nunhead.
Grier, James	Peebles.
Hales, Walter	Hemel Hempstead.
Hartness, John Benn	Chester.
Henderson, James	Kirkcudbright.
Hill, John	Birmingham.
Hiscox, Walter Reeve	Wisbeach.
Hodges, Arthur James	Dover.
Hooper, Joseph	Okehampton.
Ingram, Henry	Almer.
Keir, Charles	Stirling.
Lassasie, Laura Leonie de	London.
Leefe, Bernard Wrapson	Malton.
Llewellyn, George Parry	St. Clears.
Lucas, William Thomas	Northampton.
McLaren, James Bryce	Bridge of Allan.
Martin, Albert Goodliffe	Luton.
Morris, David Thomas	Pontardulais.
Morris, Edward Ernest	Bristol.
Nicholson, Gilbert	Tunbridge Wells.
Noble, Alexander P.	Loanhead.
Orrell, William Pilling	Ashton-upon-Ribble.
Osborn, James Ernest	Middlesborough.
Padley, Gillies	Boston.
Pain, William John	Oxford.
Rae, Alexander David	Aberdeen.
Rees, Alcwyn	Daventry.
Sansom, Maurice	Barrow-in-Furness.
Schuller, Walter Joseph	London.
Scott, William Robert	Harrogate.
Shaw, George Arthur	Stockport.
Siminson, Albert Henry	Warminster.
Simon, Henry	Guernsey.
Simpson, Henry Sheffield	Leeds.
Smith, Richard Sidney	Dartford.
Strachan, John	Edinburgh.
Thomas, James	Whitland.
Thorp, Edward F. William	Sheffield.
Thorpe, Albert	Boston.
Type, Henry George	Birmingham.
Wainwright, Percy	Castleford.
Watkinson, Harold Arthur	Farnworth.
Wild, Sydney	New Mills.
Wilkie, Herbert Farnington	Duns.
Wills, Alfred George	London.
Wishart, John	Insch.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

RESIGNATION OF MR. MARTIN.

The PRESIDENT read a letter which had been received from Mr. Martin, saying that he found he should be unable, from pressure of business, to devote the necessary time to the proper discharge of his duties as a member of the Council, and must therefore resign his seat at the Board. At the same time he assured the Council that whether in or out of office the advancement of pharmacy and the honour and welfare of the Society would always be dear to him. The President said that in the usual course, notice of this resignation would be sent with the next agenda paper, and the vacancy filled up in February. He could not help a feeling of regret that so prominent and active a member should find it necessary to retire after only two and a half years service. He hoped, however, that later on Mr. Martin might again give the Council the advantage of his judgment and activity. He begged to move—

> "That this Council desires to record its sense of the services rendered to the Society by Mr. N. H. Martin as a member of the Council since 1888. The Council begs to assure Mr. Martin that he carries with him the best wishes of his former colleagues."

The VICE-PRESIDENT, in seconding the motion, said he rather inferred from Mr. Martin's letter that in a short time he would be prepared to resume his duties if called upon. It was always a matter for regret to see the younger members retiring from the work of the Council, and in the case of Mr. Martin, whom he had known for many years, he felt this particularly, because men in his position, engaged in business in large commercial centres, were able to render very useful services to the Society.

The motion was carried unanimously.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee included a recommendation for the payment of sundry accounts, the investment of £100 on account of the Benevolent Fund and the sale of a sum not exceeding £1,500 two and a half per cent. stock on the General Fund account.

The President (as Chairman of the Committee) moved the adoption of the report. He said there was nothing special to call attention to with reference to the receipts, except a legacy of fifty guineas to the Benevolent Fund by the late Mr. Sharpe, of Notting Hill, a life member, and one of the oldest members of the Society. Having already £84 in hand on the donation account, the Committee recommended that £100 be invested, leaving a balance of £30 to go forward. The amount standing to the capital account of the Benevolent Fund was now getting to a point when it would be possible to make another purchase of freehold ground rents, so as to obtain a better return than could be obtained from Government stock. On the expenditure side also there was nothing special to remark upon, beyond the balance of the year's grant to the Research Committee. He might also point out that the whole of the expenditure connected with the working of the Benevolent Fund was borne by the Society, so that practically every sixpence contributed went to the relief of distress.

After some discussion on the details of the ground rent investments the motion for the adoption of the report was carried unanimously.

Report of the Benevolent Fund Committee.

The report of this Committee included a recommendation of the following grants:—

£5 to a registered chemist and druggist (age 56) formerly in business, but now unable to find employment. Had a previous grant in December, 1889. (Birmingham.)

£12 to the widow (age 69) of a registered chemist and druggist. Applicant has had four previous grants amounting to £30. She was an unsuccessful candidate at the last election. (Plymouth.)

£5 to the widow (age 60) of a chemist and druggist, who continued her late husband's business for some years, and has since carried on a lodging house unsuccessfully. (Hastings.)

£10 to the widow (age 44) of a registered chemist and druggist, who has had four previous grants, the last in February, 1886. Has still three children dependent on her. (London.)

£10 to the widow (age 41) of a chemist and druggist member, with two children dependent on her. (Oxford.)

One case had been deferred and two had not been entertained.

The Vice-President (as Chairman of the Committee) moved the adoption of the report. He said he had sometimes remarked that the Committee received a much larger number of applications from chemists and druggists than from pharmaceutical chemists, which might arise from there being a much larger number on the register, and probably from other causes; but he wished also to point out that those outside the Society altogether formed a large proportion of the applicants for relief.

Mr. Richardson suggested that a special "whip" for the Fund might be made in connection with the approaching Jubilee of the Society.

The President said a resolution for dealing with the Jubilee would be proposed later on.

The report and recommendations were then unanimously adopted.

Report of the Library, Museum, Laboratory and House Committee.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
November	Day . .	509	31	8	20
	Evening .	182	15	3	9

Circulation of books.	Total.	Town.	Country.	Carriage paid.
November . .	242	132	110	£1 6 8½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Allgemeiner österreichischer Apotheker-Verein, Zeitschrift, 1890. From the Verein.
American Druggist, 1890. From the Editor.
American Journal of Pharmacy, 1890.
Annual Announcement, 1890.
From the Philadelphia College of Pharmacy.
Analyst, 1890. From the Editor.
Archiv for Pharmaci og technisk Chemi, Sep. 1889 to June, 1890. From the Publishers.
Asclepiad, 1890. From Dr. B. W. Richardson.
Australasian Journal of Pharmacy, 1890.
Annual Report, 1890.
From the Pharmaceutical Society of Australasia.
British Medical Journal, 1890.
From the British Medical Association.
Canadian Pharmaceutical Journal, 1890.
Annual Announcement, 1890.
From the Ontario College of Pharmacy.
Chemical News, 1890. From the Editor.
Chemical Society of London, Journal, 1890.
—Abstract of the Proceedings, 1890.
From the Society.
Chemist and Druggist, 1890.
Chemists' and Druggists' Diary, 1891.
From the Proprietors.
Journal de Pharmacie, 1890.
From the Société de pharmacie d'Anvers.
Kaiserliche Akademie der Wissenschaften in Wien, Anzeiger, mathematisch-naturwissenschaftliche Classe, 1890. From the Akademie.
Kremers (E.), Beitrag zur Kenntniss der Isomerieverhältnisse innerhalb der Terpenreihe, 1890.
From the Author.
Linnean Society of London, Journal, Botany, 1890.
— List, 1890.
— Proceedings, 1887-88. From the Society.
New South Wales, Technological Museum, Tenth report for 1889.
From the Department of Public Instruction.
Ny pharmaceutisk Tidende, nos. 19–26, 1889; nos. 1-14, 1890. From the Publishers.
Pharmaceutical Record, 1890. From the Editor.
Pharmacie Centrale de France, L'Union pharmaceutique et le Bulletin commercial, 1890.
From the Pharmacie Centrale.
Philosophical Society of Glasgow, Proceedings, vol. 21. From the Society.
Photographic Society of Great Britain, Journal and Transactions, 1890. From the Society.
Public Health, April to December, 1890.
From the Society of Medical Officers of Health.
Royal Botanic Society, Quarterly Record, 1890.
From the Society.
Royal Gardens, Kew, Bulletin of Miscellaneous Information, 1890. From the Director.
Royal Society of London, Proceedings, 1890.
From the Society.
Royal Society of New South Wales, Journal and Proceedings, vol. 23, pt. 2. From the Society.

Sei-I-Kwai, Medical Journal, 1890.
From the SOCIETY FOR THE ADVANCEMENT OF MEDICAL SCIENCE IN JAPAN.
Société botanique de France, Bulletin, 1890.
From the SOCIÉTÉ.
Society of Chemical Industry, Journal, 1890.
From the SOCIETY.
Timehri, new series, vol. 3. part 2, 1889.
From the EDITOR.
University of Wisconsin, Annual Announcement of Department of Pharmacy, 1890.
From the UNIVERSITY.
Western Druggist, 1889. From the PROPRIETORS.

For the Library in Edinburgh—

Aitchison (J. E. T.), The Source of Badsha Salep, or Royal Salep. From the AUTHOR.
Australasian Journal of Pharmacy, 1890.
From the PHARMACEUTICAL SOCIETY OF AUSTRALASIA.
Pharmaceutical Record, Sundry nos., 1890.
From Messrs. T. and H. SMITH and Co.
Royal Society of Edinburgh, Proceedings, vol. 16, and 3 parts of vol. 17. From the SOCIETY.
Society of Chemical Industry, Journal, 1890.
From Mr. J. R. YOUNG.
Tillie (J.), A Contribution to the Pharmacology of Curare and its Alkaloid. From the AUTHOR.

The Committee recommended that the undermentioned books be purchased:—

For the Library in London—

Blyth, Manual of Public Health.

For the Library in Edinburgh—

Bayley, Druggists Book.
Dittmar, Chemical Arithmetic.
Elborne, Laboratory Course of Pharmacy and Materia Medica.
Ganot, Natural Philosophy.
Pharmacopœa Germanica, 1890.
Sutton, Volumetric Analysis, 6th ed.
Thorpe, Dictionary of Applied Chemistry.

The Committee ordered the closing of the Libraries and Museums in London and Edinburgh for the Christmas vacation.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
November	Morning	498	34	6	19
	Evening	69	10	1	2

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of Neray bark (*Carapa moluccensis*) from Singapore.
From the DIRECTOR, Royal Gardens, Kew.

To the Herbarium—

The prize Herbarium of British plants.
From Mr. W. F. E. HORRELL, the Silver Medallist of 1889.

To the Museum in Edinburgh—

Sample of fluid extract of malt.
From Mr. D. N. WYLIE.
Physiologically pure Salicylic Acid.
From Messrs. DUNCAN, FLOCKHART and Co.
Rhizome of *Podophyllum Emodi.*
From Messrs. T. and H. SMITH and Co.
Specimen of Badsha salep.
From Dr. J. E. T. AITCHISON, F.R.S.
Specimen of Piperazidine hydrochlorate.
From Messrs. A. and M. ZIMMERMANN.
Specimen of Kola nuts.
From Mr. J. C. POTTAGE.
Specimen of Kola nuts and other nuts found in original packages. From Mr. E. J. C. CHRISTIE.

The Staff of the Society's School had attended and reported on their respective classes.

The Committee having considered a letter from the Executive of the North British Branch, had recommended that the salary of the Assistant Secretary in Edinburgh be increased by £30 per annum.

It was recommended that the annual meeting be held on the fourth Wednesday in May.

An estimate for printing the Herbarium and Hanbury catalogue had been considered, and it was recommended that 2000 copies be printed.

At an adjourned meeting of the Committee the draft scheme with reference to meetings in provincial centres, submitted by Mr. Schacht, had been discussed at length, and the further consideration of the matter had been adjourned to the October meeting.

The PRESIDENT (as Chairman of the Committee) moved the adoption of the report and recommendations. There was nothing formal to call attention to, except the Herbarium and Hanbury Catalogue. Some additional estimates for the printing had since been received, and he suggested that the Committee should have power to select one and act upon it. The date of the annual meeting had been changed in order to avoid clashing with the Whitsuntide holidays. With regard to Mr. Hill, the Assistant Secretary, he had now been in office for five years, and all those who had had an opportunity of seeing his work were very glad the Committee had made this recommendation. Mr. Hill was an excellent officer, brimful of zeal for pharmaceutical work, and was respected not only by the members of the Society but by others as well. His services in connection with prosecutions had been very valuable, and he had shown not only great ability but great judgment in all those cases. At the adjourned meeting of the Committee the resolution passed two months ago with reference to meetings in provincial centres had been considered, and in the result it was adjourned to October next. It was felt that it would be as well to have a little more time to consider the matter, especially having regard to the danger which some anticipated that these meetings might clash with those of the Conference. Possibly later on it might be possible to come to some arrangement which would be advantageous both to the Conference and to the Society. At any rate, it was deemed best to adjourn the question until the date he had named, which would give members of the Conference an opportunity of discussing the subject before anything was settled.

Mr. SCHACHT said the conclusion to which the Committee had come had his entire concurrence. It must not be supposed that the Committee desired to shelve the matter entirely by putting off its decision until October, as was the case when the second reading of a Bill in Parliament was deferred for six months, but, in fact, the details of the scheme had been hardly entered upon, the question really considered having been whether these details should be considered or deferred. The arguments which were advanced in favour of the latter course convinced him as well as the other members of the Committee that it was wiser to postpone the question for a time.

Mr. EVANS said though he was not able to attend the Committee, he quite agreed with what had been done, with this exception—he had hoped that an experimental meeting would have been arranged for at Cardiff in the autumn, which he thought would be useful in helping the Committee to make permanent arrangements in October.

Mr. ALLEN thought the Committee had exercised a very wise discretion.

Mr. HAMPSON hoped the Committee of the Pharmaceutical Conference would take this subject into its serious consideration. It might be a question whether it would be desirable to have two meetings a year, and he thought probably some kind of coalition between the two bodies would be the most satisfactory way of dealing with the question.

Mr. **Martindale** said the Executive of the Conference would no doubt take the matter into consideration now that it had become public property, but he was of course not prepared to say at present what view would be taken of it.

The motion was then carried unanimously.

Report of Examinations.—*December*, 1890.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (11th)	7	5	2
„ (12th)	6	4	2
	—13	— 9	— 4
Minor (11th)	22	10	12
„ (12th)	24	9	15
„ (16th)	29	15	14
„ (17th)	29	11	18
„ (18th)	27	9	18
„ (19th)	28	15	13
	—159	— 69	— 90
Modified (11th) . . .	2	0	2
	174	78	96

Preliminary Examination.

19*th*.—Fifteen certificates by approved examining bodies were received in lieu of the Society's examination.

The Draft Pharmacy Acts Amendment Bill.

The **President** reported the receipt of resolutions in favour of this Bill from the following bodies, most of whom pledged themselves to do all in their power to secure the passing of the Bill:—The Leicester and Leicestershire Chemists' Association; the Dover Chemists' Association; and the Midland Counties Chemists' Association (at a meeting held in Birmingham); the Divisional Secretary for North Kensington, Mr. Long, had also obtained the written approval of the chemists in his district. A certain number of the signatories expressed their hope that the Bill might be strengthened in committee, and some others said they should be glad to see the widows' clause abolished.

The **President** remarked that this was a very satisfactory way of dealing with the question, and evidently showed that the Bill had been thoroughly considered. All these communications would of course be laid before the Law and Parliamentary Committee.

The Jubilee of the Society.

The **President** moved that it be referred to the Library and Museum Committee to consider the best way of celebrating the Fiftieth Anniversary of the Society's foundation. He had no special scheme prepared as yet, and he did not know whether any one else had; but the Committee had better consider the matter and report to the next Council.

This was at once agreed to.

Report of the General Purposes Committee.

The report of this Committee included the usual letter from the Solicitor, stating the progress made with papers placed in his hands. Penalties and costs had been paid by two defendants before action.

Six other cases of alleged infringement had been considered by the Committee, and in each case proceedings were recommended.

The report as usual was read and considered in Committee.

On resuming, the report and recommendations were unanimously adopted.

The School of Pharmacy Students' Association.

A request from this Association for the approval of the Council to an alteration of its rules, allowing of a fee of 10*s*. 6*d*. being paid for life membership, was agreed to.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

(Concluded from page 593.)

Crystalline Characters of Salicylic Acid and Salicylate of Soda.

BY E. RICHARDS, F.I.C.

In connection with this very important subject, I would first call attention to the work done by myself and Mr. F. Ashley Rogers, and reported by us to the members of this Association, March 21, 1889.

The principle object of this paper is to show the striking difference in the microscopical appearance of the natural and artificial products, and the unmistakable appearance of the impurity obtained from the artificial acid and its salts is, I think, of value in testing these chemicals claimed to be chemically pure, but frequently acting very differently physiologically.

The process adopted for mounting these slides is as follows. The salts are all crystallized from hot distilled water solutions, and dried over sulphuric acid, and then sealed up on to the ordinary slips. They are mounted dry, as the salts are more or less soluble in the usual mounting media; the strength is 1 grain to each drachm.

The Slide marked No. 1 (acid. salicylic., physiologically pure) crystallized out at once on cooling and appeared to be somewhat less soluble than the other forms.

Slide marked No. 8 (acid. salicylic., foreign) did not deposit needles on cooling, but only as the evaporation proceeded, and concentrated all its efforts on producing one crystal.

When we compare these different crystallizations we are much struck with the difference in appearance between the natural and artificial acids. If we take these hot solutions and add to them a little alcohol and then allow the liquids to cool, we find the pure natural will crystallize in separate distinct crystals, not adhering together; whereas the artificial always crystallizes in fine needle-shaped crystals. This is still stronger evidence that the two substances are not in every respect identical.

If the salicylic acid is not pure the presence of any slight impurity is nearly always found to alter the shapes of the crystals, so that they deviate more or less from typical form. These impurities are easily seen by examining the photo-micrographs which appear on the table.

Those marked one inch are magnified about 35 linear.

Those marked two inch are magnified about 20 times linear.

The slides exhibited are:—

1. Acid. salicylic., physiologically pure.
2. „ „ puriss., artificial.
3. „ „ natural.
4. Soda salicylate, physiologically pure.
5. „ „ puriss., artificial.
6. „ „ natural.
7. „ „ artificial.
8. Acid. salicylic., foreign.
9. Crystals obtained from acid. salicylic., artificial.

Description of characteristic crystals in photos 2, 3, and 9. There is no difference between those of Nos. 2 and 3. They are:—Oblique rectangular prisms belonging to the monoclinic system.

Colourless transparent elongated four-sided prisms with oblique terminal faces.

Well-defined separate crystals.

No. 9.—Tufts of white acicular crystals or rosettes of transparent slender needles.

The prominent distinguishing characters of pure salicylic acid are easily recognized by making a microscopical examination. When it is taken into consideration that carbolic acid employed in the manufacture of the artificial acid is a body of very varying constitution, is sold commercially of very different melting points, according to the proportion of cresylic acid contained in the sample, the price being very different according to quality, it will be easily understood that it cannot, without very great difficulty, be obtained absolutely pure.

The President said that this question was an old bugbear between Mr. Richards and himself, and they probably should never succeed in convincing each other. The whole of Mr. Richard's contention seemed to be that one could detect the difference between the "natural" and the "artificial" acids by putting them under the microscope. As the result of much experience he was of opinion that microscopical examination as a test of purity was more or less worthless. Uric acid, for example, even when pure, crystallized in many forms; evidently, therefore, consistence of crystalline form could be no criterion of purity. He thought that salicylic acid, prepared from carbolic acid and properly purified, was absolutely identical with the natural product. He had noticed that crystals of the natural acid were not always identical and this fact would add weight to his previous statement. He thought that if there were any question of relative purity the palm ought to be awarded to the purified synthetical product.

Mr. Helbing had no doubt that a pure chemical was always the same thing, whether prepared synthetically or extracted from a natural source. It was a pity that the expression physiologically pure had been adopted, since if chemists were dealing with a pure product they wanted it to be chemically pure. Unquestionably it was possible to get an artificial salicylic acid equally as pure as the natural acid. In earlier years the commercial salicylic acid was not up to the standard which might have been expected in a substance so largely employed medicinally, but within the last year or two the salicylic acid of commerce had much improved in purity. Those who were present at the last evening meeting would be aware that the same fact was incidentally shown by Professor Dunstan. Unfortunately, however, he had illustrated his experiments with acids which had lower melting points than those now sent out. Professor Dunstan gave the results obtained with an acid melting at 154·5° C., but at the present time the chief manufacturers in Germany did not turn out any acid melting below 156·6, while a quality could be obtained which melted at 157° C., like the best natural product. That melting at 156·6° C. had not even 0·5 per cent. of impurity, and in such proportion it could not be of the slightest medicinal importance. Professor Dunstan found paracresotic acid in salicylic acid, confirming the statements of Fischer and others, but the fact that paracresotic acid had been medicinally employed for a number of years was overlooked. Paracresotic acid had been taken ten years before in one drachm doses.

The President: Have you authorities in support of that statement?

Mr. Helbing cited the employment of the substance in 1876 by Buss and later in 1879 by Gatti, who gave 20 grn. doses in a number of cases. The sodium salt used by these authors was a mixture of ortho-, meta-, and para-cresotic acids. Professor Demme used the pure paracresotate of soda in 1889 and published a report on the treatment with it, in fair doses, of thirty-two children. He himself also took a drachm without any bad effect. Further, he pronounced it much milder in action and in many instances preferable to the salicylate. Animals were killed by a smaller dose of the latter salt than of the paracresotate.

The President said that though he would not dispute Mr. Helbing's statements, there remained the question, Were the paracresotic acids of the German experimenters and that of Professor Dunstan identical?

Mr. Helbing: The melting points of the two acids were exactly the same.

Mr. Ellwood remarked that the question should be settled by some chemist who was an authority. Was it not probable that ten years ago the wrong prefix was put by mistake before the name of the acid, para instead of meta. Let them examine the question themselves.

The President: The point at issue is, is paracresotic acid poisonous? Professor Dunstan is not so much involved in the dispute as Dr. Charteris.

Mr. Ellwood differed. The point with him was, were the acids identical? if so, how were they to credit what Mr. Helbing had said? If not, who were right, the foreigners in their work or Dr. Charteris in his? In reference to crystalline character, he had pointed out to Mr. Richards, when the photographs were exhibited on a previous occasion, that he had taken the best sample of natural acid, and out of his antipathy to the synthetical product, the worst sample of the artificial. He (Mr. Ellwood) had done much work on these acids, pure and otherwise, and according to his experience both the natural and artificial crystallized in several ways, or, in other words, showed polymorphic forms.

Mr. Mason stated that even natural salicylic acid showed differences in crystalline form. It was supposed to have been prepared from oil of wintergreen, but it must be remembered this was a very scarce article, and in all probability 75 per cent. of the oil was birch oil.

The President: Oil of birch is recognized officially as a source of natural salicylic acid.

Mr. Mason, in conclusion, referred to a paper read before the Liverpool Chemists' Association and published in the *Pharmaceutical Journal*, October 21, 1876, in which the natural and artificial acids were described as being equally efficacious by German experimenters, whilst in England the artificial acid was objected to on account of its caustic action. It was about this time that John Williams showed that the artificial product was one of ranging composition, and suggested as a substitute sulphosalicylate of sodium. Kolbe's artificial acid had proved a commercial success, on account of its efficacy in arresting fermentation and its antiseptic properties.

Mr. Dymond confirmed Mr. Ellwood's remarks on the polymorphic forms of the salicylic acid crystals. Salicylic acid crystals, although occurring in different forms, were all referable to the same system. They might have oblique rectangular prisms, oblique rhombic prisms, oblique rectangular base prisms, etc., all in one specimen of salicylic acid. The crystallization of salicylic acid was a most interesting study. When separated rapidly from hot solutions it assumed the form of tufts of needle-shaped crystals, but if slowly, bundles of crystals lying parallel to each other were formed. Then by a particular arrangement the interstices became filled up, a definite base was formed, and gradually a complete specimen of a monoclinic prism was obtained. It was difficult to obtain solid crystals of salicylic acid from an aqueous solution. They were apt to be hollow, having sometimes only two faces at right angles to each other, whilst others were absent altogether. This was of interest as illustrating how crystals were built up, and possibly also the manner in which molecules were built up.

Mr. Richards in reply said, in reference to the remarks of the President, he must call his attention to a leader which appeared in the *Pharmaceutical Journal*, March 23, 1889, entitled "The Microscope in Pharmacy." "Where the test-tube and dissecting knife have failed to make facts more clear to the unaided human eye, the interposition of a series of lenses has helped to make old facts plain or to expose errors whilst making manifest hundreds of new facts." He would like to know what "proper process" he referred to for making pure artificial salicylic acid. Referring to Mr. Ellwood's remarks, he would again remind him that he did not pick his crystals for microscopical work, they were always taken from bulk. He quite agreed with Mr. Helbing that the word "physiologically" pure did not mean pure, but was only an adopted word. A chemical must either be pure or impure, and these defects were easily seen by referring to the microphotographs. He could not quite agree with him as to the physiological action of cresotic acid. He had had placed in his hand that evening by Mr. Mason a note which appeared in the New York *Pharmaceutical Record*, September 1, 1890, by G. G. Henderson, Glasgow, in which the author stated that experiments made with rabbits had resulted in the death of a number of animals from doses of 10 grains of the artificial acid, while that of the natural acid (from oil of wintergreen) had no such effect on rabbits of the same weight. The impurities were stated to be cresotic acid mainly, and this from the use of impure phenol. In conclusion Mr. Richards drew attention to the fact that although substances which are capable of crystallization crystallized in definite form, so definite that it afforded a means of differentiating between such forms of matter, it was well known that the presence of foreign admixtures led to considerable alteration in the forms into which bodies crystallized. Thus the presence of a comparatively small quantity of gum or gelatine would cause sulphate of copper to crystallize in curved forms. He wished to express his thanks to Mr. T. S. Dymond for his description of the characteristic crystals, to Mr. M. E. Swan for the photo-micrographs, and to Messrs. Hopkin and Williams for the very fine specimens of pure natural salicylic acid and salicylate of soda, and also the artificial products prepared from phenol.

The next paper read was a note on—

CHEVREUL AND HIS WORK ON THE FATS AND FATTY ACIDS.

BY CHARLES J. STROTHER.

The note consisted of a *résumé*, translated from the French, of information supplied to the jurors of the 1851 exhibition, by the late Professor Chevreul, as to his work on the fats and fatty acids and his position in relation to some of the exhibits.

The last paper read was on—

CITRIC ACID IN LEMON JUICE.

BY T. A. ELLWOOD, A.I.C., F.C.S.

The British Pharmacopœia, under the character of lemon juice, states that the quantity of citric acid contained in 1 fluid ounce is 36 to 46 grains.

Having had reason for considering the latter amount a very high figure and wishing to ascertain the correctness or otherwise of this statement, I decided that I would make various analyses of lemon juice obtained from lemons procured at and probably grown at different seasons of the year.

In order to make as accurate a determination as possible I obtained lemons direct from cases as imported twice a month, namely, the first week and the third week of the calendar month. Every means in my power were used to find out as nearly as possible the date they were collected.

By making several titrations of the expressed juice I struck an average percentage of each sample, and also for the whole month, and found a graduating difference acccording to the season when they were gathered. The method of titration was the ordinary one of using a volumetric standard solution of caustic soda, and employing phenolphthalin as an indicator of the termination of the reaction. This indicator I found to be much more delicate than litmus, and always gave very concordant results. Several of the titrations were, however, checked by similar work, using litmus as an indicator.

Each fortnightly sample of lemons was pressed, and the juice mixed and strained through fine calico. Part was then boiled and again strained and preserved in stoppered bottles for a future examination, the remainder being at once employed for titration with the soda solution. In working each amount titrated was carefully weighed, as being a more accurate method than measuring, calculating the weight by the specific gravity of the sample. Six titrations of each sample were made, and the mean probable error calculated and allowed for before deciding upon the actual result in figures of the experiment and placing in the following table.

Month.	Average of 1st week.	Average of 3rd week	Average of Month.
January . .	41·38	41·04	41·21
February . .	40·46	40·02	40·24
March . . .	39·8	39·24	39·52
April . . .	38·61	38·	38·305
May. . . .	36·92	36·2	36 56
June . . .	34·46	33·46	33·96
July. . . .	33·24	33·3	33·27
August. . .	31·86	32·2	32·03
September .	33·71	34·49	34·1
October . .	36·34	38·	37·17
November. .	39·98	40·4	40·19
December. .	42·3	42·34	42·32

Average for the whole year, 37·4.

At first some of the fresh lemon juice was boiled and titrated simultaneously with the former, but the results proving the same I concluded that the effects of boiling had no immediate influence on the amount of acid yielded by the lemon juice. My presumption had been that probably a slight difference might be produced, as I thought that it was not unlikely that a trace of the acid might be decomposed by some other constituent of the juice at the boiling point, but finding this not to be the case, I dispensed with the boiling for the subsequent titration of the juice, making the six experiments upon the simple strained juice.

In calculating the amount of citric acid the formula was taken as the hydrous ($H_3C_6H_5O_7,H_2O$) and enough of the juice employed to require from thirty to fifty c.c. of the volumetric solution of soda

$$H_3C_6H_5O_7,H_2O + 3\,NaHO = Na_3C_6H_5O_7 + 4\,H_2O.$$

The table therefore represents the average results obtained, the first column being the average of the six titrations of the sample procured the first week of each month, the second column that of the sample of the third week, and the third column the mean of the whole month. The results are expressed in grains per fluid ounce, this being the Pharmacopœia method of expression. The average specific gravity of the various samples at standard temperature and pressure was 1·038. I have not considered it worth the while of making a separate column in the table to indicate the varying specific gravities, as they were but slight, and the amount of acid present will of course regulate the gravity.

The highest yield of citric acid I was able to obtain proved to be below the maximum figure of the Pharmacopœia by 3·68 grains per fluid ounce, and the lowest figure was below the minimum by 4·14 grains. For four months in the year the strength of lemon juice, if obtained from fresh lemons, must be considered to be below the official standard, although the average strength for the whole year, 37·4 grains per fluid ounce, is indicative of official strength and yet 4·6 grains below the average of the figures given by the B.P.

I am not at all in favour of lowering standards of quality of drugs, but in this instance I would suggest that the words "30 grains or upwards" should be used in place of "36 to 46 grains" as now employed. The results of my investigation seem to prove the truth of the old idea of oranges and lemons being sourer before Christmas than after; also, they show a gradual decrease of the amount of acid yielded by the fruit as the summer approaches, the lowest result being in the month of August, the difference between the average result of sample in December (highest) and that in August (lowest) being 10·31 grs., which is very close to the difference allowed in the Pharmacopœia 10 grains.

Now for a word on the preserved lemon juice, this having been preserved in stoppered bottles and kept in a cool dark place for a long time, to avoid as far as possible any decomposition from external influences. In the bottling, in order that only a sterilized product should be kept, each bottle after filling was placed for ten minutes in a bath of boiling water and then stoppered and sealed. Two ounce long phials were used, so that when opened the whole quantity could be employed for the several titrations, and as two such bottles were filled from each sample, experiments could be made at different times on the same juice, to ascertain to what extent it was affected by keeping. In all instances the effect produced was to slightly decrease the amount of acid. This alteration in lemon juice has been known to investigators for some time to be a result of increasing age, but now arises the question—What becomes of the acid? It has been asserted that by a decomposition it is converted into sugar; but as I remarked, when speaking upon a paper read by Mr. Holmes last session before this Association, entitled "Materia Medica Problems," "I do not think this assertion is correct." Again I repeat it, but as I have not yet completed my experiments in the direction of solving this problem, I will not now offer any explanation, beyond saying that the sweetness acquired by lemons and lemon juice on keeping for some time is produced by several soluble starches being converted into glucoses, and that the whole of the sugar present can thus be accounted for without entertaining the theory that citric acid, by a chemical decomposition taking place by the action of some other ingredient of the lemon juice, is converted into glucose or other saccharine matter. Is it not more probable that the citric acid is partially decomposed or neutralized by itself acting upon the starches in order to convert them into glucose?

Further work on this interesting question I hope to bring forward another time, when my investigations of the subject are more complete and the results conclusive.

In summing up, the following are the points I wish to call attention to (1) the British Pharmacopœia maximum strength for lemon juice is higher than nature warrants; (2) the average of the Pharmacopœia is also high; (3) the acidity varies regularly according to the progress of time, increasing from August to December and decreasing from December to August; (4) lemon juice and lemons, however carefully preserved, suffer a slight decrease in acidity; (5) the amount of saccharine matter increases with age up to a certain point when it remains permanent.

As the author intended bringing this subject more prominently forward on a future occasion no discussion ensued.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

Saffron, its Adulterants and Mode of Detection.*

BY F. F. RICHES AND J. DUNNING.

The adulterants usually met with are of two kinds, either vegetable or mineral. Those of vegetable origin are of two varieties—1st, parts of the *Crocus sativus* plant, other than the stigmas, such as stamens and long styles. These may be found more or less in all samples, having crept in through carelessness in picking. Secondly, foreign matter, such as florets of safflower, marigold and arnica, petals of pomegranate and red poppy slit into shreds, splinters of sandalwood, grass and rootlets of herbs, also fibres of a species of sedge. These are generally dyed to get a red colour with nitrocresylate of sodium or logwood, or sometimes with genuine saffron colouring matter, crocin. The mineral matter added is generally a salt of barium, calcium, aluminium, sodium or potassium; frequently sand, and of late an ammonia salt has been used, which has the advantage (from the adulterator's point of view) of being volatile and so driven off when estimating the ash. These powders are generally found adhering to the stigmas by means of honey or glycerine. A fixed oil, as castor or cotton-seed oil, is also added to increase the weight, and give a moist and fresh appearance. Boiled and shredded beef has also been found in some samples, detected by the bad odour evolved on burning.

Methods of Detection of the Adulterants.—The vegetable additions are detected by placing a pinch of the drug on the surface of warm water, when the peculiar form of the saffron stigma at once becomes evident. The mineral adulterants are much more difficult of detection. If suspected of being weighted with a mineral, a good plan is to place it on the surface of water and gently stir, when the water immediately becomes turbid and gradually the powder subsides, if allowed to stand. In all samples a small quantity of pollen thus deposits, but its nature can be detected under a compound microscope. The determination of these mineral additions, if *soluble*, may be ascertained by testing the aqueous infusion, such as ammonia salt, by addition of caustic alkali and the others in the usual way. The insoluble salts in the deposit have to be rendered soluble by fusion with a mixture, but this process will be described further on. The adulteration with a nitrate will be perceived by burning a little of the drug, when it deflagrates like touch paper. The nitrate is proved by adding solution of sulphate of iron, and then pouring concentrated sulphuric acid very slowly down the side of test tube, so as not to cause admixture of the two fluids. If a nitrate be present, a black ring appears at the point of junction of the H_2SO_4 and $FeSO_4$. The colouring matter, if logwood, is removed by animal charcoal.

The nitrocresylate of sodium, if used as a dye, may be detected by soaking in petroleum spirit, when the spirit acquires a lemon-yellow colour, the colouring matter of saffron not being soluble in that liquid. This is the usual dye employed. If the dyed sample be damped with water and pressed between blotting paper it is said to communicate a *red* tint rather than a saffron colour. This requires such a fine sense of colour that it is not easily applicable except by experienced judges.

The fact of these adulterations being so frequent caused the enactment of many severe laws in the middle ages against not only those who adulterated the saffron but those also who even possessed the article in an adulterated state. In France an edict of 1550 enacts the confiscation and burning of the drug when falsified, and corporal punishment of offenders. In Germany the authorities were far more severe. Public saffron inspections were occasionally established; cases occur of a man being burnt together with his adulterated saffron, and at another date, two men and a woman, implicated in falsifying saffron, were buried alive.

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* Abstract of a paper read before the School of Pharmacy Students' Association, December 4.

Our experiments and findings in the ten specimens we examined were as follows:—

Nos. 1, 2, 3, and 4 were specimens purchased in the usual retail way, and in each case were guaranteed to be the very best.

No. 5 was a specimen obtained from Mr. Holmes that he had not examined.

Nos. 6, 7, 8, 9, 10 were samples kindly given by Mr. Holmes, which he knew to be adulterated in some way. The quantity of each of these last five was too small for estimation of the ash, moisture, and of the powder deposited, so we were consequently obliged to content ourselves with the estimation of the first five, and a microscopic examination only of the last five.

We carefully examined all the samples by throwing them upon water, when they gradually unfolded, and we could thus separate out the vegetable adulterants, and notice if any powder were deposited. These five bottles upon the table contain the colouring matter extracted by infusion of ½ gram of sample in 1 ounce of cold water for twenty-four hours. In each case, as you see, the colour was good.

The details of each sample were as follows:—

Sample I.—In appearance was dry and looked like a good sample, having the characteristic odour. Seen in water it was plain that there was no addition of vegetable matter. The amount of powder deposited was very minute, and when examined under the microscope it proved to be pollen grains. Pressed between paper the sample gave no grease stain, and the aqueous infusion showed absence of any soluble salts. The amount of moisture yielded by ·5 gram was ·042, which is equivalent to 8·4 per cent. The ash from ·5 gram was ·026, equal to 5·2 per cent.

From above results we estimated this to be a good sample, but it was dry, to the detriment of the seller.

Sample II.—Was in appearance moist; the odour was not strong. It showed no addition of vegetable matter, with the exception of a style of abnormal length and a few stamens. No powder was deposited and it gave no greasy stain to paper. Examination of the aqueous infusion showed no addition of soluble chemical salts. The amount of moisture yielded by ·5 gram was ·05, equivalent to 10 per cent., and the ash of the same quantity was ·025, equivalent to 5 per cent. This was also a good sample.

Sample III.—In appearance was damp with a large admixture of yellowish fibres. Odour was rather rancid and not much like *Crocus sativus*. Placed upon water it showed a few stigmas, and a large quantity of added vegetable matter. About 40 per cent. of these were the bottom colourless portions of the styles, and about 30 per cent. were stiff, woody fibres similar to rootlets. Upon comparison of a transverse section of two or three of these with that discovered by Mr. Kirkby (*Pharm. Journ.*, October 25, 1890), a striking similarity was noticed; and as the other characteristics he mentioned seemed to be borne out, we concluded them to be identical. He pronounced them to be a species of sedge. Also a small fragment of a dicotyledon with opposite leaves. We could find no mention of anything of this sort having been previously detected, and though sent to Kew, they could give us no precise information as to its species, and some slits of petals and stamens with pollen grains. All of these had been coloured artificially, but we could not ascertain positively what the pigment was. We proved it not to be sodium nitrocresylate, or brazilin (the two most frequent colouring agents used), so suspect it to be either logwood or, more likely, a strong aqueous infusion of genuine saffron. When placed upon water the sample diffused and sank, being the only one of the specimens that did. There was a copious deposit of gritty powder, which under the microscope displayed an opaque crystalline appearance. Pressed between paper it imparted a large greasy stain, which was not dissipated after drying for one hour at 100° C. in a steam-jacketed oven, thus denoting addition of fixed oil. The infusion showed no addition of soluble chemical salts.

In estimation of the amount of added powder we obtained ·013 gram from ·5 gram, equivalent to 2·6 per cent. This powder gave no reaction with any acids even when boiled. We then fused it with dry sodium carbonate in the blow-pipe flame, dissolved the residue in water, boiled, added HCl, and evaporated to dryness; then treated the dried residue in water, the result being that part of the powder was insoluble, proving the presence of *silicates*. These were also insoluble in HCl. $BaCl_2$ gave no precipitate, proving the absence of sulphates, and barium was proved to be absent with K_2CrO_4.

The solution was then taken through the analytical chart for other salts, but none were present; this proved the powder to be *pure sand*.

The estimation of the amount of added fixed oil was pursued as follows:—1 gram of saffron was taken and treated by maceration in three successive portions of ether. The products were mixed and evaporated in a weighed beaker until constant, over a water-bath. The residue being yellowish, oily globuled, and weighing 59 grams, equivalent to 5·9 per cent. of added fixed oil. This quantity of oil obtained was insufficient for analysis, but from the taste and appearance we judged it to be castor or cotton-seed oil.

In estimating the moisture we took ·5 grams of the sample, which lost the weight of ·018 gram on drying, equivalent to 3·6 per cent. of water (the oil had been previously extracted). The ash yielded ·077 gram, equivalent to 15·4 per cent.

The sample had evidently been much adulterated.

Sample IV.—In appearance was dark and fairly moist. Odour characteristic, floated on water, showed no addition of vegetable matter with the exception of one or two stamens and a few pollen grains. It gave no greasy stain to paper and no soluble salts were present in the aqueous infusion. In estimating the moisture ·5 gram yielded ·05, equivalent to 10 per cent. The ash was ·023, equal to 4·6 per cent.

Sample V.—Was in appearance a good colour and moist, with the characteristic odour. Only a few stamens were present and no powder deposited when thrown upon water. Pressed between paper it yielded no greasy stain. Upon estimating the ash ·5 gram yielded ·028, equal to 5·6 per cent.; and the moisture from the same quantity was ·049 gram, equivalent to 9·8 per cent.

This was a very good sample and answered all the standard requirements.

All these first five samples gave an orange red colour when infused in water.

The other five samples, Nos. 6 to 10, gave light yellowish infusions, very unlike the first five. They proved to have been very much sophisticated.

Sample 6 deposited a thick powder of pinkish-white appearance under the microscope, which gave no reaction with any acids, even on boiling. There was also a small quantity present of added stamens and safflower florets.

Sample VII.—Gave a large amount of deposited powder which yielded no reaction with acids and no chemical salts were present in the solution. There were a large number of filaments, which upon examination of their microscopic structure proved to be the bottom parts of crocus styles.

Sample VIII.—Deposited no powder, but the substance of the sample was calendula florets dyed, the nerves of which could be plainly seen. They constituted about 45 per cent. of the whole. There were no soluble chemical salts present.

Sample IX.—Yielded no powder, but contained very few of the stigmas, consisting almost entirely of colourless styles and calendula florets.

Sample X.—Consisted of colourless styles with about 2 per cent. of stigmas and scraps which seemed to be small rootlets from their appearance under the lens and microscope and their cellular structure.

This completes the account of the examination of the ten specimens.

Of the first five, Nos. 1, 2, and 4 were procured from *bonâ fide* chemists in poor class neighbourhoods, and No. 5 from Mr. Holmes as a good standard sample. These all proved to be good and answered to the B.P. tests. No. 3 was obtained from a celebrated drug store of high repute—said to be the very best obtainable—but proved, as stated, to be highly adulterated.

Nos. 6–10 were received as adulterated from the Museum.

In conclusion we would draw attention to the obvious moral deducted from the evidence, that the general public who patronize cheap drug stores cannot be certain that they are not being gulled in the quality of what they purchase, only knowing that they get the article as "cheap as possible."

SOCIETY OF CHEMICAL INDUSTRY.

London Section.

A paper on "The Basic Process as Applied to Copper Smelting" by Mr. Percy C. Gilchrist, was read before the section on Monday, Jan. 5. The author has successfully endeavoured to apply the principle of the basic lining used in steel making to copper melting and refining. In place of the usual acid lining of sand he uses one consisting of ordinary basic material mixed with tar and burned on in the way commonly adopted. The tendency of a lining of this description is to stand the action of the fused charges much better than an acid lining, and by permitting the use of basic fluxes to eliminate acid-forming elements such as arsenic and antimony. The details of the process are only of interest to the metallurgist, and it is sufficient to say that the method has been found efficient for lining furnaces for working up what is known as "metallic bottoms" (this material being highly arseniferous), for roaster furnaces for converting "white or pimple metal" into "blister," and in less degree for refining "blister" to "tough cake" and "best selected" copper. That the idea has taken practical shape is shown by the fact that one large company has already nine roaster furnaces with the new lining at work, and is replacing acid linings as they are worn out with basic. The chief commercial advantage of the process consists in the greater economy resulting from the smaller amount of copper passing into the slag and needing to be reworked. At the same time although the production of copper of extreme purity is not claimed as the main feature of the process, under appropriate conditions an excellent material can be made, as may be seen from the following analysis:—

	Per cent.
Copper	99·895
Tin	Nil
Silver	Trace
Bismuth	0·015
Antimony	Nil
Arsenic	Nil
Lead	0·022
Iron	0·029
	99·961

The Chairman of the section, Mr. T. Tyrer, having opened the discussion inviting the many members and visitors having special knowledge of the metallurgy and chemistry of copper to express their views upon the matter,

Professor Roberts Austin, speaking of the composition of refined copper, mentioned that 0·1 per cent. of bismuth was fatal to copper destined for making the standard gold alloy of the mint. Arsenic was nearly but not quite as bad. The fact that the electrical resistance of copper was raised by a small percentage of the latter element showed the importance of eliminating it as far as possible if it was to be used for conducting wires. He was of opinion that copper, like iron (as had been proved by recent researches), existed in two distinct molecular modifications, a condition of things which would account for the remarkable change in its properties caused by the introduction of quantities of foreign constituents relatively insignificant.

Mr. David Howard asked whether the fluxes used in the two processes differed.

Mr. Bertram Blount said he should be glad if the author would state what in his opinion was the maximum amount of arsenic permissible in copper that was to be used for locomotive firebox plates and stays. An amount commonly specified was 0·15 per cent., but it was not infrequently exceeded in the samples which came to him for analysis.

Mr. E. Riley doubted the possibility of obtaining commercial copper with as low a percentage of arsenic as that mentioned by the last speaker, and ascribed the finding of such small proportions to defective methods of analysis. It, however, shortly became evident that Mr. Riley had mistaken 0·15 per cent. for 0·015 per cent., and the discovery of the error caused the criticism to be withdrawn. In the course of some remarks interpolated between those of later speakers, Mr. Riley informed the meeting that he had found commercial copper to average 99·25 per cent. of real copper, and that refined copper might contain 0·05 – 0·1 per cent. of arsenic, while in ordinary tough copper there might be as much as 1 per cent. In judging the quality of copper all the impurities should be taken into account. He himself was not in the habit of reporting the figures he obtained in analysis, but only of stating that the substance analysed was or was not fit for its proposed use. Bismuth was objectionable in copper and the basic process did not remove it completely. The iodide method was the best for determining copper.

Dr. Squire suggested, "The Basic Process as applied to Copper Refining" as a more appropriate title than that chosen by Mr. Gilchrist.

Mr. Gibb considered that it would be difficult to induce copper smelters to change their practice and adopt the basic process; a convenient compromise for the present would be the use of more basic charges. Specifications such as those spoken of by Mr. Blount sometimes left much to be desired, because they were drawn up by men who might be good engineers, but were certainly not chemists. In his opinion any quantity of arsenic up to 1 per cent. was permissible in tough copper, and copper containing not more than 0·5 per cent. was good for such things as fire-boxes. Copper containing a reasonable amount of arsenic was better for every purpose (except electrical uses) than pure copper. It wore better, rolled, hammered and worked better. Best selected copper might contain as little as 0·02 per cent., but in most modern tough copper there was 0·3 to 0·4 per cent.

Mr. Gilchrist, in replying, said that as regards Mr. Howard's question he might say that in the acid-lined furnaces a little slaked lime was used, but that in the basic furnaces the amount added was about a hundred times as great. With respect to Mr. Blount's question concerning the maximum amount of arsenic permissible, he could fix no definite limit, but judged each sample by the use to which it was to be put. He acknowledged the value of Dr. Squire's proposed emendation of the title of the paper and proposed to adopt it before it appeared in the Society's Journal.

Obituary.

Notice has been received of the death of the following:

On the 13th of December, Mr. William Brown Martin, Chemist and Druggist, Waterloo Street, Stoke, Devonport. Aged 78 years.

On the 15th of December, Mr. Walter Chapman, Chemist and Druggist, Wandsworth Road, London. Aged 42 years. Mr. Chapman was an Associate in Business of the Pharmaceutical Society.

On the 20th of December, Mr. James Radcliffe, Chemist and Druggist, West Street, Oldham. Aged 49 years.

On the 28th of December, Mr. John Richard Battle, Pharmaceutical Chemist, Lincoln. Aged 79 years. Mr. Battle was one of the Founders of the Pharmaceutical Society, having joined it in 1842.

On the 31st of December, Mr. James M. Leven, Chemist and Druggist, Leven Street, Edinburgh.

On the 1st of January, 1891, Mr. Willian Laen, Chemist and Druggist, Meyrick Street, Pembroke Dock. Aged 70 years.

On the 1st of January, Mr. George Taylor, Chemist and Druggist, Rosebank Place, Edinburgh. Aged 31 years. Mr. Taylor had been an Associate in Business of the Pharmaceutical Society since 1885.

Reviews.

ARCANA FAIRFAXIANA MANUSCRIPTA. A manuscript volume of Apothecaries' Lore and Housewifery nearly three centuries old, used, and partly written by the Fairfax Family. An Introduction by GEORGE WEDDELL.*

This book will delight the heart of almost any person with antiquarian proclivities into whose hands it may come, more especially so if the "compounding of family recipes" happen to be a part of his vocation. Its production is due to the enthusiasm, ability and liberality of a chemist and druggist, Mr. George Weddell, of Newcastle-on-Tyne, who found the original manuscript volume in a lumber box during the rearrangement of some rooms that have been occupied for a century past by the firm with which he is associated. A casual examination showed that the manuscript consisted of a collection of recipes, written in different hands, some of them dating probably early in the seventeenth century. With considerable perseverance and some ingenuity, Mr. Weddell, following the clue furnished by certain initials and names, collected sufficient evidence to render it probable that it was in its earlier days in the possession of a Mary Cholmeley (possibly as the gift of her mother), who was in 1626 married to the Hon. and Rev. Henry Fairfax, a son of Sir Thomas, first Lord Fairfax, and an uncle of Sir Thomas, third Lord Fairfax, the celebrated Parliamentarian general. As a clergyman Henry Fairfax seems to have held the book in high esteem, possibly because he could draw upon it sometimes in the amateur doctoring of his unfortunate sick parishioners. At any rate, he not only added in his own handwriting largely to the stock of recipes, but he seems to have levied a toll upon his friends much in the same way as in later years celebrities were made to contribute to albums. In this way other names and handwritings were introduced into the book, some of considerable historical interest. At the death of the clergyman, the book appears to have passed to his son Henry, who succeeded the Parliamentarian general as fourth Lord Fairfax. Passing from the Fairfax family on the marriage of one of its daughters, it eventually came into the hands of Robert Green, of Cocken, who seems to have made the latest additions to it somewhere about 1760.

The recipes cover a wide range of subjects and many of them, as might be expected, are very curious. The remedies for different ailments include several of the extraordinary articles of materia medica drawn from the animal kingdom in which our forefathers trusted and a fair number of herbs. But while these as a rule only provoke a smile, some of the recipes that pertain more strictly to the housewife's department seem worthy of a trial. Space will not allow of free quotation, but in taking a sample preference may be given to:—

"An Electuary y^t Queene Mary was wont to take for the passion of the hart.

> "Take damask roses half blowne out, cut of y^e whites and beate your roses very fine, and straine out y^e iuice, asmuch as you can, you may putt to it if you will a little rose water, to make it y^e more moist; Then take of the finest sugar that you can gett and make a sirop of it very thick, Then take rubies and beate them very fine, and likewise amber and pearle, a little amber greece, and mingle all these togeather with some of the sirop till it be somwhat thick, then take it morne and even vppon a knives pointe, a little quantity, you may take it els at any other tyme when you think good. This medicine is very excellent and so approved."

Here is one marked "Probatum":—

"For y^e bleeding at y^e nose.

> "Take a Toade and drie it in marche, put y^e same into some silke or sattene bagg and hange it about y^e neck of y^e party next the skinne and by gods grace it will stanch presently."

This may be put against one—

"For deafnes.

> "Take the galle of a Hare, and mix it with womans milk, and putt of it into the eare warme, and stopp it close w^{th} black wooll, and it healeth in nyne daies."

One more may be quoted, as it recalls a terrible scourge that was contemporary with some of the contributors to the book, and illustrates the weapons used in combating it:—

"The Drinke for the Plage.

> "Take harteshorne rasped one ounse, ginger slysed one quarter of an ounse, juyesberies one ounse, ffigges halfe a pound, tow Oringes the rine and meate, take turmentall roots one ounse, Angellica roots one ounse, Angellica stalkes and leaves, Elder leaves, Red bramble budds and leaves, Red sage, Rue and saxafrige y^e stalkes and leaves, of each of thease hearbes one handfull stampe all thease in a morter, put them to three pintes of white wine."

The admirable way in which the book has been produced is creditable to all who have taken part in the work. The recipes have been reproduced in *fac simile*, partly by tracing and partly by photography, and printed upon a special paper. Besides the historical introduction the *fac simile* portion is preceded by some interesting remarks on the different styles of handwriting occurring in the original. Only a limited number of copies have been printed, and as there is to be no further edition, unless the number is an unusually large one, the book is likely to be a rare one before many years have passed.

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* Newcastle-on-Tyne: Mawson, Swan and Morgan, MDCCCXC. Small 4to. Pp. i.-xlviii.; 1-206, 21*s*.

YEAR-BOOK OF PHARMACY, comprising ABSTRACTS OF PAPERS relating to Pharmacy, Materia Medica and Chemistry, with the TRANSACTIONS of the British Pharmaceutical Conference at the Twenty-Seventh Annual Meeting held at Leeds, September, 1890.*

The appearance of a new Year-Book with the first days of the new year has become an established custom. The volume now in course of distribution to the members of the British Pharmaceutical Conference resembles its predecessors in its principal features. It is preceded by a well-written introduction recounting the chief points in the principal papers published in the twelve months ending June 30 last; next follow the "abstracts," which are tersely written and cover a wide area; then follow the bibliography and list of members; and lastly the transactions, with the papers read at the Leeds meeting of the Conference. The volume presents one innovation in a capital portrait group, produced by the Meisenbach process from a photograph, of the officers of the Conference present at the meeting at Newcastle-on-Tyne, including portraits of Messrs. Atkins, Benger, Brady, Clague, Conroy, Gerrard, Groves, Maben, Martin, Martindale, Naylor, Plowman, Proctor, Ransom, Reynolds, Schacht, Siebold, Thresh and Umney. This is placed loose in the volume, with a suggestion that it is suitable as a frontispiece to the Year-Book for 1889.

EXTRA PHARMACOPŒIA SUPPLEMENT.— By W. MARTINDALE and W. W. WESTCOTT.

We have received from the authors a copy of a Supplement to the 'Extra Pharmacopœia,' dated January, 1891, which consists of a synopsis of the recent Additions to the British Pharmacopœia of 1885, with references to those preparations which are comprised in the sixth edition of the 'Extra Pharmacopœia.' This publication is printed in a form which will admit of its being conveniently inserted in the work to which it is a supplement, and it will thus be useful for reference.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PHARMACY BILL.

Sir,—In the editorial comment on the pharmaceutical curriculum of the 20th December, you kindly referred to my letter published in the *Pharmaceutical Journal* of the 13th, and I therefore ask for space to show wherein I differ from you in estimating the usefulness of this Bill.

One of the subjects in which the aspirant for registration as a chemist and druggist has to pass is the art of dispensing, and in order that he may thoroughly understand the work of preparing medicines he ought to be carefully trained and have a good practical knowledge of the subject. Under existing laws he obtains this by being allowed to compound medicines under the supervision of his master, by which he becomes so proficient that in many cases youths of 18 or 19 years of age have compounded more than twenty prescriptions daily until the term of apprenticeship expired. If the present Bill was made law such a youth would be liable to a penalty of £5 for every prescription compounded in the absence of his master, and as it is quite impossible for any man to attend day and night there must be a time when the principal is not in the shop. If at such a time a prescription was brought in for a preparation of ergot required in a case of hæmorrhage during parturition, or some opium compound for biliary colic, will it be in the interests of the public that the life of the patient in the first case should be sacrificed or that the pain of the second patient should have to be borne for a much longer period of time because the principal is engaged away from the shop, though a competent but unregistered assistant is on the premises? Under the Education Acts if a youth of any age obtains a first class pass in advanced chemistry, he is at once considered competent to teach and earn grants under the science and art department, and if by passing a suitable intermediate examination an apprentice in our trade obtained a certificate as "assistant dispenser" he would then be in a position to continue his studies in practical dispensing, so as to fit him for the final examination for registration, and the public would be able to be supplied quickly with the necessary medicines.

EDWIN YEWDALL.

EXETER ASSOCIATION OF CHEMISTS AND DRUGGISTS.

Sir,—Kindly permit me, through the medium of the Journal, to call the attention of the chemists within, say, twelve or fifteen miles of Exeter, to a matter which is, I venture to think, of importance to all those who have the interests of pharmacy at heart.

During the past few months the chemists of this city have formed themselves into an association, known as the Exeter Association of Chemists and Druggists, and trust by occasional meetings to promote more fully that spirit of brotherhood which should exist between the members of the craft.

As a subject of general importance, viz., the Pharmacy Act Amendment Bill, is to come under discussion at our next meeting, we venture to extend a very cordial invitation to any of our friends who may care to join us on that occasion.

The subject is to be introduced by Mr. H. W. Harris, and the meeting will be held on Wednesday evening next, at 9 p.m., at 187, High Street. P. F. ROWSELL.

APPRENTICES' GRIEVANCES.

Sir,—Having lately read so much in your valuable columns respecting the "Future Pharmacist" and the advantages of the present time for gaining and acquiring pharmaceutical knowledge and skill, I beg to trespass upon your space to state what I consider in my particular case as grievances and disadvantages, even in these days of so called easy-going apprenticeship.

It is very evident that the advantages we enjoy in respect of literature and theoretical assistance are much greater than those enjoyed by our forefathers. Good books are plentiful in the market, and with a fair education, talents, and ability, a studious young man stands a good chance of success in his examinations.

But that is not all that a pharmaceutical student is required to train himself in. Be a young man ever so clever as regards his pharmaceutical knowledge, that is no guarantee that he will be able to get through the ordeal of an examination successfully.

To ensure certainty of success a student must have practice with science. It is not my province to complain of my educational disadvantages, as all this can only be overcome by studiousness and assiduity; but I consider it my duty to complain of the disadvantages which I experience in the sphere of practice. I have been in my present situation as an apprentice for fifteen months and, although I agreed with my master—who is a fully qualified young man, doing largely in the grocery and Italian warehouse business—to pay him a large sum for teaching and instructing me *to the best of his skill and knowledge as a chemist and druggist*, I have not yet received the least instruction, nor has he in any way or at any time *condescended* to trouble himself about my progress. And I may say that I am old enough to know the value of my time, money and services; yet, sir, I am almost ashamed to admit that I have not been shown nor allowed to dispense or put up in any way a single bottle of medicine. But I am constantly engaged in the elegant practice of dispensing paraffin; that is, I am engaged in bottling paraffin oil in pint and quart bottles, and wrapping the same up for retailing. It does not pay the chandlers and ironmongers to do in such pettifogging retail business, nor would it pay my master had he to do the work himself.

However, as a subservient being I am obliged to keep the mill going by such means as putting up paraffin, weighing whiting, pitch, and despatching newspaper returns, etc. I should like to know if such be the state of things everywhere. A chemist without practical skill is much the same as a preacher who cannot preach, and as such is of very little good. And even if we do enjoy greater advantages than our forefathers did, there is infinitely more in comparison expected from us at our examination, and in a case such as my own, who cannot afford college fees and expenses, I do not know how to get on. So, without the opportunity of practical experience in the shop, and the self-assistance of experimenting, I am at a loss to know how to make any progress. I trust that these few lines may meet the eyes of some masters, who are inclined as my own to take all out of their apprentices, and not to give even a word of encouragement in return.

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* London: J. and A. Churchill. Demy 8vo. Pp. 1-551.

North Wales. A DISCOURAGED APPRENTICE.

PHARMACOPŒIAL TINCTURES.

Sir,— I have perused with much interest the tables of results obtained by Mr. John Findlay, in working on the above subject, given in the Journal for December 20. Mr. Findlay has prepared separate series of each of forty-six B.P. tinctures, by the maceration process, with menstrua of five different degrees of strength, and has also noted the effect of a longer or shorter period of maceration upon the yield of extractive by each tincture. The results given by Mr. Findlay, I have taken the trouble to compare with those obtained by myself, which were reported in the *Pharmaceutical Journal* of October 25, 1890, especially as regards the yield of dry extract by one fluid ounce of each tincture prepared with the menstruum ordered in the B.P.

The similarity in the amount of extract yielded by Mr. Findlay's tinctures and my own is remarkable. Out of forty-five tinctures in nineteen cases the yield of extract is the same; in eighteen the difference only amounts to ·5 grain per fluid ounce; in five the variation amounts to 1 grain per ounce; and in only three cases is the disparity greater than this. Does not this seem to indicate that the extractive strength of the B.P. tinctures, when carefully prepared, may not vary to so great an extent as is commonly supposed, and that further work in the same direction may *possibly* afford evidence of the fact sufficiently strong to warrant a future pharmacopœial committee in fixing a standard of dry extract for many of the non-alkaloidal tinctures. R. WRIGHT.

MILK OF SULPHUR.

Sir,—I read with much regret Mr. Pickering's paper on this subject and the discussion thereon which appears in the current number of the Journal. I had hoped that the exhaustive inquiry at Knutsford in April, 1877, and the subsequent valuable experiments by Dr. Redwood, published in the Journal for August, 1876, and February, 1877, had finally disposed of this question. It seems, however, that because two chemists, either from ignorance or carelessness, have sold "milk of sulphur" when "precipitated sulphur" was asked for and been properly fined for so doing, there is a chance of the question being raised again. But why? The two things are quite distinct and different, both chemically and physiologically, and if that fact were recognized there need be no further trouble in the matter. I have been in business for thirty years, and I have never been once asked for or sold one single ounce of precipitated sulphur. On the contrary, I have had it brought to me more than once with the query, "What has been given me for milk of sulphur? I can make nothing of it. Please give me the right article" (*vide* my letter in the *Pharmaceutical Journal*, [3], vi., 999). If I were asked for it, indeed, I should at once conclude that it was for an inspector, who, of course, would get what he wanted, as I keep it for dispensing purposes. There seem to be two stumbling blocks upon which the advocates of precipitated sulphur founder. One is the utterly absurd comparison between the sulphate of lime as it exists in milk of sulphur and in plaster of paris, when in reality there is no comparison at all; it would be much more sensible to compare it to the native fibrous sulphate of lime, "gypsum," from which the plaster is made. The other is some fancied injury to health caused by the calcium sulphate. This statement must, however, be made in sheer ignorance, because its only therapeutic action is that of a slight laxative. It would be just as absurd to condemn the use of Burton beers for the self same reason, when all the world knows that it is the very presence of calcium sulphate in the waters of the Trent that gives the Burton ales such pre-eminence. Much more might be said, but I refrain, and will conclude with the hope that milk of sulphur will never be given as a synonym of sulphur præcipitatum. J. H. BALDOCK.

FEHLING'S SOLUTION.

Sir,—*Apropos* of the introduction of Fehling's solution into the B.P., and Mr. Martindale's remarks on the subject in the *Pharmaceutical Journal* of December 27, it would be interesting to know at what date prior to 1866 Mr. Martindale suggested the plan of keeping the two solutions separate. The credit of this idea is generally ascribed to Mr. Griffin, of Garrick Street, who sold the solutions in separate bottles twenty-five years ago, and published in his 'Chemical Handicraft,' 1866, his reasons for so doing.

The history of this solution, known as "Fehling's," seems sufficiently interesting to be put on record.

An observation of Becquerel in 1831 on the reducing action of glucose on copper salts in alkaline solutions was used by Trommer in 1841 as a qualitative test for diabetic sugar.

In 1844 Barreswill applied the reaction to the quantitative estimation of sugar, using neutral tartrate of potash and solid caustic potash; hence in France it has been generally known as Barreswill's process. It is rather an odd fact that in Gmelin's 'Chemistry,' subsequently copied into Watts' 'Dictionary,' a formula for the preparation of Barreswill's solution is given, containing 1600 grams of solid ingredients dissolved in 500 c.c. of water, which cannot be found in the reference quoted nor (as far as can be ascertained) anywhere else.

In 1848 Fehling (*Archiv f. physiol. Heilkunde*, p. 64, 1848) gives the following formula:—40 of sulphate of copper dissolved in 160 of water; 160 neutral tartrate of potash dissolved in 160 of water; 560 of caustic soda solution (sp. gr. 1·12) and water to make 1000 volumes.

In 1849 Fehling (*Annalen*, lxxii., 106) diluted the 1000 volumes with water to 1154·4 volumes in order that 10 c.c. should correspond to ·05 gram of grape sugar; a result which is now obtained by using 34·65 grams of sulphate of copper in 1000 c.c. of water.

Omitting any reference to the comparatively unimportant variations (in 1849) of Schwarz, Kersting and Poggiale, no improvement appears to have been chronicled till 1858, when Fehling suggested the change from the neutral tartrate of potash to Rochelle salt, "as being more easily obtained pure in commerce."

In 1866 we have the separation of the two solutions by Griffin (as previously mentioned), noted in the 'Extra Pharmacopœia' in 1882.

As Fehling in his first paper states that soda-lye is specified rather than potash, solely on account of its being more readily obtained pure, and as a definite weight of caustic potash was used by all the earlier workers with the exception of Fehling, the later use of solid caustic soda is rather a variation than an original improvement. Powdered caustic soda of over 98 per cent. being now obtainable at the cost of a few pence per pound, we may expect to see potash wholly superseded by soda in analytical work.

The most important change which has been made in the process or the reagent since the time of Barreswil and Fehling is undoubtedly that of Pavy (in 1879), and I think there is some cause for regret that when introducing a test solution for sugar into the Pharmacopœia Pavy's solution was not preferred to Fehling's.

Fehling's solution is only employed officially for the testing of picrotoxin, for which Pavy's solution is equally applicable; but as the latter is much better suited for the estimation of sugar in urine, a purpose to which it is largely applied by the medical profession and chemists, it seems a matter of surprise that this escaped the notice of the Pharmacopœia Committee. P. W. SQUIRE.

A. B. Taylor.—The statement in the footnote appears to approximate very closely to the adoption of the name "Seidlitz Powder" as a synonym of "Pulvis Sodæ Tartaratæ Effervescens," and in view of known facts, that course is, in our opinion, one which should commend itself to pharmacists. See a reference to this subject at p. 598.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Farr, Shaw, Taylor, Duck, Apprentice.

A NEW ALKALOID IN TYLOPHORA ASTHMATICA.

BY DAVID HOOPER.

Tylophora asthmatica is one of the better known Indian drugs among Europeans, on account of the leaves being made official in the Pharmacopœia of India, and because a chapter is devoted to it in the 'Pharmacographia' of Flückiger and Hanbury. The specific name of the plant points to its medicinal activity as being an important character, although other plants in the same natural order have somewhat similar properties. The older botanical names of the plant, *Asclepias vomitoria*, *Cynanchum vomitorium* and *C. Ipecacuanha*, refer more exactly to the physiological action of the drug, and as the action resembles so closely that of the true ipecacuanha of Brazil, it has been recommended in medical practice as a substitute in India, Mauritius and other countries where it grows.

The leaves have been stated to be more certain and uniform in their action than the root, and a report on an examination of them occurs in 'Pharmacographia' (2nd ed., p. 427). "A concentrated infusion of the leaves has a slight acrid taste. It is abundantly precipitated by tannic acid, by neutral acetate of lead or caustic potash, and is turned greenish-black by perchloride of iron. Broughton, of Ootacamund, obtained from a large quantity of leaves a small amount of crystals, insufficient for analysis. Dissolved and injected into a small dog they occasioned purging and vomiting." I have been unable to discover any further particulars of Mr. Broughton's analysis among his note-books and reports, but an alkaloid I have recently found in the roots probably constituted the crystals obtained by him from the leaves.

The roots are pale brown, very brittle, and about 6 inches or more in length by half a line in diameter. They have a sweetish taste, followed by acridity. The odour of the freshly dried root is suggestive of old brown Windsor soap.

The alkaloid is dissolved out of the inspissated alcoholic extract with water, and the filtered solution, rendered alkaline with ammonia (which causes a precipitate of the base), yields it up to ether on agitation with that liquid. Its solutions in ether and alcohol are alkaline in reaction, and it is only sparingly soluble in water in a free state. It forms neutral solutions with acids, and is precipitated by all the usual alkaloidal reagents. It is crystalline when evaporated from its more volatile solvents, and forms prismatic crystalline salts with hydrochloric and nitric acids. The pure alkaloid added to a few drops of sulphuric acid is dissolved with a reddish brown colour which changes into a red, turning to green and finally to an indigo tint. With nitric acid the alkaloid is coloured purplish red; that which dissolves is orange coloured. Hydrochloric acid forms with it a yellowish solution. Frohde's reagent dissolves it with a sap-green coloration. Sulphuric acid and bichromate of potassium form a violet-brown fluid. A solution discharges the colour of permanganate of potassium, but is not affected by ferric chloride and plumbic acetate.

These reactions are not to my knowledge peculiar to any of the known alkaloids. The purplish red colour with nitric acid is similar to that obtained with buxine and pereirine, but the absence of a strong bitterness, and the different purposes to which the respective mother plants are put, do not admit of a chemical relation between these bases.

I propose for this alkaloid the name of "tylophorine," and when opportunity affords I hope to be able to give some further particulars of its chemical constitution, and, with the assistance of a medical friend, of its physiological action. The occurrence of alkaloids in the natural order Asclepiadaceæ has not been recorded, or very rarely so, but I have recently found that they are by no means absent from this family of plants.

POISONS AND POISONERS.—III.

BY FREDERICK SPURR.

Classification of Poisons.—Probably the first step in the direction of a systematic classification of poisons was made about two thousand years ago, when a certain physician of Greece, named Nicander, of Colophon, wrote a treatise in the form of a poem of six hundred hexameter lines on the subject, in which he mentioned opium, henbane, colchicum, and various fungi, which he called "evil fermentations of the earth." He divided poisons into two great classes, viz., those which kill quickly and those which kill slowly; and though it must be admitted that this was a very crude and imperfect classification, it nevertheless possessed the merit of being founded on a scientific basis, that of physiological action, rather than of mere origin. Another poem named "Theriaca" (Θηριακά) by the same author, consists of nearly a thousand hexameter lines, and treats of venomous animals and the wounds inflicted by them. Among the ancients his authority in all matters relating to poison-lore seems to have been considered high, and his works are frequently quoted by Pliny, Dioscorides and other well-known writers of that age.

For about two centuries Nicander's attempt at classification was the only one known, but later writers attempted to improve on his system by arranging poisons into three classes, according to their derivation from the animal, vegetable or mineral kingdom. Thus under the head of animal poisons Dioscorides described cantharides and allied beetles, salamanders, poisonous snakes, toads, a peculiar variety of honey, and the putrid blood of oxen. Amongst vegetable poisons he enumerated opium, black and white hyoscyamus, mandragora, conium (supposed to have been the poison used in the Athenian executions), colchicum, elaterin, and the juice of a species of euphorbia. Dioscorides also made special reference to aconite, which was well known to the Greeks, and which they fancifully regarded as originating from the foam of the dog Cerberus.

The mineral poisons known at this period were very few, arsenic, mercury, and the oxides of copper and lead probably exhausting the list.

The classification of Dioscorides and Pliny was the one generally accepted until within comparatively recent times, and for many centuries the state of our knowledge of poisons and their mode of action remained *in statu quo*.

Probably this lack of progress is to be accounted for by the fact that for many ages the study of poisons was regarded as forbidden ground, and therefore the only investigators of the mysteries of toxicology—then, however, unknown as such—were found amongst the classes which furnished the professional poisoners, to whom reference was made in a former paper (*Pharm. Journ.*, Jan. 25, 1890) and who naturally guarded their knowledge of the subject with great secrecy.

Coming down to more modern times we find the first suggestion of the system of classification adopted in the scientific works of to-day emanating from a celebrated French writer named Foderé, who lived between 1764 and 1835. A few years after there arose another foreign *savant*, Orfila, whose classical investigations and writings on the subject of poisons and their actions were of so important a character that he is now frequently spoken of as "the father of modern toxicology."

"Orfila's chief merit was the discovery that poisons were absorbed and accumulated in certain tissues, a discovery which bore immediate fruit, and greatly extended the means of seeking for poisons. Before the time of Orfila, a chemist not finding anything in the stomach would not have troubled to examine the liver, the kidneys, the brain, or the blood. The number of experiments which Orfila undertook is simply marvellous. Some are of little value and teach nothing accurately as to the action of poisons, but there are still a large number which form the very basis of our pathological knowledge. His method of experiment was usually to take weighed or measured quantities of poison, to administer them to animals, and then after death —first carefully noticing the changes in the tissues and organs—to attempt to recover, by chemical means, the poison administered. In this way he detected and recovered nearly all the organic and inorganic poisons then known, and most of his processes are, with modifications, in use at the present time"* (Wynter Blyth. *Poisons: Their Effect and Detection*, p. 16).

Slightly modifying the arrangement formulated by Foderé and recognizing the inutility of a classification which was not based upon a consideration of the action of poisons on the animal economy, Orfila arranged them into six classes, according to the symptoms they produced in the body. These classes he denominated as follows:—(1) Corrosives, (2) Irritants, (3) Acrids, (4) Narcotics, (5) Narcotic Acids, (6) Septics.

In the early part of the present century Sir Robert Christison, an eminent professor in the University of Edinburgh, published his celebrated 'Treatise on Poisons,' in which he suggested and adopted a slight modification of the classification just given. He rejected altogether the class designated "septic poisons," on the ground that "no substance could cause putrefaction in the living body." The remaining five classes in Orfila's arrangement he divided into three, viz., irritants, narcotics and narcotico acrids.

At the present time, however, poisons are more commonly classified as corrosives, irritants, and narcotics, though one eminent writer, Dr. Taylor, recognizes only irritants and neurotics.* But it must be admitted that every system must be more or less arbitrary, as it is certain that there are many poisons, which may with equal propriety be assigned to two or more different classes.

Practically the division of poisons into corrosives, irritants and neurotics appears most satisfactory, and therefore it will be the one adopted in this paper.

Corrosive poisons then may be defined to be those which corrode and destroy the parts with which they come into contact, and according to Sir Robert Christison, a purely corrosive poison depends for its effect entirely upon the organic injury it occasions.

The most commonly administered corrosives are the strong mineral acids—sulphuric, nitric, hydrochloric, etc., and oxalic acid; the alkalies—potash, soda, ammonia; certain metallic salts, such as zinc, tin, and antimony chlorides, silver nitrate, etc.

Most if not all the corrosive poisons act also as, and produce the symptoms of, irritants, in addition to those peculiar to themselves. Corrosive poisons may, as a rule however, be distinguished from irritants by the rapidity with which the symptoms are developed: in the former case occurring almost immediately, as a result of mere contact and resulting chemical action; in the latter case, as a rule, only after the lapse of a varying period of time, rarely, however, less than half an hour. Again, in consequence of the powerful chemical action of corrosive poisons, an examination of the mouth will generally be sufficient to make their presence manifest. Thus there will always be some swelling and excoriation of the tongue and throat; the parts will have a white painted appearance if sulphuric acid has been taken, a yellow coating from nitric acid, and a brownish staining in the case of hydrochloric acid.

Irritant Poisons are such as cause inflammation of the parts to which they are applied, many of them producing also well-marked secondary effects on the nervous system. They are derived from the mineral, vegetable and animal kingdoms, and amongst those derived from the mineral world may be mentioned, arsenic and its compounds, antimony, zinc, barium, etc. The vegetable world furnishes examples in colocynth, elaterium, gamboge, etc., and the animal kingdom gives us cantharides.

Irritants have been further divided into two classes, according as their action is principally local, as in the case of zinc, which is called a *simple* irritant, or constitutional, as is seen in poisoning by arsenic, a *specific* irritant.

The *symptoms* of irritant and corrosive poisoning bear a very close resemblance, and briefly stated are these:—A burning acrid sensation in the mouth and œsophagus, with difficulty of swallowing, coming on very rapidly in the case of corrosives, and after the lapse of some little time in the case of irritants,

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* Orfila's chief works are:—'Traité de Toxicologie,' 2 vols., 8vo., Paris, 1814; 'Leçons de Chimie, apliquées à la Méd. Pratique,' Brux., 1836; 'Leçons de la Méd. légale,' Paris, 1821; 'Traité des Exhumations Juridiques, et Considerations sur les Changemens Physiques que les Cadavres éprouvent en se pourrissant,' Paris, 1831.

* Dr. Taylor's classification may be thus tabulated:—

(1) Irritants	Mineral	Acid poisons. Alkaline poisons. Non-metallic poisons. Metallic poisons.
	Animal.	
	Vegetable.	
(2) Neurotics	Cerebral. Spinal. Cerebro-spinal. Cerebro-cardiac.	

but quickly followed in either case by intense pain in the abdomen, which is greatly increased on pressure. Next, nausea, vomiting and purging ensue, the vomit being often dark-coloured, even black, from the admixture of altered blood. Should the efforts of nature now fail in speedily ejecting the poison, the symptoms become more and more urgent, and the sufferer may die from collapse due to nervous shock; in some cases surviving this he is carried off by violent convulsions; or he may linger for several days, or even weeks in less severe cases, dying ultimately from exhaustion or starvation.

Neurotic poisons, as their name implies, are such as act on the nervous system, and they have been divided into classes according to the symptoms most prominently developed, and according to the part, or parts of the nervous system principally affected. Thus, in the first method they are divided into four classes, viz.:—

1. NARCOTICS (chief symptom insensibility, which may be preceded by more or less cerebral excitement): *opium*, *chloral*, etc.

2. DELIRIANTS (delirium for the most part a prominent symptom): *belladonna*, *hyoscyamus*, *stramonium*, etc.

3. CONVULSIVES (convulsions a leading and *constant* symptom), *alkaloids of the strychnos class*.

4. THOSE PRODUCING COMPLEX NERVOUS PHŒNOMENA:—*Aconite*, *digitalis*, *hemlock*, *calabar bean*, *tobacco*, *lobelia*, and *curare* (Wynter Blyth, *op. cit.*, p. 25).

According to the parts or organs affected, Neurotics are divided into:—

1. CEREBRAL (which are supposed to act principally on the brain, and which produce stupor and insensibility, without convulsions): *opium*, *morphia*, *hyoscyamus*, etc.

2. SPINAL (do not generally cause loss of consciousness, or sensibility, but produce violent convulsions; action confined to spinal cord): *nux vomica* and *strychnia*.

2. CEREBRO-SPINAL (act on brain and cord; produce delirium, coma, paralysis; and sometimes convulsions): *snake poison*, *aconitine*, *atropine*, *conine*, etc., etc.

To these Taylor adds a fourth group which he calls Cerebro-Cardiac, which produce very marked effects on the heart, *e.g.*, *Calabar bean*, *digitalis*, *tobacco*, and certain other substances which he mentions (Poisons, 1875, p. 62).

Poisoning by neurotics may as a rule be distinguished by several symptoms, one or more of which will be always present. These may follow the ingestion of the poison very quickly (*e.g.*, prussic acid), or a considerable time may supervene. They are principally headache and giddiness, with contraction (myosis) or dilatation (mydriasis) of the pupils, numbness, paralysis, coma, insensibility, anæsthesia and convulsions.

In addition to the modes of classification already detailed Mr. Wynter Blyth (*op. cit.*) has suggested an arrangement based principally upon chemical grounds, and following as far as possible the order in which an analytical expert would search for an unknown poison. This classification is as follows:—

A. ACIDS AND ALKALIES.

1. Sulphuric, hydrochloric and nitric acids.
2. Potash, soda, ammonia.
3. Neutral sodium, potassium and ammonium salts.

B. POISONOUS SUBSTANCES CAPABLE OF BEING SEPARATED BY DISTILLATION FROM EITHER NEUTRAL, OR ACID LIQUIDS.

1. Hydrocarbons.
2. Camphor.
3. Alcohol.
4. Amyl-nitrite.
5. Chloroform and other anæsthetics.
6. Carbon disulphide.
7. Carbolic acid.
8. Nitro benzene.
9. Prussic acid.
10. Phosphorous.

C. ALKALOIDS AND POISONOUS VEGETABLE PRINCIPLES SEPARATED FOR THE MOST PART BY ALCOHOLIC SOLVENTS.

Division I.—Vegetable Alkaloids.

1. Liquid volatile alkaloids.
2. The opium group of alkaloids.
3. The strychnine or tetanic group of alkaloids.
4. The aconite group of alkaloids.
5. The mydriatic group of alkaloids.
6. The alkaloids of the veratrines.
7. Physostigmine; pilocarpine; taxine; curarine; colchicine; muscarine; and the active principles of certain fungi.

Division II.—Glucosides.

1. The digitalis group and other poisonous glucosides acting on the heart.
2. Saponin.

Division III.—Poisonous Anhydrides of the Organic Acids.

1. Santonine.
2. Mezerein.

Division IV.—Various Vegetable Poisonous Principles not admitting of Classification under previous three Divisions.

Ergot, picrotoxin, cicutoxin, croton oil, savin oils, etc.

D. POISONS DERIVED FROM LIVING OR DEAD ANIMAL SUBSTANCES.

Division I.—Poisons Secreted by the Living.

1. Poison of the amphibia.
2. Poison of the scorpion.
3. Poisonous fish.
4. Poisonous insects.
6. Snake poison.

Division II.—Poisons formed in dead Animal Matters.

Ptomaines and allied bodies.

E. THE OXALIC ACID GROUP.

F. INORGANIC POISONS.

Division I.—Precipitated from a Hydrochloric Acid solution by Hydric sulphide; Precipitate Yellow or Orange.

Arsenic; antimony; cadmium.

Division II.—Precipitated from Hydrochloric Acid solution by Hydric Sulphide; Precipitate Black.

Lead, copper, bismuth, silver, mercury.

Division III.—Precipitated from Neutral Solution by Hydric Sulphide.

Zinc, nickel and cobalt.

Division IV.—Precipitated by Ammonium Sulphide.

Iron, chromium, thallium.

Division V.

Alkaline earths, barium.

NOTES ON THE DILUTION OF DR. KOCH'S LYMPH FOR TUBERCULOSIS.

Mr. Henry Campbell, Pharmaceutical Chemist, Queen's Hospital, Birmingham, writing to the *British Medical Journal* for the 10th inst., says:—

Dr. Koch's lymph for the treatment of tuberculosis is sent out in stoppered bottles, each containing 5 cubic centimetres. It is slightly viscid, and has a specific gravity of 1150. It keeps well with ordinary care.

The dose for an adult ranges from 0·001 cubic centimetre to ten times that amount, 0·01 cubic centimetre. In some reports these quantities are called 1 milligram and 10 milligrams (or a centigram) respectively. This is not strictly correct, for 0·001 cubic centimetre of the lymph weighs slightly more than a milligram.

For hypodermic use the lymph is diluted, a 1 per cent. solution being usually the most convenient; but in some cases a stronger solution (10 per cent.), or a weaker ($\frac{1}{10}$th per cent., or 1 in 1000), is desirable.

If a dilution made with distilled water is to be set aside for a few days, it must first be raised to a boiling point—a process which Dr. Koch states is likely to weaken the lymph. It is better, therefore, to dilute with a $\frac{1}{2}$ per cent. solution of carbolic acid. If a dilution becomes turbid it is unfit for use.

All measuring apparatus and bottles used to prepare the dilutions should be rinsed with the carbolized water, drained and kept free from dust, and the hypodermic syringe washed with absolute alcohol, and then with the carbolic diluting fluid. Alcohol renders the stronger solutions slightly turbid.

To make the diluting fluid ($\frac{1}{2}$ per cent. carbolic), place a pint of distilled water in a flask, marked at that volume, boil for five minutes, add 44 grains of pure carbolic acid, boil for another minute, cork up, and remove from the heat. When cold, dilute if necessary to 1 pint with boiled distilled water.

To make the dilutions (metrical system), attach an ordinary half-ounce glass syringe by india-rubber tubing to a pipette of 1 cubic centimetre capacity, and deliver half a cubic centimetre of lymph into a 10 cubic centimetre measure. Rinse the pipette twice with the diluting fluid, add the rinsings to the lymph and dilute the whole to 5 cubic centimetres. Place in a stoppered bottle, and label "Dr. Koch's tubercle lymph (10 per cent. solution, No. 1); 0·01 cubic centimetre of solution contains 0·001 cubic centimetre of lymph."

In the same way dilute half a cubic centimetre of No. 1 up to 5 cubic centimetres, and label "(1 per cent. solution, No. 2); 0·1 cubic centimetre contains 0·001 cubic centimetre of lymph."

If required, dilute half a cubic centimetre of No. 2 up to 5 per cent. and label "($\frac{1}{10}$th per cent. solution, No. 3); 1·0 cubic centimetre contains 0·001 cubic centimetre of lymph."

The special hypodermic syringe used by Dr. Koch contains (when filled to the mark nearest the india-rubber ball) 1 cubic centimetre, and is graduated into ten divisions. Therefore—

A syringeful of No. 1 dilution = 0·1 cubic centimetre of lymph.

A syringeful of No. 2 dilution = 0·01 cubic centimetre of lymph.

A syringeful of No. 3 dilution = 0·001 cubic centimetre of lymph.

⁂ The English measurements are not nearly so easily managed as those of the metrical system; and it would be well, in carrying out treatment and giving descriptions, to adhere to this latter, otherwise there would be endless confusion, especially where people have not the opportunity of, or practice in, translating one into the other.

THE CHEMISTS' BALL.

The "Silver Anniversary" Ball was held at the Portman Rooms, London, on Wednesday. Considerably over two hundred ladies and gentlemen danced to the music of Mr. Dan Godfrey's band. At the close of the supper, Professor Attfield, who had been specially invited by the Committee to be present, said that once more he offered for acceptance their only toast of "Success to the Chemists' Annual Ball," with three cheers for the ladies present. Every year for twenty-five years that single toast had been received with heartiness that had apparently maintained its effect through the succeeding twelve months, indirectly ensuring success to the succeeding gathering. Such success was somewhat uncertain when the ball was inaugurated. There was a fear that the rivalries amongst pharmacists would prevent them assembling in sufficient numbers for more than a year or two, and that the ladies might hesitate to lend their fair name and fame to an untried institution. But these and other fears had long since vanished, and all the older guests would agree that they had had twenty-five thoroughly successful dances. The first ball was started by his students, especially Mr. Henry Smith, and himself, aided by Mr. Billing, Mr. Watson, and others. He (Dr. Attfield) was the Chairman of the Committee for the first eight or ten years, often also the Chairman at the supper, and had held some office or other without a break to the present time. One lady who was present, he need not mention her name, had done much in the earlier years to induce other ladies to join their assemblies, and when, after twenty odd years, their enthusiasm began to relax it had been taken up by their son and two daughters, and they were all there that evening. He had ventured to mention that personal matter because it enabled him to point out that much of their past success was due to the similar conjoined efforts of the older and younger members of other families, whose names he was not at liberty to give, and that if, during the intervals of future balls, a few families would take similar interest in their gatherings, the hands of the Committee would be greatly strengthened, and there would be, twenty-five years hence, an equally satisfactory "golden anniversary." The Chemists' Ball had not only afforded annually for a quarter of a century a perfect evening's enjoyment, which was their main object, but had certainly contributed to the promotion of good will and *esprit de corps* amongst metropolitan pharmacists, and it had served as a type for many similar provincial gatherings. But besides all that, when they had had a surplus of income over expenditure it had been handed over to the Benevolent Fund of the Pharmaceutical Society. This year he hoped nearly thirty pounds could be thus contributed, making a total—Mr. Bremridge had told him—in the twenty-five years, of exactly five hundred guineas. They also maintained their reserve fund of nearly a hundred pounds, so that if in any year they lost money through bad weather or other cause, the continuity of the balls would not be broken. He was allowed to state that of those who were present at the first ball in 1867, there were present to night, besides himself and wife, Mrs. Boyce, only a very slight accident keeping Mr. Boyce at home, Mr. Martin, Mr. Preston and Mr. Martindale. Only unforeseen circumstances prevented Mr. and Mrs. Carteighe being there. Mr. Francis was doing secretarial work for Mr. Thomas, kept away by bereavement. The toast was then drunk with the heartiest enthusiasm, "the ladies" were vociferously cheered, while at the suggestion of the master of the ceremonies, Mr. Martin, the health of "The Chairman and Mrs. Attfield" was drunk with musical honours.

The Pharmaceutical Journal,

SATURDAY, JANUARY 17, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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COMPANY TRADING AND ITS REPRESSION.

THOSE who now reproach the Pharmaceutical Society and its executive officers for the popular disregard into which proprietary qualification has fallen overlook, if they do not forget, the fact that the blame rests elsewhere than upon the Society. It was originally one of the leading principles which the founders of the Society sought to establish, that every person engaged in the business of pharmacy should have a suitable qualification. It was thought that among the various grades of qualification the proprietor of a pharmaceutical establishment should possess the qualification of a pharmaceutical chemist. That was held to be desirable in the general interests of pharmacy, and in the particular interest of those engaged in business on their own account. And though the qualification was then only a voluntary one, it is probable that if the principle set up by the Society had been supported by the whole body of chemists and druggists its influence would have been highly beneficial to all concerned. The recognition and support of this principle by chemists would have materially helped to confirm the tendency prevailing with the better informed of the community to rely upon the reputation and known skill of individual owners of pharmacies, and to strengthen the belief that when medicine was required recourse should be had to them because their drugs were good, their competence assured, and their carefulness established from long experience. This disposition still exists, though it is probably much less general than formerly, since the desire to obtain medicines and drugs at reduced prices has overshadowed the consideration that the proper supply of these requirements involves an amount of knowledge, skill and care on the part of the seller far greater than the sale of ordinary commodities demands and justifies a much higher rate of remuneration. But unhappily the course of action that would have promoted such a result was not followed, and when it came to be a question what should be the compulsory qualification for the sale of poison and for dispensing medicines containing scheduled poisons, the majority of chemists and druggists acquiesced in and supported the view that the qualification which the Society had thought requisite for assistants would be sufficient for ensuring the safety of the public. The result was that the higher standard of the Society was abandoned except as a voluntary matter, and it was made the law that any person acquiring the inferior qualification should be entitled to registration as being legally qualified to sell and dispense poisons and to keep open shop for that purpose. That was the first step towards the shifting of special pharmaceutical responsibility from the proprietor of a business to the person who actually conducts a sale or carries on the management of the business.

The subsequent development of the co-operative system, under which people combined together to do the business of everybody else as well as their own, soon furnished scope for an invasion of the pharmacist's domain, and by steps which we need not recount duly registered chemists found themselves face to face with a form of competition inconsistent with the spirit and undoubted intent of the Pharmacy Act. The attempt to put an end to that anomaly was to a great extent attended with failure; but it was so far successful that the necessity indicated by the Act as being requisite for the public safety was recognized by the courts, and while the keeping open shop for the sale of poison by a company of unregistered persons was held not to be unlawful because it was outside the scope of the Act, the presence of a duly registered person to conduct the business was declared to be indispensable for securing the safety of the public. This construction of the Pharmacy Act has never met with much approval from chemists and druggists. We need not here dwell upon the reason for that, and will only point out that the practical effect of the decision was to promote disregard of the importance to the public of proprietary qualification. At the present time the claim on the part of the public is not that the proprietor of a chemist's shop shall be a qualified person, but that the individual who actually supplies poison or dispenses medicine containing poison shall be qualified. In the best interests of pharmacy we believe that this is unfortunate, but it is a result that has not been brought about by the Pharmaceutical Society. It is, however, some consolation to reflect that even with this deviation from the original idea of the Society, the demand for the individual qualification of the actual seller may still be made of some service to the trade. Therein lies the power to regulate if not to prevent company trading that is inconsistent with the intention of the Act. That power is now in the hands of registered persons; it is probably the utmost and the only power that they would ever be able to obtain, and if they were united in their desire to put it in exercise through the agency of the Pharmaceutical

Society, it would no doubt be the means of doing away with much that is now complained of.

Since no company of unregistered persons can carry on the business of a chemist and druggist so far as that is protected by law, except through the agency and by the employment of a duly registered person, that portion of the business would be impossible for companies if registered persons could not be induced to act for them. That is perhaps too much to expect, though it is a condition that may be thought within reach of achievement. In any case, however, a strict enforcement of the demand for a registered person to conduct sales of poison and the dispensing of medicine containing poison would go far to put a stop to the practices now complained of so much. If that were done by the united action of the whole body the result could not be otherwise than beneficial. At the very worst registered chemists and druggists would have no more ground for complaint against companies conducting their business through the agency of registered men than they would have if those registered men were carrying on business on their own account, as they would be entitled to do in virtue of their being registered. But in order to carry into effect such a system of protection it is essential that chemists and druggists should enter upon the contest without any liability to be reproached for laxity in their own observance of the requirements laid down in the Pharmacy Act. The sale of poison and the dispensing of medicine containing poison must be treated by them strictly as matters that cannot, under any conditions, be left in the hands of persons who are not registered. It is on that ground that we have always urged the scrupulous observance of the provisions of the Act in this respect. It is on that ground also that we have endeavoured to convince chemists and druggists of the advantage to be derived from the recent judicial construction of the Pharmacy Act and of the practical value of the decision in the WHEELDON case as being a sure means of protecting their individual interests and those of all registered persons. If the fact of qualification is to be of any utility to chemists the privileges attached to that position must be protected by registered persons. When that is done it will be possible for the Society to support their endeavours, but if that is not done generally by members of the trade the Society cannot guard their interests as it would desire to do. The extension of the same principle, as proposed by the 7th section of the draft Pharmacy Bill, should for the same reasons be supported by all persons on the register.

DEATH BY POISON.

THE publication of the fifty-second annual report of the Registrar General again affords opportunity for reviewing the statistics of the various modes in which death has been caused by poison during the year 1889. In reference to the several heads under which deaths by poison are classified, it is stated in the report that the mortality from accident was almost identical with that of 1888, but lower than in any previous year. It is chiefly the deaths by poison which fall under this head that are of interest as indicating the extent of the danger that is susceptible of prevention. The death rate from suicide in 1889 was lower than in the three previous years, when it was abnormally high. The total number of deaths by poison in 1889 was 642 out of the number of 17497 deaths resulting from some form of violence. This is a smaller actual number, and also a smaller proportion of the deaths caused by violence, than in the previous year, so that the favourable inference hitherto drawn as to the beneficial operation of the provisions of the Pharmacy Act in reducing the danger arising from poison is still supported by the statistics of the Registrar General.

Of the total number of 642 deaths by poison in 1889, those ascribed to accident were 376, the cases of suicide were 260, and the remaining six were cases of homicide. It is chiefly in regard to suicide that there was a very considerable reduction in the number of deaths, while those due to accident were almost exactly the same as in the previous year. It is worth noticing that the number of males who died from accidental poisoning was very much larger than the number of females who were poisoned in the same manner, the actual numbers being 257 males and 119 females. In the deaths by suicidal poisoning there is an approximation to the same ratio, the number being 153 males and 107 females. However, the ratio of accidental deaths from poisoning continues to be small, and although the suicidal deaths from poison form a much larger proportion of the deaths of that nature from all causes, or about 12 per cent., the proportion is rather less than it was in 1889.

Among the particular poisons to which the deaths by accident are referred, narcotic poisons figure, as is usually the case, most prominently as having been the cause of death in 100 instances. The deaths ascribed to the more potent alkaloids, aconite, atropine and strychnine, amount to 12, while the deaths caused by chloral are 5, and those attributed to alcohol 9. Cyanide of potassium and prussic acid do not appear to have been the cause of death accidentally in more than 5 instances. Among the articles which are not legally poisons carbolic acid again holds the first place as the cause of accidental death in 27 instances, while the common mineral acids have caused death in 13 instances; so that the accidental deaths caused by these poisons, which are not included in the Schedule of the Pharmacy Act, amounted to upwards of 10 per cent. of the entire number of deaths by accidental poisoning. In the cases of suicidal poisoning narcotic poisons have been used in 48 instances, chloral in 2, and the poisonous alkaloids, strychnine, aconitine, etc., in 20 instances. Oxalic acid has been the cause of death in 22 instances, and cyanide of potassium or prussic acid has caused death in 30 instances. Of the poisons not included in the schedule carbolic acid has been the cause of death by suicide in 41 instances and mineral acids in 25 instances, so that the deaths by suicide attributed to those poisons amounted to upwards of 25 per cent. of the total number, and the whole number of deaths caused by them by accident and suicide amount to more than 16 per cent. of the total deaths from poison. It is evident, therefore, that the careless manner in which these poisonous articles are handled is a frequent source of fatal accident, and that the ease with which they can be obtained admits of their being largely employed for the purpose of suicide. Under these circumstances it is to be regretted that some provision is not made for regulating the sale of these articles in accordance with the recommendations that have been submitted to the Privy Council by the Pharmaceutical Societies of Great Britain and of Ireland as well as the King and Queen's College of Physicians in Ireland.

The death of Mr. Brady, recorded in the present number of the Journal, will be lamented in wider circles than that of the pharmaceutical community, but within those narrower limits it must be regarded as a serious loss. Though Mr. Brady had long retired from active connection with pharmacy, and had ceased to occupy any official position in the Society, his influence upon both has been continued, as a result of the scientific pursuits to which he devoted his leisure without any deficiency of attention to trade interests. It may be mentioned that the first time the writer of this note ever heard of Mr. Brady was during the discussion of a scientific project, and in reply to a disparaging remark that Mr. Brady was a provincial chemist and druggist, a distinguished man of science said that however that might be it must be remembered Mr. Brady was successfully engaged upon high class scientific work, and was on that account alone entitled to the utmost respect. In his case, as in that of Daniel Hanbury, the advantage of such repute was not merely personal, for it reflected credit upon the Society of which they were members, and contributed to raise the position of the class to which they belonged. For this reason as well as for special services to pharmacy, the name of Henry Bowman Brady should be held in grateful remembrance by all those of whom he was a fellow-craftsman.

* * *

We are now enabled to report the times and places of the meetings that will be held next week to afford opportunity for the chemists and druggists in Scotland to confer with the President of the Pharmaceutical Society upon pharmaceutical affairs generally, and especially upon the provisions of the draft Pharmacy Bill that is now under consideration.

We learn from Mr. Strachan, the local Secretary for Aberdeen, that the meeting in that city on Monday, the 19th inst., is arranged to take place in the rooms of the local Society, 21, Bridge Street, at 1 p.m., when Mr. John Johnstone, President of the Aberdeen and North of Scotland Chemists' and Druggists' Association, will take the chair. In the evening, at 9 o'clock, Mr. Carteighe will address the Assistants' Association.

From Mr. Hardie, the local Secretary for Dundee, we learn that the meeting in that town on Tuesday, the 20th inst., will be held in the Town Hall at 3 p.m. We also understand that the chair will be taken on the occasion by Mr. Kerr, the President of the Dundee Chemists' Association, and it is expected that there will be a large attendance of the chemists of Dundee and surrounding districts, as numerous invitations have been sent out. Mr. Carteighe has accepted an invitation to be present at the annual Conversazione of the Dundee Chemists' Assistants' Association, which will take place in the evening of the same day, at 9 p.m., in Gray's Rooms.

The meeting at Glasgow on Thursday, the 22nd inst., will take place at the Waterloo Rooms, at 6 for 6.30 p.m., and the chair will be taken by Mr. Robert McAdam.

Mr. Hill, the Society's Assistant Secretary in Scotland, informs us that the meeting in Edinburgh on the 23rd inst. will be held in the Society's House. To afford opportunity for meeting the President personally, the time fixed is 8 p.m., and at 8.30 the chair will be taken by Mr. J. R. Young, J.P. A good meeting is expected, and the committee entrusted with the arrangements for the President's reception has decided to hold a complimentary dinner in the Royal Hotel on Wednesday evening, at 6.30 p.m., to which the President has accepted the invitation of the Committee.

Arrangements are also being made to hold a meeting at Carlisle on Monday, the 26th inst., at which the President will meet the chemists and druggists of that town and neighbourhood. We hope to receive further particulars for notification in our next issue.

* * *

We learn from Professor v. Hofmann of Berlin that some friends of the late Professor Heinrich Will of Giessen propose to arrange for the publication of the portrait of him in the *Berichte* of the German Chemical Society. The editor of this Journal will be happy to receive from friends and past pupils of the late professor any contributions they may desire to make in support of this manifestation of friendly remembrance, and to remit them with the names of the donors to Prof. v. Hofmann.

* * *

A series of four "Gresham" lectures on "The Preservation of Health," will be delivered by Dr. E. Symes Thompson, at six o'clock in the evening of Tuesday, the 20th inst., and three following days, at Gresham College, Basinghall Street, E.C.

* * *

The next meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, W.C., on Thursday, January 22, when there will be a discussion entitled, "Is the Position of the Chemist's Assistant Improving?"

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, January 22, when Mr. T. J. Roberts will read a paper on "Vegetable Mimetism," and Mr. F. A. Hocking will give a Report on Pharmacy.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

January 13, 1891.

The following are the questions that were set for this examination:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin:—*

1. Antonius made laws for himself.
2. Nothing is more amiable than virtue.
3. Your father and I were elected consuls by the Roman people.
4. Caesar hastened into Italy with long marches.
5. Atticus used to praise Cicero because he had saved his country.

II. Translate into English either A. (Caesar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CAESAR.

1. Interea ea legione, quam secum habebat, militibusque, qui ex provincia *convenerant*, a lacu Lemanno, qui in flumen Rhodanum *influit*, ad montem Juram, qui fines Sequanorum ab Helvetiis *dividit*, milia passuum decem novem murum, in altitudinem pedum sedecim, fossamque perducit. Eo opere perfecto, praesidia *disponit*, castella communit, quo facilius, si se invito *transire conarentur*, prohibere possit. Ubi ea dies quam constituerat cum legatis venit, et legati ad eum reverterunt, negat, se more et exemplo populi Romani posse iter ulli per provinciam dare; et, si vim facere conentur, prohibiturum *ostendit*.

2. Dies colloquio dictus est, ex eo die quintus. Interim, saepe ultro citroque quum legati inter eos mitterentur, Ariovistus postulavit ne quem peditem ad colloquium Caesar adduceret; vereri se, ne per insidias ab eo circumveniretur; uterque cum equitatu veniret; alia ratione sese non esse venturum.

Grammatical Questions.—For those only who take Caesar.

1. Give the principal parts of the verbs in italics (Par. 1).
2. In what cases are the following words, and why? —*die*, *eos*, *se*, *eo*, *equitatu*, *ratione* (Par. 2).
3. Give the comparatives and superlatives of *bonus*, *bene*, *malus*, *magnus*, *multus*.
4. What sort of verbs take the construction of the accusative and the infinitive? Give three short sentences in illustration.

B. VIRGIL.

1. Nulla tuarum audita mihi neque visa sororum,
O—quam te memorem virgo? namque haud tibi vultus
Mortalis, nec vox hominem sonat. O dea certe:
An Phoebi soror? an nympharum sanguinis una?
Sis felix, nostrumque leves, quaecumque, laborem,
Et quo sub coelo tandem, quibus orbis in oris
Jactemur, doceas.

2. Hoc primum in luco nova res oblata timorem
Leniit: hic primum Aeneas sperare salutem
Ausus, et afflictis melius confidere rebus
Namque, sub ingenti lustrat dum singula templo,
Reginam opperiens, dum, quae fortuna sit urbi,
Artificumque manus inter se, operumque laborem,
Miratur, videt Iliacas ex ordine pugnas,
Bellaque, jam fama totum vulgata per orbem,
Atridas, Priamumque et saevum ambobus Achillem.

Grammatical Questions,—For those only who take Virgil.

1. Give the principal parts of all the verbs in Paragraph 1.
2. In what cases are the following words, and why? —*rebus*, *urbi*, *se*, *ordine*, *orbem* (Par. 2).
3. Give the comparatives and superlatives of *bonus*, *bene*, *malus*, *magnus*, *multus*.
4. What sort of verbs take the construction of the accusative and the infinitive? Give three short sentences in illustration.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. What stock of coals is required to supply 28 fires for 36 weeks, each fire consuming daily 20 lbs. of coals? What would be the cost of the coals at 8 lbs. for $\frac{3}{4}$*d.*?
2. In marching soldiers take 75 steps a minute, in quick marching 108; how far would a regiment advance in 3 hours, the last half-hour at quick march, reckoning each step 2 ft. 8 in.? (Answer in miles, etc.)
3. Simplify $\frac{2\frac{1}{4}}{2\frac{3}{8}}+\frac{2\frac{1}{3}+5\frac{1}{6}}{3\frac{1}{4}+9\frac{1}{2}}+\frac{1}{2}+\frac{3}{8}$ of $\frac{3}{25}$.
4. Add together $3\cdot\dot{0}2\dot{1}$ and $3\cdot0\dot{2}\dot{1}$; and reduce the result to a vulgar fraction.
5. Find the value of $3\frac{4}{7}$ of £3 12*s.* $6\frac{3}{4}$*d.*; and reduce the result to the decimal of £35 0*s.* $3\frac{3}{4}$*d.*
6. Multiply 24 hect. 2 ares 9 centiar. by 76; and give the result approximately in English acres.
7. If iron raised at an expense of £4 5*s.* $3\frac{1}{16}$*d.* per ton be sold at £4 19*s.* 9*d.*, what is the gain per cent.?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

[Read the following passage before answering Questions 1, 2, and 3].

"We worldly men, when we see friends and kinsmen
Past hope sunk in their fortunes, lend no hand
To lift them up, but rather set our feet
Upon their heads to press them to the bottom."

1. Parse the following words:—*worldly*, *when*, *past*, *no*, *rather*, *bottom*.
2. Give the subjects and direct objects of the following verbs:—*see*, *lend*, *set*.
3. Give the perfect tense (1st person singular only) and the past participle of all the verbs in this passage.
4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—at length ravenswood's impatience broke the bounds he had imposed upon it i perceive he said that sir william ashton is unwilling to announce himself in the castle of wolfs' crag i had hoped it was unnecessary said the lord keeper relieved from his silence as a spectre by the voice of the exorcist and I am obliged to you master of ravenswood for breaking the ice at once where circumstances unhappy circumstances let me call them rendered self-introduction peculiarly awkward and am i not then said the master of ravenswood gravely to consider the honour of this visit as purely accidental.

*5. Write a short composition on *one* of the following subjects:—

(i.) Duty to Parents.
(ii.) The Sagacity of Insects.
(iii.) The Conditions of Success in Life.
(iv.) "Fortune a goddess is to fools alone;
The wise are always masters of their own."

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* This must be attempted by every Candidate.

EVENING MEETING IN EDINBURGH.

An Evening Meeting of the Pharmaceutical Society of Great Britain was held at 36, York Place, Edinburgh, on Wednesday, January 14, at 8.30 p.m., Mr. Wm. Gilmour, F.R.S.E., in the chair.

The first paper read was on a "Test for the Detection of Sesame Oil in Olive Oil," by J. F. Tocher, A.I.C.—The test consisted in using a solution of pyrogallol in hydrochloric acid, by which, the author stated, 5 per cent. of the sesame oil can be detected.

The second paper was on the "Isolation of a Crystalline Neutral Substance from Sesame Oil," by J. F. Tocher, A.I.C.—The substance referred to was separated from an extract obtained by shaking up sesame oil with glacial acetic acid. It forms prismatic crystals having the percentage composition C 30, H 5, O 65, about. The constitutional formula has not yet been determined.

The third paper read was a "Note on Iron Wine," by J. A. Forret.—The author stated that ten commercial samples examined had been found very deficient. Experiment showed that in preparing the wine it takes up iron for the first three weeks and then begins to throw it down again and gradually becomes nearly inert from precipitation of iron.

The next business was a Discussion on the Addendum to the B.P, which was taken part in by Messrs. P. Boa, D. B. Dott, Thomas Thompson, C. A. Macpherson, and Dr. Inglis Clark, and eventually the discussion was adjourned until the next meeting.

A full report of the papers and discussions will be published in the Journal for the 24th.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 7th instant, at No. 11, Harcourt Street, Dublin, the President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells, Mr. Hayes, Professor Tichborne, Dr. Burnes and Messrs. Grindley, Hodgson (Treasurer), and Simpson.

The first business on the agenda paper was the election of a member of the Council in the room of Mr. McNaught, who had resigned.

The Vice-President said he had great pleasure in moving that Mr. P. J. Lyons, of Belfast, be elected. Mr. Lyons took very great interest in the working of the Society in Belfast; and he was one of those who went to London at his own expense to assist the members of the Council while they were there in reference to the passing of the Amendment Act. He obtained for the deputation interviews with Mr. Sexton, M.P., and two or three other influential persons; and he also got about twenty-five new members for the Society last year.

Mr. Grindley seconded the motion, which was unanimously agreed to.

Reports from the Law Committee and the Pharmacy Act Amendment Committee were read, discussed and adopted.

A report from the House and General Purposes Committee recommended the following regulations for adoption in connection with the Society's new School of Pharmacy:—(1) That the School be conducted by a committee of members of the Pharmaceutical Society, being members of the Council, to be elected by the Council at its first meeting after the annual meeting of the Society. (2) That a Treasurer be elected from the School Committee. (3) The said Treasurer shall submit a statement of the accounts of the School to the Auditors of the Society in time for the annual meeting of the Society. (4) The Treasurer is to be entitled to settle with the Professors at such time as may be convenient. (5) The Registrar of the Pharmaceutical Society to act as Registrar of the School. (6) That no pupil be allowed to attend the classes until he has paid at least half of the fees, the remainder to be paid prior to the issue of his certificate of attendance. (7) That the certificates be signed by the Professor and by the Registrar of the Pharmaceutical Society. (8) That a roll call of attendance be duly kept by the Professors. (9) That certificates be printed for the candidates who attend the classes, stating the number of hours of practical work the student has given and the extent of the course. (10) That the School be open on Mondays, Wednesdays, and Fridays, only during the presence of one or both of the Professors. (11) That none but students of the School shall have the privilege of attending the classes or practising at the benches. There was a further recommendation in the form of a request to Professor Tichborne and Mr. Kelly to draw up a curriculum.

Professor Tichborne said he had prepared a rough sketch of a curriculum. It was extremely difficult to get young men to study without compulsion; and further the effect of certain regulations laid down by the influence of the late President of the Society, Mr. Brunker, had been to induce young men to attempt to master practical chemistry without an adequate knowledge of the theoretical elements. He had endeavoured to meet these disadvantages in the draft which he had prepared. It proposed that there should be a theoretical course, consisting of the general principles of chemistry and chemical physics. This should be alternated with bench work, so as to teach the pupils the making of the principal gases, and the typical processes of distillation, precipitation, sublimation, etc. The chief technical processes should be illustrated by diagrams and verbal description. The practical chemistry course should be distinct and should include qualitative chemistry, the recognition of all the chemical substances of the Pharmacopœia, the qualitative determination of impurities and an acquaintance with Marsh's and Reinsch's methods of determining arsenic. The modes of determining the presence and the reactions of the alkaloids and of poisonous principles should also be taught, and urine testing by volumetric estimation of the sugar of albumen. Public health chemistry, including the Nesslerizing, volumetric determination of the hardness of water and air analysis should be taught. These proposals could be revised in committee. Strictures had been made upon the School, but he believed that the carrying out of these recommendations would be an answer to them. In fact, if this course should be carried out in its integrity it would be an improvement upon anything that existed in the medical schools except for very advanced students. It would also show that the matter had been under the consideration of the Council before anything in the shape of strictures appeared in the Journals about the School.

The Vice-President: We were not in a position for a long time to make any curriculum, because we feared that the School might be upset. The present proposals are almost identical with what they have been doing heretofore in the School.

Mr. Hayes said the best course would be to return the draft curriculum to Professor Tichborne and Mr. Kelly for further consideration before it should be finally adopted by the Council.

This was agreed to, and the rest of the report was adopted.

A letter was received from Dr. Ninian Falkner, the examiner in Dublin under section 7 of the Amendment Act, reporting that Samuel Parker Boyd, M.A., of 18, Leeson Park, Dublin, and Arthur H. Jones, of the

Medical Hall, Doneraile, Co. Cork, had passed the examination held at 11, Harcourt Street, on the 18th ult.

A letter was received from Dr. McKinley, the Examiner at Belfast, under section 7 of the Amendment Act, reporting that Abernethy, Campbell Blakeley, 143, Albert Bridge Road, Belfast; Acheson, Samuel Edwin Albert, 42, Cromac Street, Belfast; Beattie, John, 31, Upper Frank Street, Belfast; Brown, James, 12, Ilchester Street, Belfast; Campbell, James A., 128, Dover Street, Belfast; Campbell, Robert, 40, Hartington Street, Belfast; Campbell, Thomas, 128, Dover Street, Belfast; Canavan, Joseph, High Street, Portadown; Chapman, Joseph, 37, Ann Street, Belfast; Davison, Isaac, 3, High Street, Portadown; Doig, William, 39, Mill Street, Belfast; Gibson, Charles, 62, Beersbridge Road, Belfast; Gibson, Samuel, Montpelier Road, Belfast; Gibson, William James, Montpelier Road, Belfast; Gorman, Thomas B., Bangor, Co. Down; Gray, John, Armagh; Haslett, William, 8, Sandon Terrace, Ormeau Road, Belfast; Jackson, David, 52, Maryville Street, Belfast; Lyttle, William, 170, North Queen Street, Belfast; M'Cabe, Thomas, Ballybay; M'Dowell, Samuel, 209, Shankhill Road, Belfast; M'Ilroy, David, 61, Willow Street, Belfast; Rankin, William James, 171, New Lodge Road, Belfast; Richardson, James, 39, Lonsdale Street, Belfast; Richardson, Joseph, 39, Lonsdale Street, Belfast; Reid, Samuel M., 9, Wilmont Terrace, Belfast; Shaw, John Harper, 60, Beechfield Street, Belfast; Shaw, William, 186, Grosvenor Road, Belfast; Smith, Robert, Templemore Avenue, Belfast; Turkington, Samuel, Cookstown; Walsh, Jacob, 209, York Street, Belfast; Watson, John, Knock, Co. Down; and Watson, Robert, Rathfriland, Co. Down, had passed the Examination held at Queen's College, Belfast, on the 22nd and 23rd ult.

Letters were received from Mr. Johnston Montgomery and Mr. J. C. C. Payne, members of the Society, and visitors from the Council reporting on the Belfast examinations. It was stated that the examinations were held in a hall of the Queen's College, Belfast, which was admirably suited for the purpose, as each candidate had a separate table, and that thirty-six candidates presented themselves for examination. The examinations were conducted orally and by papers.

On the motion of Mr. Hayes seconded by Mr. Hodgson thanks were voted to the President of Queen's College, Belfast, for having granted the examination hall of that college for the purpose of the examinations under section 7 of the Amendment Act, and thanks were also voted to the President of Cork College, who had granted similar accommodation although no examinations were held there.

Letters were received from Sir William Kaye, Clerk of the Privy Council, conveying the Lord Lieutenant's approval of the examiners appointed by the Council under section 8 of the Amendment Act, and of the dates fixed by the Council for holding the examinations under section 7 of that Act.

A letter was received from the General Medical Council, stating certain additional subjects in which in future persons holding the Preliminary certificate of the Society would be required to pass.

A letter was received from Mr. Ernest A. Bourke, complaining that although he had complied with the regulations of the General Medical Council, the Preliminary certificate which he holds from the Society had been refused by the Registrar of the Irish Branch Council. Mr. Bourke enclosed a correspondence which he had had with the Medical Council on the subject.

The President remarked that it would be a very serious thing for the Society if its certificates should be refused by the General Medical Council.

Dr. Burnes said it appeared from the correspondence that the General Medical Council had not absolutely refused to accept Mr. Bourke's certificate, but had only put him off until next May.

Mr. Hodgson suggested that the President should see Dr. Heard on the subject of the correspondence, and also in relation to a letter received from Mr. Daniel Enright with reference to the extra subjects required by the General Medical Council.

A letter was received from Mr. G. Lane McCormack, resigning his seat on the Council. Mr. McCormack stated that the hours of meeting of the Council and of its committees were such that he could not attend them.

The President: Mr. McCormack will be a great loss to us. Could we fix upon hours of meeting which would be more convenient to the members generally?

Mr. Grindley: The hours are most inconvenient for all of us.

Mr. Hayes: You cannot have more convenient hours than the present.

On the motion of Mr. Grindley, seconded by the Vice-President, it was resolved that Mr. McCormack be asked to reconsider his determination.

A letter was read from Sir James Haslett complaining of the regulation that there were to be no local examinations under section 7 of the Amendment Act unless at least twelve candidates should present themselves.

On the motion of Dr. Burnes, seconded by Mr. Simpson, it was resolved that a letter should be written to Sir James Haslett, stating that inasmuch as it was not likely that there would be less than twelve candidates at the next examinations under the Act in question, the Council did not think it would be wise to apply to the Lord Lieutenant for the alteration of a regulation so recently passed.

A letter was received from Mr. A. R. G. Clark resigning membership of the Society.

A letter was received from Mr. J. H. Herley submitting chemistry certificates for acceptance.

It was ordered that Mr. Herley should be informed that his request could not be complied with inasmuch as his certificate did not show that he had put in the requisite number of hours at chemistry bench work.

On the motion of Professor Tichborne, seconded by Mr. Hayes, Dr. W. R. Oliver Barker was nominated for membership of the Society.

Donations were received from the Trustees of the Australian Museum of a copy of their report on the Technological Museum of Sydney, N.S.W.; from the publishers of the *Chemist and Druggist* of a copy of their Diary for 1891; and from the Mason Science College, Birmingham, of a copy of the Calendar for the Session 1890-91.

On the motion of Dr. Burnes, seconded by Mr. Grindley, thanks were voted to the donors.

On the motion of the Vice-President, seconded by Dr. Burnes, Mr Hampton A. Gray, 4, Charlemont Place, Armagh, was elected a member of the Society.

On the motion of Mr. Hayes, seconded by the Vice-President, Mr. W. I. McNeight, of the Linen Hall, Dublin, was elected an Associate Druggist.

Some accounts having been ordered to be paid,

The Council adjourned.

JANUARY PHARMACEUTICAL EXAMINATIONS.

Preliminary.—Messrs. J. H. Henry, J. Walsh, S. M. Martin, A. E. Moran, C. G. Draper, J. T. Chamberlain, J. Ritchie, passed. Seven were rejected.

Licence.—Messrs. W. J. Meredith, G. McGuire, E. M. McSwiney, F. J. Miller, T. J. Frazer, R. Lynch, and W. M. Bleakley have passed, and are qualified to act as Pharmaceutical Chemists. Four were rejected.

Provincial Transactions.

SOUTHAMPTON CHEMISTS' ASSISTANTS' ASSOCIATION.

The chemists' assistants and apprentices in Southampton and the neighbourhood have recently formed themselves into an association for the promotion of intercourse among themselves, and the discussion of subjects tending to the welfare of all interested in pharmacy. The President is Mr. W. B. Randall, J.P., and the Vice-Presidents are Messrs. G. H. Bishop, A. G. Gamble and J. H. King. Mr. T. Postlethwaite is the Hon. Treasurer, and Mr. Norton D. Desborough performs the secretarial duties. The first meeting was held at the Nautical School, Hanover Buildings, Southampton, on Wednesday evening, January 7. Mr. Randall presided over a very fair attendance, which included several qualified chemists in business in the town.

The President said it was not without hesitation that he accepted the duty of giving a short opening address on the occasion of the first meeting of this Association, for while it was undoubtedly true that those who were nearing the end of their career ought to be able to speak wise words to their juniors, it was not less true that knowledge grew and methods improved, and economic ways changed—these last, perhaps, not invariably for the better. Much that not long ago was pertinent and valuable was now obsolete, and of interest only historically. Times changed and often brought silent revolutions, the effects of which were far more potent and far-reaching than convulsions that startled and shook the whole community. Of this the system of distribution of commodities through the great stores, and their imitators, and the legal provision for limited liability trading were remarkable instances. But in the midst of change, whether sudden as the eruption of a volcano, or gradual as the growth of a coral reef, one thing remained very much the same, and that was human nature. Within the memory of one generation their business, and, indeed, all business, had been revolutionized; but those who were entering upon it still had to sustain each for himself the old inward conflict between the wish for improvement and the inclination for amusement, between the instinct of rest and the ambition to achieve. Happy was he who was able to preserve the balance. If they had not already thought seriously, and definitely settled with themselves what they would aim at—their ideal—let them be advised to do so at once. "Shall I simply aim at getting a living, and if it may be, gradually accumulating money? Shall I seek for distinction, more or less extended. Shall my first desire be to do daily duty with intelligence and integrity?" All these aspirations were valuable, and in practice they most of them made a mixture of them in their early days, for their own taking, but the proportion of the ingredients, how they varied them? How important to adjust them rightly. It was obvious that these considerations applied pretty equally to all who were yet in the preparatory stages of their life. Turning to matters which specially related to their own employment, Mr. Randall said that pharmacy was a business, a trade. This it was affectation to ignore. It was also an art and a science. Business habits must be firmly fixed in them. Manipulative ability must also be learned, till hand and head worked together automatically, and the more they got to the bottom of the why and wherefore of the substances they used, and the processes they carried out, that was to say the more science they put into their everyday work, the better. That was his individual opinion, founded on his own experience; but he was aware that it was not accepted by all, and even controverted by many. He advised all beginners to resolve not to be satisfied until they had gained the Major qualification, and to aim, if possible, when the first stage of their career was past, at a full course of instruction in a regular school of pharmacy. He dealt at some length with the question of competition, and pointed to the direction in which the work of the qualified chemist and druggist would lie in the future. He heartily commended the attempt to encourage and assist each other in acquiring scientific knowledge, which they were inaugurating that evening, and he trusted that they would find association in study a powerful stimulus to sustained effort. Old memories made him very confident in this hope, for a small society to which he belonged during his five years' apprenticeship, in which about ten others took turns to lecture to one another, and shared in frequent debating, did this essential service for him, and when he went to study in London he was amazed at the help that these early efforts had given him. This was for their encouragement, who were beginning life's race, from the experience of one who was nearing the goal. His last word to them was—Persevere. It is the "stayer" who wins.

Mr. King proposed a vote of thanks to the President for his interesting and instructive address, and said that he looked forward to much good being done by means of the Association.

Mr. G. H. Bishop seconded the proposition, and said that by means of an association of this kind they would be able to render each other much mutual assistance. He hoped there would be good attendances at all the classes which it was intended to hold.

Mr. W. Bates, speaking not as an assistant but as a chemist, supported the motion, and in doing so pointed out the direction in which their efforts should lie in order that they might achieve success. He was very glad that the Association had been started, and he thought it would result in much good being done in rendering assistance to young men preparatory to their entering for their examinations, and in bringing them together for their mutual good. He hoped they would follow the words of counsel and advice given to them in their President's beautiful address, and he was sure they would find their efforts crowned with success.

The proposition was carried by acclamation, a compliment which the President briefly acknowledged.

The Hon. Secretary read a letter from Mr. O. R. Dawson, regretting his inability to attend, and wishing the Association every success. Mr. Desborough also read out the syllabus for the session as far as it had been arranged, and said that with a good attendance of members he felt sure the meetings of the Association would be successful ones.

It was stated that a few things had been sent for the use of the members, and Mr. Bates said he should be pleased to give them some books of reference. He was sure that other chemists in the town would be glad to do likewise.

Votes of thanks having been accorded to those who had already assisted in the formation of the Association and had given presents, the proceedings ended.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the above Association was held on Tuesday evening, at Mason College, Birmingham, Mr. A. Southall, President, in the chair.

The Secretary announced that the following books had been received:—The Chemists and Druggists' Diary from the proprietors. Southall's 'Organic Materia Medica' from the President. Five volumes (bound) of the *Pharmaceutical Journal* from Mr. Gibson, Wolverhampton. The donors were thanked, on the proposition of Mr. Perry, seconded by Mr. Crooke.

A paper was then read entitled:—

SHORT NOTES ON THE GALENICAL PREPARATIONS OF THE B.P. ADDENDUM.

BY H. W. JONES, F.C.S.

Acetum Ipecacuanhæ.—The addition of sulphuric acid in the proportion of 1 in 1000, as allowed for vinegar, might be suggested, as it would act as a preservative and prevent fungoid growths.

Emplastrum Menthol.—I find it is best to melt the resin and wax in a vessel with upright sides, to allow the mixture to cool down to about 80° C., and then to add the whole of the menthol, when the temperature at once falls some 20 degrees. If necessary a little extra heat may be applied during the mixing.

Extractum Euonymi Siccum.—The mixture of spirit and water in equal proportions gives a good extract, and the addition of milk sugar greatly helps in the final powdering of the product. If strong rectified spirit were employed a considerable amount of oily matter would be extracted, and this would have to be removed.

Extractum Hamamelidis Liquidum. Extractum Hydrastis Liquidum.—In both cases the menstruum has been adapted to the nature of the drugs. A little glycerine added to the portion to be evaporated would, I think, have been an improvement, as glycerine specially prevents drying on the sides of the dish during the stirring down process.

Liquor Cocainæ Hydrochloratis.—The addition of salicylic acid or other preservative is necessary, as cocaine solutions, unless containing chloroform or salicylic acid, etc., soon show growths if exposed to the air occasionally. In filtering the official solution it is best to employ a plug of absorbent cotton wool or pure white paper, as any trace of iron will impart a distinct tint to the liquor.

Liquor Morphinæ Sulphatis.—Another solution of morphine to be kept in the pharmacy, but easily made and likely to keep well.

Liquor Trinitrinæ.—Prepared of the usual strength from pure nitroglycerine. A method for the preparation of nitroglycerine, with tests, might have been given.

Magnesii Sulphas Effervescens.—The sulphate of magnesium is directed to be dried in such a manner that the salt loses practically three out of its seven molecules of water. In practice I have found no difficulty in granulating, and the formula works very well, the finished compound having very little dust, and requiring little manipulation with the sieve to obtain tolerably uniform granules.

Sodii Phosphas Effervescens. Sodii Sulphas Effervescens.—Both are easily made.

Mistura Olei Ricini.—This appears to be a very unsatisfactory preparation. The character of the emulsion depends very much on the variety of oil used. East Indian castor oil works better than the "tasteless" Italian (due to the different amounts of the free fatty acids). After failing with the 'Addendum' process, I found the following method answer very well:—

Mix the oils with the syrup in a mortar, add the whole of the solution of potash, triturate till a thick white emulsion results, and add the orange-flower gradually with constant trituration.

The use of caustic potash adds to the acrid taste of the oil, which is not entirely masked by the flavouring agents employed.

Pilula Ferri.—Instructions are given for the mass to be divided into pills; it might well be added, I think, that they should be varnished or otherwise coated, or freshly prepared.

Pulvis Sodæ Tartaratæ Effervescens.—As the "commonly known" seidlitz powder has now an officially recognized strength, the proper article ought to displace some of the wretched substitutes frequently sold.

Suppositoria Glycerini.—Suppositories containing as much as 75 per cent. of glycerine have been known for some time. The 'Addendum' formula is to yield 70 per cent., and made of this strength the suppositories will be found to act very well.

Syrupus Ferri Subchloridi.—An old-fashioned syrup now introduced. The formula is a good one so far as can be seen at present. Characters of the syrup as it should be might have been given in addition to the sp. gr.

Tinctura Hamamelidis. Tinctura Hydrastis.—Prepared entirely by percolation. The instructions for many of the tinctures of the 1885 Pharm. to "subject the contents of the percolator to pressure," etc., have not been continued.

Tinctura Strophanthi.—Commercial ether free from alcohol and water is allowed for the removal of fixed oil, but if used care should be taken that such ether leaves no odour after re-drying the marc at 120° F.

Trochisci Sulphuris.—Need no comment. Sulphur has been well "boomed" of late by the various makers of tablets, pellets, etc.

Unguentum Conii.—On making the ointment according to the official instructions, and incorporating the hydrous wool-fat with the concentrated juice in a warm mortar, using a pestle and spatula, making good use of the latter, I obtained a nice ointment. On keeping it for a few days I noticed on re-potting it that a portion of liquid exuded on disturbing the mass with a knife. Why not have ordered pure wool-fat instead of the hydrous article?

Unguentum Hamamelidis.—The formula given makes a nice ointment.

The President, Mr. A. Southall, thought that it was an opportunity for young members to state their experience. Already correspondence had begun in the journals to show the various merits and demerits. The effervescent sulphate of magnesium was very bitter, and could with advantage be displaced by sodium sulphate, which was an old, and, in his opinion, better preparation.

Mr. Cripps referred to euonymin, and said that a weaker spirit might have been used with greater advantage. He thought that the bitterness of the effervescent magnesium preparation would have been reduced if the strength were 25 per cent. He considered the use of liquor potassæ for the castor oil mixture was unpharmaceutical; mucilage was much better. The fluid preparations of hydrastis and hamamelis were satisfactory, and did not deposit very much. He also referred to several other preparations.

Mr. Perry was very much pleased to hear that so little fault could be found with the book, and hoped to have something to say next month concerning the iron pill. He thought the addition of liquor potassæ to the castor oil mixture aided the action. With regard to the fluid preparations, he preferred maceration to percolation, but objected to the making up process.

Mr. Perks showed the meeting a sample of the castor oil mixture which he had made by adding all the potash to the oils, triturating well, and adding the whole of the water at once. It seemed to him very easy to make by any method except the one in the 'Addendum.'

Mr. Campbell endorsed Mr. Jones's idea about ung. conii, but suggested the addition of lard. An [illegible]ment of "Huile de Cade" should have been [illegible]rized. In the castor oil mixture he thought th[illegible] liquor potassæ developed the acridity of the oil. W[illegible] regard to the solution of cocaine, if prepared with [illegible] boiled water to 4 per cent., no preservative was re[illegible]quired.

After a few remarks from Mr. Jo[illegible] Four[illegible] Mr. Jones replied to the remarks made.

Perks's castor oil mixture a success, and summed up this mixture by saying that a good old rancid oil would no doubt produce a satisfactory emulsion.

A vote of thanks was accorded to him for his paper.

The next paper was by Dr. W. B. Featherstone, entitled "Ambulance Work." After giving an historic sketch of the work of the Ambulance Society, and explaining how such societies were formed in various districts, he proceeded to give an outline of the five lectures which usually constituted a course upon which candidates were examined for obtaining certificates of proficiency in the objects of rendering first aid to the injured. With the assistance of Mr. Bramley Dr. Featherstone practically illustrated (1) the uses of the triangular bandage (2), method of improvising a pad and tourniquet, (3) the application of splints to broken bones, (4) what to do in cases of fainting, drowning, scalds, etc., (5) the use of the stretcher and the right manner of carrying the injured.

In the discussion which followed, in which many members took part, Mr. Thompson, in proposing thanks to the lecturer, suggested that it would be very useful if an extended course of lectures could be given to members of the Association by Dr. Featherstone at some convenient time. There was no doubt that it would be most useful to them and of great value to those with whom they might be brought in contact where such services would be required.

Mr. Perry, in seconding the vote of thanks, agreed with Mr. Thompson's suggestions, especially so as pharmacists were always at home.

There was a very good attendance of members.

EXETER ASSOCIATION OF CHEMISTS AND DRUGGISTS.

A meeting of this Association was held at Messrs. Holman, Ham and Co.'s., High Street, on Wednesday evening, and those present included Mr. Henry Gadd (in the chair), Messrs. J. H. Lake, D. Reid, Fouraker, J. J. O'Evans (Teignmouth), Bartlett Lemmon, H. W. Harris, and P. F. Rowsell.

After the minutes of the last meeting had been read and confirmed, Mr. H. W. Harris read a paper on the—

Pharmacy Acts Amendment Bill.

Before addressing myself to the subject chosen for our discussion this evening, allow me to express the satisfaction with which I look upon our Association as a *fait accompli*, and remember that although only a single meeting has been held we have accomplished two results—to wit, the commencement of combined action with regard to the sale of poisons and the unanimous agreement to close our shops at an earlier hour, not to speak of the greater intimacy which has already been produced amongst the members of our fraternity in the city and suburbs.

This propitious start should, I submit, encourage us to hope that with judicious management ours will be a prosperous and useful Society, and although friction will doubtless sometimes occur amongst us, owing to the difficulty of doing justice to ourselves in these times of keen competition without treading on our neighbour's toes, yet I have great trust that mutual confidence and respect will ere long have been so well established that in the event of trade differences unfortunately arising in our midst, the matters in dispute may be amicably settled by arbitration, thereby removing jealousy and ill will. Now for the consideration of the proposed Pharmacy Act Amendment Bill.

So much has been said and written on the subject, both critically and in defence, that there seems no room left for original remarks. I will however endeavour to collect and summarize the various opinions which have been reported in the journals both for and against the measure.

There appears to be greater dissatisfaction at what are considered omissions from the Bill than with what is embodied in it. As to the latter, it is difficult to conceive what could be urged by objectors, unless it be the stock argument of too many in our day, "Things are very well as they are, and what was good enough for our fathers ought to be good enough for ourselves and our children." I will not, however, insult the present company by supposing that anyone here regards matters in this light.

There may, however, be with some of us the half acknowledged feeling that we have very little interest in the curriculum, and that all our wits are required to hold our own and keep pace with our neighbours in the race of life. But if our best opportunities of gaining knowledge and so elevating ourselves in the social scale have passed away, it is still open to us to raise the status of our calling by adopting the best means available to admit only intelligent and well informed men, and although by so doing we may for a time limit our supply of assistants and apprentices, yet in the long run we shall undoubtedly be placed as a body on a much higher level in the eyes of the public, and consequently secure to ourselves higher remuneration for our services.

Now the best means to this end which has been suggested is that the qualification necessary for entering business shall be gained step by step, insuring steady application of the mind to study during pupilage and also detecting unsuitability in the candidate before he has reached a period in his life when it is too late to turn to other pursuits.

I have seen no serious objection brought forward against the admission to membership of the Society and eligibility to a seat on the Council of chemists and druggists in business or above the age of twenty-five.

Pharmaceutical chemists will, I think, willingly waive what advantages they now possess in this respect for the sake of consolidating and strengthening the Society. Freedom from service on juries, too, should not be grudged to those who, being registered, have the same claim to exemption which pharmaceutical chemists had at the time the Juries' Act was passed.

The fault generally found with the Bill, however, is that it does not put a stop to the dispensing of medicines and sale of poisons by co-operative societies.

To effect this is undoubtedly the desire of us all, but the question that divides us is, "Have we the power to bring it about?"

Those who have had the largest experience in parliamentary matters, and are most likely to estimate aright the amount of antagonism likely to be evoked, consider that such an attempt would not only be unsuccessful in itself but would greatly jeopardize the whole Bill, especially when it does not receive the support of the trade.

On the other hand some whose opinions carry much weight, say that without this feature is included, the Bill will not satisfy the bulk of chemists, and that it is the duty of the Council to try at any hazard to prevent the evasion of the law so largely practised by the farce of so called co-operation.

To reconcile these opposing views, the excellent suggestion has been made that the Bill should be presented to Parliament as it is in the first instance, leaving the dangerous element to be introduced as an amendment at the second reading or in committee. Organizations could be everywhere formed for the purpose of bringing all possible pressure to bear on Members of Parliament as soon as this matter is brought forward, and should the attempt to incorporate in the Bill fail the latter need not suffer in consequence.

There seems to me much force in the argument that before we attack companies on the ground that each proprietor (or part proprietor) of a pharmacy should be qualified, we must ourselves get rid of the anomaly of its being legal for the business of a deceased chemist to be carried on by trustees or executors. The question then arises, are we willing to forego this right? Is it, generally speaking, a desirable privilege? I am inclined to doubt it very gravely, though I admit it in the case of a son being within measurable distance of qualifying himself to carry on his deceased father's business for the benefit of the family, it would be a hard case to insist on the business being parted with. Still, individual cases must not be considered when the welfare of the whole body is involved.

It must also be borne in mind that the Council of the Pharmaceutical Society would be charged with the duty of enforcing the law, and could be trusted not to act with harshness in such a case as I have referred to. If the majority of chemists are willing to have what is called the "widow's clause" abolished, it would be most desirable to take this step, by which our position would be vastly strengthened in seeking recognition of the fact that there is the same necessity for qualification in the proprietor of a pharmacy as in the owner of a legal or medical practice.

Having attempted to put before you, as briefly as possible, what I consider the chief points of interest in the Bill, I call upon you, gentlemen, to express your views freely, and to allow your minds to be so open to conviction that we may arrive at a unanimous conclusion. By way of giving point to the discussion, I propose, with our President's leave, to move the following resolution:—

> "That this meeting approves of the Pharmacy Act Amendment Bill proposed by the Council of the Pharmaceutical Society, and accords the measure its hearty support."

Probably other motions or amendments will be moved, but I think we ought to get a clear expression of opinion on these two points, and if we can by our decisions in any degree strengthen the hands of Mr. Carteighe and his colleagues, who have taken so much pains to make plain to us what after many years of experience and study they have themselves mastered, I for one shall heartily rejoice.

Messrs. Lemmon and Evans spoke in favour of the motion, which on being put to the meeting was carried unanimously.

The widow's clause and the conducting of chemists' businesses by companies were then discussed, and the following resolution, proposed by Mr. Harris and seconded by Mr. Jake, was unanimously adopted:—

> "That this meeting is of opinion that every business of a chemist and druggist should be conducted by the proprietor, he being qualified under the Pharmacy Act, and on this ground would be willing to waive the widow's clause."

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the second session of this Association was held in Lockhart's café, St. Nicholas Square, on Wednesday evening, January 7, at a quarter past eight o'clock. Mr. F. Park, President, in the Chair. There was a rather small attendance.

The usual routine business having been transacted, the President read a paper on "Pulverization," by J. G. Chapman, Ph.C.

The discussion which followed was so prolonged that, upon the motion of the secretary, communications by Messrs. P. Bell and T. S. Herd were held over till a future meeting.

The next meeting will be held in the Association's rooms on Wednesday, January 21, at the usual hour, when Mr. T. Oliver Mawson, Hon. President, will read a paper on "How Plants Grow."

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

At the ordinary meeting of this Association, held on the 7th inst., Professor Thomas King, of Anderson's College Medical School, delivered a lecture on Economic Botany.

The President, in introducing the lecturer, said that angling had been called the gentle art, and he thought botany might be termed the genial science, and he was sure no more genial and enthusiastic exponent of it could be found than Professor King, who when asked to contribute to their syllabus, with cheering readiness promised to give the lecture which he had pleasure in asking him now to deliver.

Professor King said: In a learned botanical work which I have, the author makes the following curious remark: "The old form of 'Herbals' has now gone out of fashion to give place to 'Floras,' which while they enter minutely into the most trifling differences in various organs of insignificant weeds, take no notice whatever of the uses of plants to man in the way of food, medicine, or anything else. . . Economic botany, which one would think the most important branch [of the science], has latterly received but little attention in England, while we have been deluged with 'Floras,' all excellent, but most of them substantially alike."

Now that book (Alcock's 'Botanical Names for English Readers') was published no farther back than 1876. There was, at one time, and perhaps still is, some ground for the complaint. But I think I can explain how the neglect of economic botany arose. Botany had its origin in the use of plants as drugs, and naturally the old botanical works or herbals treated chiefly of the medicinal uses or "virtues" of plants. But much of what they said was absurd and puerile, so that we need not be surprised that when botany was becoming really a science, the younger men turned with scorn from these old wives' fables and went to the opposite extreme, directing their attention chiefly to classification and ignoring the economic aspect of the subject. I have been told of an excellent botanist, now dead, of this town, who would never say what a plant was good for lest he should be mistaken for a herbalist.

These old herbals are very instructive historically and sometimes amusing. Culpepper, the writer of one of them, was born the year Shakespere died, yet his 'Herbal' is still to be seen in book shops. In an edition published in 1810 is the following passage respecting the bay tree: "It is a tree of the sun and under the celestial sign Leo, and resisteth witchcraft very potently, as also all the evils old Satan can do to the body of man, and they are not few. . . . . . Neither witch nor devil, thunder nor lightning will hurt a man in a place where a bay tree is." Gerard, who lived in the time of Queen Elizabeth, gives an account of certain trees that bore, instead of ordinary fruit, living geese. Here is a receipt from the 'Grete Herbal.' "For dronkennesse.—To eschewe dronkennesse drink ye iuce of bryony with as moche vyneygre and he shall not be dronke of all that weke."

Now, however, within the last thirty years economic botany is a recognized branch of the science, but it is not much lectured on, except that section of it which comes under materia medica and to a less extent that relating to agriculture.

Before going further I will state what I consider the aims and limits of economic botany. It treats of plants from a utilitarian point, of the uses to which we can put them. But we must not carry this idea too far. We must mark off this branch of botany from medicine, chemistry, agriculture, cookery and the different arts and sciences relating to vegetable substances. The distinctions cannot be sharp, as one science runs into another; but I think the explanation I am about to make will be sufficient. Economic botany then treats rather of the plants themselves that yield us useful substances than what we do afterwards with the products. For example, the wheat plant yields us grain, but it does not fall within the limits of economic botany to trace that grain through the processes of milling and baking. Jesuits' bark and quinine are vegetable products. The natural history of the plants that produce them belongs to the branch of botany under consideration, but not the chemical composition of quinine, its physiological effects or the mode of administration.

What, then, are the specific points to which a student desirous of obtaining a comprehensive knowledge of economic botany should direct his attention? I think they are chiefly these:—(1) The scientific and popular names of the plants. (2) Their natural order. (3) Native country. (4) Dispersion. (5) Present geographical range. (6) Habitat. (7) Our sources of supply. (8) Products and their uses, and (9) generally anything remarkable about that may reasonably be included in an account of it. Even thus defined and limited the field of study is very extensive, embracing as it does a knowledge such as I have indicated of all plants in the vegetable kingdom (yielding useful products) that we can press into our service. A student might well be dismayed at the prospect of commencing such a study. Where should he begin? How proceed? What aids in the form of books or specimens? I will now try to answer these questions. One of the greatest aids to study is the grouping of objects, or in one word, classification. Now the leading idea or underlying principle of classification in systematic botany is affinity; that is the relations of plants to one another as a result of descent from pre-existing plants. But in economic botany we must adopt a different mode of grouping, a classification having for its underlying principle utility. Now the bare necessaries of life are three: food, clothing, housing. We might make these a basis of classification, but it would be rather an incorrect one. We come to consider many things necessary that we could hardly fit into such a scheme. Where should we put medicinal plants? Medicine is scarcely food; nor is a newspaper, though made of vegetable fibre, clothing. We must adopt some other mode of grouping, and the simplest and best is merely to classify the plants according to the purposes to which we apply them. This is not a scientific classification, but we shall find that in many cases it coincides with the scientific classification founded on affinity, as closely related plants often possess like properties and are applied by us to like purposes. On this principle the classification would be somewhat as follows:—Food plants, medicinal plants, plants yielding fibres, timber, forage, dye stuffs, tanning materials, oils, gums and resins and miscellaneous.

The best collection of specimens is, of course, that in the Museums of Economic Botany in the Royal Gardens, Kew; but nearer home are those in the Industrial Museum, Edinburgh, and the small but increasing one in Kelvingrove Museum, Glasgow. Books on the subject are not very plentiful, but I may mention various articles scattered through 'Chambers' Encyclopædia,' 'Origin of Cultivated Plants,' De Candolle, International Series, 1884. Handbooks describing articles exhibited in the Indian and Colonial sections of International Exhibitions. Also a series of articles on Commercial Botany, presently being published in 'Cassell's Popular Educator.'

Professor King then proceeded to illustrate the subject, on the lines he had laid down, by means of a number of specimens, using them as examples of his classification of economic plants. While not adhering too closely to the principles he had laid down in passing the specimens under review, he imparted a fund of information regarding them, which interested by its value and did not weary by its length.

A hearty vote of thanks to the lecturer brought the meeting to a close.

On January 21st it is intended to consider the Draft Pharmacy Bill.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the thirteenth session was held in the Pharmaceutical Society's house, 36, York Place, Edinburgh, on Wednesday, January 7, at 9.15 p.m., Mr. J. Blenkiron, Vice-President, in the Chair.

The minutes of last meeting having been read and approved the following communications were read:—

Extract of Belladonna.

BY W. B. COWIE.

The official process for these preparations allows manufacturers to place on the market articles varying much in alkaloidal strength. If it be desirable to standardize such preparations as the extracts of cinchona, nux vomica, and opium there seems equally good reason why belladonna extracts should also be standardized.

The facts that they are largely used, and contain a powerful alkaloid, are sufficient, but there is another weighty reason in the fact that they are found to vary so much.

I estimated six commercial samples of the alcoholic extract. The process I adopted was to dissolve a definite weight of extract in acidulated water, remove colouring matter, etc., by shaking up with chloroform, making alkaline with ammonium carbonate, and then washing out the alkaloid with chloroform, transferring the chloroformic solution to a tared beaker, evaporating the chloroform, and weighing. The results were as follows:—

No. 1	. . .	3·27	per cent. total alkaloid.
„ 2	. . .	4·0	„ „
„ 3	. . .	3·6	„ „
„ 4	. . .	3·2	„ „
„ 5	. . .	1·6	„ „
„ 6	. . .	3·7	„ „

No. 2 gives a fair representation of what the extract ought to be. Nos. 1, 3, 4, and 6 are too low, while No. 5 is hopelessly deficient. Dunstan and Ransom, in a paper in the *Pharmaceutical Journal*, give the percentage of alkaloid in nine samples of alcoholic extract of belladonna. Only two of them are the same. Their average is 2·87 per cent., which is extremely low, and the difference between the minimum and maximum is 2·8 per cent. Some of my results correspond with theirs, but my average percentage is rather higher. If the B.P. process has been followed in the preparation of my samples, it shows that the direction to use water has been variously interpreted, and in some cases very liberally.

It has been suggested that the liniment and tincture of belladonna should be made from the extract, but it is obvious that before this can be done a definite formula for a standarized extract must be adopted.

Tincture of Nux Vomica.

BY A. J. DEY.

In 1886 Mr. Martin ('Year-Book,' 1886, p. 507) found that ten out of fourteen samples of this tincture were stronger than the official standard, and expressed an opinion that in two years time from that date the discrepancy would be even greater. The following experiments were undertaken to discover to what extent his prediction had been fulfilled. I procured from various sources eight samples of the tincture. These were examined in the usual way with the following results:—

Sp. gravity.	B.P standard.	Extract. 6·65 grs. per oz.	Total alkaloid 1·0 gr. per oz.
1 . . .	·899	5·11	1·30
2 . . .	·988	5·96	1·35
3 . . .	·990	5·82	1·31
4 . . .	·902	5·68	1·97
5 . . .	·893	5·68	1·60
6 . . .	·901	5·40	1·55
7 . . .	·896	5·68	1·2
8 . . .	·930	6·53	1·45

The tinctures corresponded pretty closely in colour, 7 and 8 being decidedly paler than the rest. All of them are over the official standard, No. 4 being nearly twice the B.P. strength. The specific gravity varies a good deal. This may be partly due to the quantity of extractive, but seems also due to the varying quantity of water in the menstruum. The quantity of extractive is in every case less than the official standard, but this may be due to the fact that a portion is always insoluble, and filtered off in making the tincture. This is a point not provided for in the B.P. formula, which omits any mention of filtration. The extract used in making No. 8 must have been very poor in alkaloid. The above results seem to indicate that the attempt to standardize this tincture has so far been a failure.

Better results would be obtained by using a dry extract, as recommended by Mr. Duncan in his paper on extract of nux vomica, or it might be done by diluting a standardized fluid extract. Such an extract could readily be prepared containing one half the percentage of alkaloid in the present extract, and it would not be liable to alter in potency by keeping as the present extract does.

The difficulty might also be overcome by dissolving the official quantity of extract, 133 grams in 10 ounces, instead of 20 ounces of the menstruum, estimating the alkaloidal strength of the solution and diluting with sufficient menstruum to make the product contain 1 grain of total alkaloid per fluid ounce.

The trouble and expense of first making the extract and then dissolving it in the menstruum could be avoided by exhausting 1 ounce of powdered nux vomica with 15 fluid ounces of the official menstruum by percolation, estimating the percentage of alkaloid in the percolate and diluting with sufficient menstruum so that the finished tinctures would contain 1 grain of total alkaloid per fluid ounce. I have proved the feasibility of the latter suggestion by the following experiment:—

Take of—Powdered nux vomica 1 ounce.
Distilled water. . . 3 fluid ounces.
Rectified spirit . . 12 fluid ounces.

Moisten the nux vomica with sufficient menstruum, allow to macerate for forty-eight hours, pack lightly in a percolator with a little roughly powdered pumice or sand, pour over the remainder of the menstruum till 15 ounces of percolate are obtained. Take 1 ounce of this percolate, evaporate to one half, to remove alcohol, and estimate the total alkaloid by the official process. The percolate was found to contain 1·65 grains per ounce of total alkaloid, equal to 24·75 grains in the 15 fluid ounces. It is obvious that if this be diluted with a further quantity of the same menstruum to 24¾ fluid ounces it will give a tincture corresponding to the official standard of 1 grain per fluid ounce. The percolate was very pale coloured, even more so than the old rectified spirit tincture of the 1867 Pharmacopœia. Examination, however, showed that the seeds were practically exhausted. The further percolate, after 15 fluid ounces had been obtained, was only faintly bitter, and gave no precipitate with alkaloidal reagents. I would suggest that by adopting this method of manufacture a tincture of definite and constant alkaloidal strength would be obtained, and it would have the advantage of containing the alkaloids in their natural combination, no heat being employed in the operation.

The reading of the papers was followed by a discussion, taken part in by Messrs. Blenkiron, Cowie, Dey, Findlay, Henry, Hill, Hoseason, Lothian, Macpherson, Petrie and Robertson, and on the motion of the Chairman a hearty vote of thanks was awarded to the authors. It was intimated that the next meeting will take place on Wednesday, February 4, when papers on "Tincture of Kino," by Mr. Victor Wright, and "Kola, the New Dietetic," by Mr. H. G. Parker, will be read.

The meeting then closed.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of this Association held at 103, Great Russell Street, on Thursday, Nov. 27, Mr. A. Campbell Stark, President, in the chair, the following paper was read:—

Electro-Chemistry.

BY T. A. ELLWOOD, A.I.C., F.C.S.

Electricity in its existence is as old as the universe, probably much older than the earth in its present form. Amongst the other subtle influences, such as gravitation and magnetism, it takes an important stand as to antiquity, and yet notwithstanding the ages it has existed its useful application is but of recent date.

The ancients saw the vivid flash of lightning and heard the roll of thunder and yet knew not whence they came or whither they went, nor were cognizant of the fact that in the lightning was a power that could influence nearly everything around it; that it was but the casket from which could be extracted by the key of knowledge ideas that would revolutionize the world, and prove an important factor in the management of nations.

To, however, depend upon statical electricity alone for all the development of usefulness we have acquired from the electric science as applied to art, would be a fallacy, but as one discovery leads up to another, so have the improvements in this science been brought about. Philosophy has introduced to this field of research numerous workers and experimenters since the discovery of voltaic electricity in the year 1790 by Galvani, Professor of Anatomy at Bologna, of whom Arago says, "It may be proved that the immortal discovery of the voltaic pile arose, in a most immediate and direct manner, from a slight cold with which a Bolognist lady was attacked in 1790, for which her physician prescribed the use of frog-broth." Galvani says he was "dissecting a frog on a table upon which stood an electrical machine when the limbs suddenly became convulsed by one of his pupils touching the crural nerve with a dissecting knife at the instant a spark was taken from the prime conductor of the machine." These effects were produced by induction.

Investigators have now been for a long time studying the effect produced in generating electricity by the action of chemicals upon metals, and very accurate results have been arrived at, as being the constant effect.

In the prosecution of these researches step after step has been attained, until we find electro-metallurgy and analysis by electricity are accomplished facts, the gradual development of which has marked a new era in manipulation in the laboratory, and with some businesses has created a complete revolution in the commercial world.

Thus commencing with the discovery that "two dissimilar metals in a solution acting unequally upon them produce electricity," we can easily understand the variety of batteries that can be devised and which we have in actual use, also the general reason of the production of electricity, which, as is observed, is dependent upon the chemical action; we may therefore safely affirm that the study of voltaic electricity is but the study of the result or the cause of chemical action.

A brief explanation of the theory and action of electrolysis will not be out of place here.

The earliest recorded fact we have in connection with voltaic electrolysis dates back to the year 1752, when Sulzer made the important observation, "that if you join two pieces of lead and silver, so that they shall be upon the same plane, and then lay them upon the tongue, you will notice a certain taste resembling that of green vitriol, while each piece apart produces no such sensation."

The investigator to whom we owe most for the development of electrolysis is Faraday. The basis upon which all our observations depends is chemical, and advances the fact:—"When a current of electricity passes through a suitable liquid it produces a chemical change."

Electricity is the cause, and chemical action the effect. Faraday arranged the nomenclature and founded the laws which we now employ. He first applied the term *electrolysis* to this special branch of the electrical science; called the liquid in which the action takes place the *electrolyte*, and the conductors immersed in the liquid the *electrodes*; the one by which the current enters the liquid the *anode*, and that by which it leaves the *kathode*; the elements or radicles which are electrolysed by the current he termed the *ions*, those appearing at the anode the *anions*, and those at the kathode the *kathions*.

In electrolysis, then, there must of necessity be a double action, which we describe by saying, "Whatever substance or mixture of substances are set free at one electrode, a chemically equivalent weight of substances of opposite electrical nature is set free at the other." From these facts, then, are deduced the quantitative laws of electrolysis:—

I.—The amount of chemical action is equal at all points of a circuit.

II.—The quantity of an *ion* liberated at an electrode in a given time is proportional to the strength of the current.

III.—The quantity of an *ion* liberated at an electrode in one record of time is equal to the strength of the current in ampères multiplied by the electro-chemical equivalent per coulomb of the *ion*.

The basis for the calculation of the electro-chemical equivalent is derived from Faraday's discovery of the electrolysis of water, his apparatus forming an efficient *voltameter*, or measurer of the current work. One ampère decomposes ·00009324 gram of water per second, thus liberating ·000010384 gram of hydrogen and ·00008286 gram of oxygen; hence calculating the volume of electrolytic gas liberated by one ampère in one minute we have 10·436 c.c. This is a useful figure for electrolytic analysis, being a unit of easy application and calculation as a check of the current when using a voltameter.

The electro-chemical equivalent of any element may be calculated by multiplying the electro-chemical equivalent of hydrogen by the atomic weight of the element in question and dividing by its valency.

We must now have a brief explanation of the units of measurement employed in electro-chemical manipulation. These are the ampère, volt, watt, coulomb, and ohm; the other minor units can be dispensed with in most work interesting to us as chemists.

The *ampère* is the unit of the current strength as power to work, and as we have just mentioned is capable of decomposing in one second ·00009324 gram of water. It is the strength produced by an electro-motive force of one volt in a circuit having a resistance of one ohm.

The *volt* is the unit of electro-motive force or the force by which the current is pushed through the circuit. A Daniell's cell = 1·07 volt.

The *watt* is the measurement of effective working energy exerted, and is the product of the ampère and volt.

The *coulomb* is the unit of the quantity of the current, and is the amount one ampère gives in one second.

The *ohm* is the unit measurement of the resistance of the circuit to the flow of the current, or the resistance offered to one ampère flowing with an electro-motive force of one volt, and is graduated by mercury 1sq. mm. in section, and 106 centimetres long at 0° C. offering that resistance.

Polarization.—Upon the electrolysis of a solution, the ions which are separated by force of the current have a tendency, by reason of chemical affinity, to reunite; the tendency produces an opposing electro-motive force to the original, thus weakening it. This effect is termed polarization. It therefore becomes necessary that the working current employed should have a higher electro-motive force than that due to the chemical affinity of the resolved ions. The electrolysis of water will afford an illustration of this. After its decomposition with hydrogen and oxygen the chemical affinity exerted by these gases, which is equal to 1·5 volts, offers an opposing force to the direct current. Therefore, for the decomposition of water we must have an electro-motive force of higher voltage than 1·5.

The early batteries, though based upon established scientific rules, did not make provision for the continuous chemical action, by allowing the gases resulting from the decomposition of the electrolyte to escape, and which therefore depositing or adhering to the electrode produced polarization. The question arose:—Can this be prevented? To this investigators applied their energies, and first came the mechanical method of preventing the trouble by such men as Smee, Walker, and others; these mechanical means proved not to be very satisfactory. Chemical knowledge then was brought to bear upon the difficulty, and in action said:—"If you cannot easily get rid of the gas you can easily employ it to bring about the decomposition of something itself inert, and also yielding non-influencing substances." And upon this theory is based the construction of the bichromate battery as a single cell non-polarizing; and the numerous two celled batteries which have been in use during the last fifty or sixty years, such as Daniell's contrived in 1836, which is still in very large employment by the Post Office authorities and others. Grove's, Brunsen's, Leclanché's, Cullan's, and many more of similar nature have been designed with the one avowed object of preventing polarization and give regularity and constancy of working.

Polarization, which at first, as I have shown, had been a source of trouble, has now been made use of as a source of electricity, or rather of a steady electric current. If the electro-chemical action produce polarization, why should not depolarization produce chemical recombination, and hence an electric current? Planté, in 1860, proved that such could be effected, and as evidence devised his storage battery or accumulator, which is designed in such a manner that the decomposition is brought about by means of electricity from another battery or a dynamo. The elements of the accumulator are lead plates, immersed in dilute sulphuric acid; the electrodes are rubbed over with red lead, peroxide of lead having, as discovered by De la Rue, a powerful affinity for hydrogen. After charging, the accumulator or storage battery can be worked by simply connecting the plates and thus completing the circuit, when the chemical reaction gives off a steady and continuous flow of electricity, which can be used in all cases where the direct electric current is employed.

Magneto Electricity.—The production of dynamical electricity is not dependent alone upon chemical action, which implies a modification of Volta's discovery. If such were the case, the multiplicity of cells and batteries that would be necessary for the production of the strong currents required to accomplish many kinds of work, would render their use impracticable, and would only tend to make electricity an interesting study with but few commercial uses attached to it, and would in no wise give it a place in the manufacturing world as a powerful rival of steam, gas or machinery. The immortal Faraday, one of the most earnest investigators and keenest observers of the present century, deduced and propounded the theory in 1831, "If magnetism can be produced by electricity, then why should not electricity be produced by magnetism?" and in the application of this theory he found that it coincided with actual practice. Thus was the way paved for the introduction of the magneto-electric machine, of which the present day's dynamo is only an improved modification, in construction brought up to the most recent electric knowledge.

The early magneto-electric machine was constructed under the idea that permanent magnets were needed in order to induce the flow of electricity, the strength of the current, then, as now, depending upon the efficiency of the machine and the mechanical power employed. In the year 1866 Dr. Werner Siemens produced a machine involving a new principle—the abandonment of the use of permanent magnetism. Sir C. W. Siemens, in explaining the principle of the doctor's machine, in a paper read before the Royal Society in February, 1867, says:—"An experiment has been suggested to me by my brother, Dr. Werner Siemens, of Berlin, which proves that permanent magnetism is not requisite to convert mechanical into electrical force, and the result obtained by this experiment is remarkable, not only because it demonstrates this hitherto unrecognized fact, but also because it provides a simple means of producing very powerful electrical effects. . . . . Instead of employing a battery to commence the accumulative action of the machine, it suffices to touch the soft iron bars employed, with a permanent magnet; or dip the former into a position parallel to the magnetic axis of the earth, in order to produce the same phenomenon as before. Practically, it is not even necessary to give any external impulse upon restarting the machine, the residuary magnetism of the electro-magnetic arrangements employed being found sufficient for that purpose."

Induced currents are directed through the coils of the electro magnets which produce them, increasing their magnetic intensity, which in its turn strengthens the induced currents, and so on; accumulating by mutual action until a limit is reached.

The dynamos of the present day are of two types, depending upon the winding of the armature; there is the drum armature and the ring armature. Dynamos used for electric lighting are high tension machines, and those for electro chemical purposes have a low tension, but a high current.

Electro-Depositing.—One of the first applications of this branch of electricity was the depositing of certain metals upon a baser foundation, either as a preservative or as a cast of delicate work. In 1836 De la Rue observed in Daniell's battery the thickening of the copper plate at the expense of the solution of sulphate of copper, and referring to it remarked:—"The copper plate is also covered with a coating of metallic copper, which is continually being deposited, and so perfect is the sheet of copper thus formed, that on being stripped off it has the counterpart of every scratch of the plate on which it is deposited" (*Phil. Journ.*, May, 1836).

The same year Mr. G. R. Elkington patented a process for gilding; and with this patent and those subsequently taken out by him, established the art of electro-plating as a commercial industry. The result of his enterprise is manifest by the present position of the firm of Elkington, electro-platers, with their large works in Birmingham and numerous show rooms throughout the world.

Electro-typing soon followed with its various modifications and complications, forming another important industry, in which electricity is the essential factor.

Continued discoveries of the power possessed by the electric current to bring about chemical decomposition, and thus the liberation of metals from their soluble salts, linked with the improved methods of effecting the flow of the current and also the cheapening of its production, led to numerous investigations of its use in further depositions. The one aim being to effect its utilization on a large scale, so as to make it a commercial success, and to ensure this the cost of production of the finished article must be so low as to give it chance of a fair competition with its rival productions obtained by other means.

This study is but in its infancy, and offers an enormous field for investigations, encouragement being afforded by a glance at the success of the few processes already being worked. First there is the purification of crude metals by its means, in which the factor worked upon must be, the cost must not exceed the extra value imparted to the metal. Secondly, there is the production of the metals from their ores in a pure or alloyed state, when the factors of cost, convenience and expedition must be considered. Electricity has been in use now nearly twenty years for the manufacture of copper, and an estimate furnished of cost of production is favourable enough to establish the electrolyte process on a firm basis.

(*To be continued.*)

Obituary.

HENRY BOWMAN BRADY.

It is with sorrow that we write at the head of this column the name of Henry Bowman Brady, LL.D., F.R.S., F.L.S., etc., who died at Bournemouth on the 10th inst., from pneumonia, the duration of which must be reckoned rather by hours than by days. Many of our readers are aware of the enfeebled condition of Mr. Brady's health during the past two years, and his practice of wintering in more favoured climes than England did not in 1889–90, when he formed one of a party on the Nile, issue in unqualified success. But there seemed sufficient prospect of his continuing the part of the carefully-tended invalid to justify arrangements that were made for his permanent residence near Bournemouth, on a site adjoining the homes of some of his intimate scientific friends. The exceptional severity of the present winter has, unhappily, falsified these anticipations.

Henry Bowman Brady was born in 1835, being the second son of Henry Brady, surgeon, of Gateshead-upon-Tyne. He was educated at schools of the Society of Friends at Ackworth and at Tulketh Hall, near Preston. The bias which shaped his mature career came from the colony of naturalists which has had its head-quarters in Newcastle-on-Tyne for several generations. The names of Bewick, Alder, Albany and John Hancock and others have been contributions made by Newcastle to the roll of English naturalists, and so thoroughly was the Brady family permeated by the local enthusiasm that it has attained the rare honour of having for many years past, two of its members (Dr. George S. Brady, L.L.D., F.R.S., Professor of Natural History in the University of Durham, and his younger brother, the subject of this notice) as Fellows of the Royal Society, in consequence of their distinguished abilities as naturalists.

In 1850 H. B. Brady was apprenticed to the late Mr. Thomas Harvey, pharmaceutical chemist, Leeds, for a term of four years, and his associations in Leeds with young men having an active taste for scientific pursuits developed his own tendencies in these directions. Chemistry, botany and the new and fascinating science of photography found ardent disciples amongst these young students, and Brady especially valued and availed himself of the opportunities which the business afforded for making many more galenical preparations than was the custom of the retail druggist. In 1855, although he had not attained the age of 21 years, Mr. Brady launched out for himself by taking over a pharmacy in Newcastle on Tyne. His conspicuous ability soon gained for him the support of the medical profession and the public, and he laid the foundation of the group of enterprises, since carried on with great extensions, in wholesale and retail pharmacy and scientific apparatus, by the firm of Brady and Martin.

Mr. Brady never married, and after twenty-one years of successful business life he retired from the firm in 1876. But for many years prior to this release from business cares he had also devoted his marvellous energy to the service of pharmaceutical organization, having been a member of the Council until 1870, when he resigned his seat on account of the strain imposed by so long a journey in the winter months. In announcing this retirement, the *Pharmaceutical Journal* remarked that its own appearance as a weekly instead of a monthly journal was chiefly due to Mr. Brady. Perhaps the Board of Examiners was his more congenial sphere, and his membership here was of vital importance, from his colleagues depending chiefly upon him for testing the knowledge of candidates in the subject of botany.

Mr. Brady delivered the Sessional Address at the Pharmaceutical Society's School of Pharmacy for the Session 1868 to 1869. His watchword to the students was that which had long guided his own efforts—"Thorough;" and he urged them to let their ambitions have scope beyond their own calling, by the cultivation of a taste for literature and general science.

Mr. Brady appeared in the character of a founder in professional matters, when he was one of the foremost of the twenty-one pharmacists meeting in Newcastle-on-Tyne in 1863, with the result of the inauguration of the British Pharmaceutical Conference. Of this body he was the first Treasurer (1864 to 1870) and filled the office of President in the years 1872 and 1873. His address to the meeting at Brighton concluded with words which he might well make his own, viz., Lord Bacon's injunction—"I hold every man to be a debtor to his profession; from the which, as men of course do seek to receive countenance and profit, so ought they of duty to endeavour themselves by way of amends to be a help and ornament thereunto." In his address before the Conference at the Bradford meeting, Mr. Brady reviewed the newer remedies and gave interesting information, based upon his extensive scientific correspondence, respecting the cultivation of cinchona throughout the world. He had recently visisted the United States and had established the most cordial relations with several eminent pharmacists, amongst them Professor Edward Parrish, whose recent death he deplored and to whose talents and virtues he paid a hearty tribute. But his warmest *éloge* was offered to the memory of his firm friend, John Cargill Brough, the late editor of the *Chemist and Druggist*, and first editor of the 'Year-Book of Pharmacy.' The noble qualities of a talented man, having rare magnetic influence over his fellows, struggling bravely under failing health, brought out Mr. Brady's fraternal feeling in words of burning eloquence.

Mr. Brady's chief researches communicated to the Conference were contained in papers entitled "Microscopic Research in Relation to Pharmacy" and "Micro-Chemical Examination of Extract of Flesh," produced jointly with Mr. Henry Deane, and both admirably illustrated. The drawings by Mr. Brady were very delicate and effective.

The field of natural history has long required that specialization should be confined to but a section of a section if the results are to be worthy of a master. Mr. Brady was from early years an expert with the microscope, and his selection of a department of natural history fell upon one of the smaller forms of animal life, the Foraminifera. On this subject, he became one of the first living authorities, describing numerous new species and keeping in touch with all that was known, either at home or abroad.

Mr. Brady's *opus magnum* may be said to be his Report on Foraminifera, the bulky volume which forms Part XXII. of the Zoological Series of Reports on the Scientific Results of the Voyage of H.M.S. *Challenger*. This volume was officially indicated in 1884 as being "the largest section which has been published up to the present time." The illustrations of such a work are of vital importance, and the author gave to this department the fastidious care of a skilled draughtsman and ensured equal accuracy in the work entrusted to the pencil of Mr. Hollick. In March, 1888, the University of Aberdeen conferred the honorary degrees of LL.D. upon him for his distinguished services to natural science. He was honorary member of a large number of foreign scientific societies, including the following devoted to pharmacy:—American Pharmaceutical Association, Pharmaceutical Societies of St. Petersburg and Vienna, Philadelphia College of Pharmacy; also of the Leeds Philosophical and Literary Society. In 1888 he was placed upon the Council of the Royal Society. Mr. Brady's trips abroad, perhaps originating in the necessity for escaping from our climate in winter, often developed into voyages worthy of a globe-trotter, and in this way he visited the following beyond the limits of Europe, viz., Morocco, the United States, China, Japan, Egypt, India, Borneo and various Pacific Islands. The friends at home who were privileged to read the methodical and graphic letter in which he recorded these experiences of travel will long recollect what they thus saw through the medium of his intelligent observation. In bringing to a close this notice of a departed friend and an accomplished man, our sorrow is tempered by the knowledge that pharmacy brought forth and nurtured him, and will add his name to the lasting roll on which the type is such a name as that of Daniel Hanbury, men who have achieved that which Bacon advised, and of whom their chosen calling can avow "that they have been a help and ornament thereunto." R. R.

The funeral took place at Jesmond Old Cemetery, Newcastle-on-Tyne, on the 14th inst., and was attended by Dr. G. S. Brady and Mrs. Brady, Mr. and Mrs. Jno. Brady, Mr. Carrick Watson, Mr. and Mrs. Edward Watson, Dr. Thos. Hodgkin, Dr. R. Spence Watson, the Principal and Professors of the College of Science, Dr. A. M. Norman, Dr. Embleton, Mr. Ellis, Mr. Richard Reynolds of Leeds, Mr. N. H. Martin, and others.

Notice has also been received of the death of the following:—

On the 25th of December, Mr. John Mark Brock, Chemist and Druggist, Fulham Road, London. Aged 47 years.

On the 5th of January, Mr. William Thomas Quick, Chemist and Druggist, Lympstone, Devon. Aged 33 years. Mr. Quick was an Associate in Business of the Pharmaceutical Society.

On the 11th of January, Mr. Samuel Mould, Chemist and Druggist, Grange Park, Thornton Heath. Aged 69 years.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PHARMACY BILL.

Sir,—I may say that I have carefully read the draft of the Act through over and over again. It appears to me to be short, concise, and moderate in tone, dealing as it does, right up to the 7th Clause, with what might be called the internal affairs of the Society itself, viz., the education of its members.

The 7th Clause seems to have been the one to have given most room for discussion all over the country.

We have heard a very great deal about the unfairness embodied in this clause to the large number of existing unqualified managers. At first sight there does seem to be some apparent unfairness, but on second consideration I am bound to say that I sympathize with the view taken by the framers of this Act. When we consider the purpose for which the Modified Examination was established, and the systematic way these gentlemen with open eyes have evaded or overlooked their privilege for so many years, they can hardly wonder at the period of mercy coming to an end.

I believe it to be most unfair for those who have striven properly to qualify themselves to have to stand aside until this clause has ceased to exist.

Much has been said about a "stores" clause, and undoubtedly this is a point upon which we all feel most keenly.

We must not forget, however, that the gentlemen who framed this Bill are better able to judge what we may expect in the way of legislation than the bulk of outsiders can possibly be.

They consider it much wiser to approach Parliament with a mild Bill like the one before us, which will most likely pass without much opposition, than run the risk of having a more stringent measure thrown out.

We must remember that much may yet be done in committee with judicious introduction, and even if we only succeed in passing the Bill as it stands, we are moving in the right direction. We will have all our old privileges and something more, and when we have set our house in order and can show a front of educated men, we can reasonably hope, with the inevitable evolution of things in general, to approach Parliament again in say eight or ten years time and demand privileges.

Again, if we set up a great outcry against the "stores" it would be taken as a sign of weakness, and the Bill as the last straw to a drowning man.

I do think, however, that, if at all possible, the Act should be so worded as to make it impossible for other companies to commence on the same lines; also that the sale of all poisonous substances and compounds containing such substances should be entrusted solely to chemists, and that some arrangement ought to be made to enable chemists under certain conditions to supply medicated wines, etc., without a licence.

The 9th clause I am sure we are all agreed as to it being a good one, and with carefully framed bye laws for the working out of the first six clauses, I consider the Bill good so far as it goes, and if under present circumstances we cannot hope for success should we demand more, I think it is the duty of every chemist, so far as lies in his power, to seek to further the passing of the Bill before us.

Exeter. DAVID REID.

Sir,—There is one point where I agree with the President of the Pharmaceutical Society, viz., that it is not well to show up our weakness, and it is on this account alone I refrain from offering any remarks upon the editorial comment with which you were good enough to favour my letter of the 10th inst., beyond stating that the illustrations which I gave were chosen with all the facts of the recent legal decisions fresh in my memory.

Evidently you are happy in the thought that the legal definitions already given will govern the case I mention, but I very much fear you will be rudely shocked some day to find that a little difference in the actual facts has made a great difference in the judicial result. I am exceedingly obliged for the courtesy you have shown towards me on this question, but in the interests of the classes to which I referred in my first communication, it seems to me such an Act ought not to find a place in the Statute book.

EDWIN YEWDALL.

APPRENTICES' GRIEVANCES.

Sir,—Allow me to offer a few words of consolation to a "Discouraged Apprentice." His journey on the road to fame in the world of pharmacy has only just begun, so he must not faint yet, nor be weary, for the way is long and the road beset with many difficulties. Let hope sustain him and his watchword be "*Spiro dum spero.*" Fifteen months with me at the commencement of my career gave me a knowledge such as he received, that of measuring paraffin oil, etc., weighing up stock, folding up seidlitz powders, beating up pill masses, dusting, washing dirty bottles (some greasy) in soda water. Next thing was the mixing properly of four pints of Oleum Lini with 28 pounds of Farina Lini to make P. Lini c. Oleo. After a while the paraffin "biz" was lost to us by the hawkers taking our custom, and then began a more prosperous time in the way of dispensing, etc. My duty then was to learn to read and copy prescriptions and write labels, etc., whilst the master dispensed, and this continued until nearly the end of the fourth year, and then I was allowed to do some simple work in the way of dispensing until the end of the fifth year, when my apprenticeship was complete. Now if he would get on and learn his business, let him be of an inquiring frame of mind, and if he does not find his master takes any interest in him, cause his master to do so by asking at convenient times and seasons the why and the wherefore of all he wants to know, and he will do his master good as well as himself; for when a master does not know, rather than plead ignorance he will find out first for himself and then inform his apprentice, and both will be benefited by knowing what neither knew before. As to encouragement he must not expect any, as all I had was sundry boxes in the ear when I wrote a label all "askew" instead of copper plate style, and never a word of satisfaction for anything I did, but plenty of grumbling if what I did was not approved of. If I knew who our young friend was I would give him some experience of my career which would inspire him with hope, and with the advice to be not weary in well-doing, I will close by telling him I was also once

ANOTHER DISCOURAGED APPRENTICE.

F. Andrews.—The subject referred to in your letter is receiving attention. There appears to be some misconception as to the officer to whom your letter purports to have been addressed.

W. H. Burrell.—Formerly an impure native sulphur was designated as sulphur vivum, but the name is said to be now applied to a residue from the subliming pots.

Sympathizer.—We have not yet seen any reason for encouraging a discussion of the subject you refer to in the columns of this Journal.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Saul, Mair, Shaw, Rowsell, Bowden, Blunt, Brown, Seccomb, Rawlings.

The Pharmaceutical Journal,

SATURDAY, JANUARY 24, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MEETINGS IN SCOTLAND.

THIS week, in addition to the usual supply of the Journal to those members of the trade who are connected with the Pharmaceutical Society, a copy is sent to every registered person resident in Scotland. For although the several meetings that have taken place at Aberdeen, Dundee, Glasgow and Edinburgh have been well attended by the chemists in those places and the surrounding districts, there are many other members of the trade in Scotland who have been unable from various causes to be present at those meetings. In order to afford them an opportunity of becoming acquainted with the views put forward in the addresses delivered by the PRESIDENT, as well as with the discussions that took place in reference to the Pharmacy Act Amendment Bill, we have decided to send to all Scotch chemists copies of the Journals containing the reports of the several meetings.

The meeting at Aberdeen was attended by thirty-four members of the trade, and the discussion of the draft Pharmacy Bill, which assumed a form consistent with the hard headed character of the Northern Scotsmen, resulted in the unanimous adoption of a resolution that the Council of the Pharmaceutical Society deserves the support of the trade in promoting further legislation in the interests of pharmacy. In the afternoon Mr. CARTEIGHE was entertained at dinner by the members of the Aberdeen Society of Chemists and Druggists.

The conversazione of the Chemists' Assistants' Association at Aberdeen on Monday evening was largely attended, and Mr. CARTEIGHE delivered an address to the members, in which he dwelt upon the importance of thorough educational preparation for those who intended to enter the calling of pharmacy. He also insisted upon the necessity of entering upon that occupation with the object of commanding public recognition by upholding its professional character, and urged that it was only upon this principle that there was any prospect of advancing the position of pharmacy or ensuring the welfare of those engaged in its practice.

At Dundee the meeting was one of the largest gatherings of chemists and druggists which has ever taken place there. The discussion, however, was not remarkably forcible, so far as it was taken part in by the local members of the trade. One of the speakers, who objected to the curriculum as imposing restrictions upon the trade, approved of the division of the qualifying examination into parts, apparently overlooking the fact that this division of the examination is a main feature of the curriculum, having the object of creating a necessity for and better opportunity of giving greater attention to the subjects of study which apprentices require to gain a knowledge of. This speaker's opposition to the Bill must therefore have been based on an association of the word curriculum with ideas that are totally distinct from the project of educational reform that is contemplated by the Council and that is actually approved of in its main features by the speaker. In reference to the ideas expressed on the subject of company trading by some chemists who are not members of the Society, the PRESIDENT remarked that they furnished evidence of the weakness of the body. It was, he declared, a mockery for men in that position to say they would join the Society when it had put a stop to company trading. To do that, even if it be attainable, everyone in the trade must be a member of the Society, and enable it to go to Parliament with the support of the entire body and of its unanimous confidence. A tendency was manifested by some of the speakers not to approve of the Draft Bill, and to confine any motion to an expression of thanks to the PRESIDENT for the trouble he had taken, but Mr. CARTEIGHE protested that the meeting would not in that way satisfy the business object with which he had attended to address the chemists of the Dundee district. He wanted them to say what they meant, whether they approved or disapproved of the Bill, so that he could tell the Council what was their decision. The result of the voting would seem to show that there was really no opposition, for when the motion approving of the draft Bill was put to the meeting by the CHAIRMAN, twenty-one persons voted in support of it and not one ventured to vote against it. It would appear from this circumstance and from some of the incidents of other meetings, that certain chemists entertain desires which they are disinclined to formulate definitely, and that their hostility to the Society arises simply from the feeling that those desires could never be countenanced by it.

At the dinner given to the PRESIDENT in Edinburgh on Wednesday evening, opportunity was taken by him in returning thanks for the toast of the Pharmaceutical Society, to enumerate the leading principles upon which the Society relied for general recognition, and in the maintenance of which it claimed the support of all members of the trade.

But for further details of the proceedings on this occasion and at the other meetings in Scotland, we must refer to the special reports, as our space is too much occupied to allow of further comment.

We learn from Mr. Hallaway, the Chairman of the Committee appointed to make arrangements for the reception of the President at Carlisle on the 26th inst., that the meeting of registered chemists will be held at the County Hotel, Carlisle, and that the chair will be taken by Mr. A. Thompson at 2.30 p.m. The meeting is called especially for the consideration of the Pharmacy Acts Amendment Bill. The President of the Society and Mr. Martindale will be present at the meeting, and give such information and explanations as may be desired in regard to the Bill and other trade questions. Since writing the above we learn from Mr. Nichol, formerly member of Council, that invitations have been issued to the chemists of all the towns in the district round Carlisle, and that it is anticipated there will be a good attendance. With only two exceptions all the chemists in Carlisle have promised to be present at the meeting.

* * *

The Brighton Association of Pharmacy will hold its second Annual Ball on Thursday next, the 29th inst., at the Royal Pavilion, Brighton, under the patronage of his Worship the Mayor of Brighton, the President of the Pharmaceutical Society, the President of the Brighton Association of Pharmacy, Mr. Alderman Cox, J.P., and Mr. Alderman Manwaring. Tickets may be obtained of the Honorary Secretary, Mr. J. Williamson, 144, Church Road, Brighton. There will be a reception at 8.30 and dancing will commence at 9 o'clock. It is expected that Mr. Carteighe will be present at the Ball, and we are informed that taking advantage of this opportunity arrangements are being made for a dinner and for holding a Conference to discuss the Pharmacy Bill.

* * *

The annual general meeting of the Chemists and Druggists' Association was held in Dublin on the 15th inst. Mr. McNeight, who occupied the chair, said although the recent legislation amending the Irish Pharmacy Act was not all it might have been, it was, in his opinion, so far satisfactory that it would set at rest questions which had been long at issue. The annual report referred to some of the advantages gained in the recent legislation, and advocated mutual co-operation between all sections of the trade. Some regret was expressed that the Association had not received more support from assistants, and eventually it was agreed to continue the Association for another year "on strictly economical lines."

* * *

The first election under the 13th section of the Pharmacy Act (Ireland) Amendment Act of last year was held on the 15th inst., and resulted in the return of Messrs. S. P. Boyd (Dublin). W. J. McNeight (Dublin), S. Gibson (Belfast), C. Johnston (Dublin), W. F. Moore (Dublin), W. J. Rankin (Dublin) and J. H. Shaw (Belfast), as representatives of the classes of "chemists and druggists" and "registered druggists" on the Council of the Pharmaceutical Society of Ireland.

* * *

The next meeting of the Chemists' Assistants' Association will be held at 103, Great Russell Street, W.C., on Thursday, January 29, when a paper on "The Glucosides" will be read by John C. Umney. Chair to be taken at 8.30 p.m.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The second evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, January 14, at 8.30, Mr. William Gilmour, F.R.S.E., in the chair.

The minutes of last meeting were read and approved.

The following communications were then read:—

TEST FOR THE DETECTION OF SESAME OIL IN OLIVE OIL.

BY J. F. TOCHER, A.I.C.

I had occasion a short time ago to examine some oils, and while so engaged I failed to find a published reliable test for the detection of sesame oil in smaller quantities than 10 to 25 per cent. The U.S.P. test is not reliable below 20 per cent., and serves principally as a distinctive test between sesame and olive oils. Considering the liability of olive oil being readily adulterated with sesame oil, I applied myself to the task of obtaining a more satisfactory test for the latter. I have been successful in finding one, which although it cannot rank with the silver test for cotton seed oil, still enables one to detect with rapidity and ease 5 per cent. of adulteration, while 1 per cent. can be detected by exercising a little care in the manipulation. I found that the acetic acid extract from sesame oil, which I was examining for another purpose, mentioned in my next note, turned blue or bluish-purple when boiled with HCl, in which a few grains of pyrogallol had been dissolved. The same experiment was tried with sesame oil itself, using equal parts of the pyrogallol solution with the oil, with the result that the pyrogallol solution turned purple. I treated olive oil in a similar manner and found it to give only a faint yellow coloration. Almond, rape and ground nut oils gave no colour, while sunflower oil turned the solution a very faint blue and cotton seed oil imparted a very light red. It now occurred to me that this behaviour of sesame oil with HCl solution of pyrogallol might be utilized for its detection in olive oil. Accordingly solutions of sesame oil in olive oil of various percentage were prepared and the test applied. The following are the results obtained upon treating olive, sesame and other oils with hydrochloric acid solution of pyrogallol and boiling:—

Pure Olive: faint yellow.
Sesame: deep purple.
20 p.c. Sesame: purple.
10 p.c. Sesame: purple.
5 p.c. Sesame: faint purple.
1 p.c. Sesame: very faint purple.

Almond: colourless.
Ground Nut: colourless.
Cotton-seed: very faint red.
Sunflower: faint olive.
Rape: colourless.
Oleic Acid: faint red.

I obtained the best results by applying the test as follows, viz.: Prepare a solution of pyrogallol in pure hydrochloric acid (ʒss. to ℥j.). Measure half an ounce of this solution into a wide-mouthed test-tube provided with a cork, and add half an ounce (an ounce if the proportion of sesame oil be small) of the oil to be tested. Shake vigorously and then set aside for about a minute to allow the oil and acid to separate. Draw off the supernatant liquid by means of a pipette, and boil the hydrochloric acid solution for about five minutes, when, if sesame oil be present, the colour of the solution will have changed to purple. The colour does not appear at once, but developes on boiling for a short time. When viewed by transmitted light the colour is wine red to purple, and by reflected light it is blue, which is best observed by pouring the solution into a small porcelain basin. When the purple solution is allowed to stand for some time a small purple deposit takes place. It has not yet been examined.

but it has the appearance of a dye. It would be interesting to determine what this substance is, because the pyrogallol reaction with sesame oil points probably to the presence of still another constituent in the oil other than the one I am now about to describe in the following short communication, viz.:—

Isolation of Another Substance from Sesame Oil.

BY J. F. TOCHER, A.I.C.

In the 'Pharmacographia' it is stated that "sesame oil contains an extremely small quantity of a substance, perhaps resinoid, which has not yet been isolated. It may be obtained in solution by repeatedly shaking five volumes of the oil with one of glacial acetic acid. If a cold mixture of equal weights of sulphuric and nitric acids be added in like volume, the acetic solution acquires a greenish-yellow hue. . . . The oil itself being gently shaken with nitro-sulphuric acid takes a fine green hue, as shown by Behrens in 1852, who pointed out that no other oil gave the same reaction. . . . ." I have made an examination of this extractive from sesame oil, having had three objects in view, viz.:—

1. To find, if possible, a reaction more delicate than that given in the Pharmacographia, which would suit as a test for the detection of sesame oil. 2. To ascertain whether the reaction caused by nitro-sulphuric acid was due to a constituent in the extractive, as implied in the Pharmacographia. 3. To separate the resinoid substance said to be present.

How far success has followed me in the first-mentioned can be judged by those who apply the test described in my former note. Regarding the second an affirmative reply has to be given, for when a little of the extractive was brought in contact with $H_2SO_4+HNO_3$ on a porcelain slab, the acid mixture acquired a fine green colour, changing to a bright red. The third and principal object, the examination of the extractive for the purpose of separating the resinoid substance, was one in which I entered by no means sure of success, but the following will indicate to what extent the object has been attained.

Flückiger and Hanbury state that five volumes of oil should be taken with one volume of glacial acetic acid to obtain the solution giving the reaction with nitro-sulphuric acid. I found that if I desired to obtain a reasonable quantity to experiment upon, five to one was not the proportion to use. I therefore measured out ten volumes of oil and seven volumes of acid, and shook vigorously from time to time, and then set aside for the acid to separate. The acid was then drawn off into a porcelain basin and placed over a water bath, in order to drive the acid completely off. The residue was gelatinous, transparent and amber-brown in colour. It was at this stage that the pyrogallol reaction, formerly described, was obtained. A small quantity of the gelatinous extract was now treated with dilute potash and warmed. No result was obtained by doing so, but when the solution was vigorously shaken and then allowed to stand for some time it was found that a white deposit had taken place. In the meantime I had found that the extract was partially soluble in hot alcohol, and that when diluted with distilled water, a deposit also took place there. A little of this deposit was placed under the microscope, when small crystalline needles were observed, which served to indicate the probability of the separation of the constituent I was in search of.

The amount was so small that no examination could be made, and there being no evidence against the supposition that the crystals might simply be those of myristic, palmitic and other known acids contained in sesame oil, I again concentrated my attention on the deposit obtained by saponifying the extract. The remainder of the gelatinous extract was therefore treated with warm dilute potash, shaken from time to time vigorously and set aside for twelve hours in a conical test glass, in order to collect the deposit. The supernatant fluid was siphoned off and the deposit washed several times with distilled water. It was now boiled in dilute HCl, collected on a filter, washed until the washings ceased to give an acid reaction and then dried in a water oven. The substance was found to be soluble in alcohol. It was therefore dissolved in hot alcohol and set aside to crystallize. Long crystalline needles were formed in the course of a few hours which, when collected, washed and dried, melted at 116–118° C. Subsequent recrystallization was resorted to in order to ascertain whether the melting point was constant. The substance again melted at 117–118° C. It was found to be soluble in benzene, turpentine, carbon disulphide, and of course alcohol and glacial acetic acid, very soluble in chloroform, insoluble in water and alkalies and also hydrochloric acid, and decomposed by sulphuric and nitric acids. It was quite neutral to litmus and other indicators. It gave no reaction with HCl solution of pyrogallol, proving that it was not the cause of the purple colour which formed the base of the new test. Nitro-sulphuric acid, however, gave a green and then bright red colour, similar to that obtained on treating the gelatinous extract with the same reagent, and corresponding to the U.S.P. test for sesame oil. On treating the alkaline liquor from which the substance had deposited with HCl solution of pyrogallol, the purple colour was at once obtained. The new substance may therefore be considered as the cause of the colour described in the U.S.P., but not of pyrogallol coloration. The gelatinous extract would appear from the foregoing to be a mixture of substances and not a simple resinoid body, as one would infer from the 'Pharmacographia.' In fact, the great proportion of the extract is simply oil, the substance which I have been able to separate forming a very small proportion indeed.

The following is a comparison in a tabulated form between the properties of the new substance and those of oleic acid:—

With Nitro-sulphuric Acid:—New substance, green, then bright red; Oleic acid, brownish.
With Nitric Acid:—New substance, green, then yellow.
With Pyrogallol Solution:—New substance, no reaction; Oleic acid, faint red.
With Sugar and Sulphuric Acid:—New substance, brownish; Oleic acid, brown, afterwards bright violet.

Neither stearic, palmitic nor myristic acids gave any definite colour with the foregoing reagents. It will be observed that oleic acid is mentioned as giving a violet colour with sulphuric acid and sugar, which fact I have not yet seen stated. It is very characteristic of oleic acid.

With the collection of facts I have here recorded, I now turned my attention to what the percentage composition, and from that the formula, of the substance might be. I therefore proceeded to prepare more of the substance, in order to perform a combustion. Half-a-gallon of the oil was used in the extraction of the substance and from that I obtained a yield of crystals equivalent to ·04 per cent.

The method employed was that formerly described, and I may here state certain precautions which I found it necessary to take in order to obtain crystals of a constant melting point. The acetic acid extract may be said to be satisfactory when it is firm, gelatinous and dark brown. If the extract is liquid, too much glacial acetic acid has been used. It may be mentioned in passing however that the extracts from cotton seed and olive oils are liquid and yellow in colour. Regarding the precautions to be taken after the deposit has been collected, it was found that after treating which HCl, washing and drying an oily stain had been imparted to the filter paper, indicating the presence of oleic or other acids, as the substance does not melt at the boiling point of water. In that case, the substance had to be repeatedly treated with KHO, etc., in order to remove the last trace of foreign matter, and less trouble was experienced in crystallizing.

The combustions were performed in the usual way with CuO, using a filter pump as an aspirator at the close of the operations, taking the precaution, of course, of inserting an apparatus for drying, etc., the air previous to being used. The following are the results:—

No. 1. Amount of substance taken ·2483 gram. Result ·2781 gram CO_2 = ·0758 C. ·1239 H_2O = ·0137 H. No. 2. Amount taken ·1851 gram. Result ·2028 gram CO_2 = 0555 C. ·0890 gram H_2O = ·0099 H. No. 3. Amount taken ·2065 gram. Result ·2355 gram CO_2 = ·0642 C, and ·1010 gram H_2O = ·0112 gram H. The following therefore are the percentages found:—

	I.	II.	III.	Mean.
C . . .	30·50	30·02	31·08	30·53
H . . .	5·54	5·35	5·42	5·43
O (by diff.) .	63·96	64·63	63·50	64·04
	100·00	100·00	100·00	100·00

The hydrogen has been pretty constant but the carbon rather variable (maximum has been 1 per cent.), but the results are constant enough to warrant one in saying that the substance does not correspond to any known constituent in sesame oil. To arrive at its formula, it only remained for me now to determine the molecular weight of the substance, which I tried by one method, but owing to the small quantity remaining at my command I did not obtain concordant results. Time has also been against me, having only had five days at my disposal after the completion of the above experiments, that time being quite inadequate to commence anew to prepare another crop of crystals. I had pledged myself, moreover, to give these short communications at this meeting, and have endeavoured to do so, incomplete as one of them is, promising that should success attend further experiments to give the results at a future meeting.

Mr. Gibson said the test proposed by Mr. Tocher has feasible and easily worked. His experience was, wowever, that sesame oil as an adulterant of olive oil was not now commonly met with. After attention had been so much attracted to the occurrence of such an admixture as to make its employment too risky to attempt fraudulent makers had recourse to cotton seed oil. That also had been so much noticed that the pressers of olive oil had been compelled to drop it, and now only pure olive oil was put upon the market. Still, of course, Mr. Tocher had done good work in giving a process by which small quantities of sesame oil could be detected.

Mr. Dott said these two papers were an interesting contribution to the analysis of oils. These colour tests for detection of various oils were not by any means always reliable, inasmuch as the same colours might be produced by a variety of substances. They were useful, however, for practical purposes, in default of any better method. The colour was not usually due to the oil itself, but to some impurity. He could not altogether agree with Mr. Gibson's opinion that adulterated olive oil was not now met with in the market. It might be that the oil used as an adulterant was more highly purified than formerly, but he thought that cotton seed oil was still so used to some extent. With regard to the crystalline substance described by Mr. Tocher it was not possible to say much yet as to its nature. It seemed possible that it might have been formed during the process of extraction.

The Chairman said he could confirm what had been said as to the unreliability of colour tests for oils. He had also been much disappointed by the results of spectroscopic examination, and found the so-called chlorophyll bands in all kinds of animal oils.

NOTE ON IRON WINE.

BY J. A. FORRET.

Although iron wine is a variable and unsatisfactory preparation, and is seldom prescribed or asked for over the counter, it still holds a place in the British Pharmacopœia, and some medical men prescribe it regularly.

Some time ago a doctor brought me a sample of what had been supplied to a patient for iron wine. Its appearance had raised his suspicions. It was pale in colour, turbid and devoid of all vinous aroma, and on examination I found a mere trace of iron, three or four drachms giving a very faint coloration with the usual reagents.

I was curious to know the average quality of iron wine as retailed, and as time permitted have examined various samples obtained over the counter in ordinary course, and the results show that the quality of the article as supplied to the public does not come within the range of variability allowable in a B.P. preparation.

Sample.	Per cent. Fe.
A	·2016
B	·2016
C	·2688
D	·0896
E	·2016
F	·2912
G	·2800
H	·2352
I	·0224
J	·2688

The iron was estimated by decinormal bichromate, the wine being first evaporated to get rid of alcohol, and the residue charred with sulphuric acid to destroy organic matter. On heating the residue with sulphuric acid, adding water, and filtering, I found all the iron in the ferrous condition. The presence of sulphuric acid (formed from the sulphuric acid by the carbon which is set free) was suggested as accounting for the reduction of the ferric iron which the wine originally contains, and on applying the zinc test I found distinct indication of the presence of this reducing agent, which if present in the solution to be estimated would lead to false results. By gently heating the charred mass for a few minutes, however, the excess of sulphurous acid is readily dissipated. By proceeding as above, therefore, charring of organic matter and reduction of the iron are effected in one operation.

An article by Messrs. Draper and Whitla, and one by Mr. Sutton, read before the British Pharmaceutical Conference at its first sitting in 1864, are about the only notes on this subject which I have come across. In the former article the authors suggested as an improvement upon the then B.P. wine, namely, that made with tartarated iron, the substitution of ammonio-citrate of iron for the tartrate, as forming a more stable sulution, and the addition of neutral citrate of ammonia to keep the wine bright. In the latter paper Mr. Sutton gave the result of an examination of several samples of iron wine made previous to the introduction of the British Pharmacopœia, that is according to the London Pharmacopœia, as the wine does not appear in either the Edinburgh or Dublin Pharmacopœias. He found a maximum percentage ·2468 metallic iron, and a minimum of ·0708, the average being ·1286, there being a considerable difference between each sample examined, while in wine made with tartarated iron the average was ·2514, the difference between each being very slight.

Tartarated iron is not wholly soluble in sherry, nor does the filtered solution remain bright for any length of time; in orange wine the tartrate behaves much in the same way. With sherry the ammonio-citrate gives a muddy solution, which is difficult to filter bright, and on keeping again deposits, while with orange wine, as in vinum ferri citratis, it at once forms a bright solution which for all practical purposes is permanent.

A quantity of iron wine, as B.P., was put on and estimated each week with the following results:—

1 week	·2016 p.c. Fl.
2 weeks	·3136 „ „
3 „	·3146 „ „
4 „	.2912 „ „
5 „	·1568 „ „
6 „	·1344 „ „

It will be seen that in this experiment the wine ceased to take up iron at the third week, and then gradually became weaker. It was suggested that the wine ceased to act upon the iron on account of the coating which forms on the iron. To test this a small quantity of fresh iron was added at the fifth week, but on estimating at the sixth week, the dissolved iron was found to be still on the decrease.

The deposit from this wine is apparently of the same composition as that thrown down from wine made with the tartrate. The precipitate is insoluble in water, freely soluble in dilute hydrochloric acid, and contains both ferrous and ferric iron.

In vinum ferri citratis we have a definite quantity of an iron salt added to a menstruum, with which it forms a perfect and stable solution, and I would suggest that it be called simply vinum ferri, and that the present indefinite, unstable, and inelegant iron wine be deleted from the next issue of the Pharmacopœia.

The Chairman said his experience was that the percentage of wine dissolved was in inverse proportion to the quality of the wine used. The poorer the wine the more iron it took up.

Mr. Gibson said he could corroborate the author's results as to the loss of iron in this wine through age. The iron continued to deposit till the preparation acquired the original pale sherry colour.

Dr. Inglis Clark said from the results contained in this paper it appeared that the variation in iron wine was not very great. It would be interesting to know if the decrease after the maximum attained in three weeks was due to the excess of salt causing precipitation of a basic compound of iron. A solution of ferrous chloride behaved in this way after the point of saturation was reached. If the above were the explanation of the decrease then it would be an advantage to remove the iron at the end of the three weeks.

Mr. Hill said the papers to which Mr. Forret referred were published to recommend the substitution of a wine of ammonio-citrate of iron for the wine made from iron wire. They had now had a sufficient experience of the two formulæ. The former was a definite and stable solution, while the latter was exceedingly variable and unreliable. It seemed reasonable therefore to say that the time had now come to discard the latter altogether. The reduction of the iron to the ferrous state during the charring with sulphuric acid had an important bearing on the use of this reagent to char the sugar in saccharated carbonate of iron and Bland's pill mass. If during the charring reduction took place in these cases the results would always be too high.

Mr. Stephenson said he had always made this wine with a salt of iron in preference to iron wire. In using the potassio-tartrate a strong solution could be made in water, but there was an immediate bulky precipitate on the addition of spirit. There was not now a great demand for this wine. He had found that the ammonio-citrate with sherry made a very good preparation.

Mr. Leman said he thought it would not be correct to supply a wine made from the potassio-tartrate when *vinum ferri* was prescribed. This wine seemed to be a survival of some old nostrum. He thought nothing could be better than the official *vin. ferri citratis.*

Mr. Forret, in reply, said that his extract was warm when the sulphuric acid was added, and he found that no reduction to ferrous iron took place when no artificial heat was employed. He did not regard sherry as a suitable vehicle for vin. ferri citratis, and thought orange wine alone should be used. In making the wine with potassio-tartrate of iron there was a considerable deposit of ferric oxide, but after filtration the wine remained pretty clear for a year at least.

A discussion then took place on the new—

ADDENDUM TO THE BRITISH PHARMACOPŒIA.

Mr. Boa said that there were only two preparations in regard to which, on the present occasion, he had any remarks to make. A. *Mist. Olei Ricini.*—He could confirm the experience of Mr. Conroy and others that the official directions did not produce a satisfactory result; in fact a more presentable "mixture" could be obtained by mixing all the ingredients but the oil in a bottle and adding the oil in successive portions, shaking after each addition. At first sight it occurred to him that the quantity of liquor potassæ and oil of lemon was large, the mixture containing 1 fluid drachm of the former and 10 minims of the latter in 2 fluid ounces. As the dose is given as from half to two fluid ounces one dose might contain the above quantities. The effect of the liquor potassæ would probably be modified by the oil, but he knew that 10 minims of oil of lemon would, in many people, give rise to unpleasant gastric irritation. The flavouring was redundant and he thought wasteful. Using orange flower water in presence of so much lemon and cloves appeared a useless waste of this delicate flavour. B. *Syrupus Ferri Subchlor.*—The name he thought unfortunate. He had always been accustomed to call it protochloride. He never saw the term subchloride used for this iron salt by prescribers. In Edinburgh ferrous chloride was in considerable use. Professor T. R. Fraser had been chiefly instrumental in popularizing it among the profession. Their chairman, Mr. Gilmour, had at an early stage published a formula for its preparation. The salt was usually prescribed in syrup or pills, and it was always designated as protochloride, or occasionally ferrous chloride. When syrup. ferri protochlor. was ordered without any strength being specified it was customary, he believed, to give it of a strength of 2 grains of the anhydrous ferrous chloride in each fluid drachm. The strength of the official syrup was 3½ grains per drachm. If a prescriber wrote syrup. ferri subchlor. it would be clear the official syrup was intended; if he wrote syrup. ferri protochlor. it would not be clear that he so intended, because protochloride is not given as a synonym in the Addendum. This was a point which he feared might give rise to some trouble. It was a grave omission, he thought, that it was not stated how much $FeCl_2$ the syrup was intended to contain. Prescribers were not going to trouble themselves calculating it. In illustration of what he was saying he might remark that he had seen it stated in a *résumé* of the Addendum that this syrup contained 4½ grains $FeCl_2$ per drachm. That strength was right if the calculation were made on the basis of the iron, but as the iron was in considerable excess, the hydrochloric acid had to be taken as the basis of the calculation.

Mr. D. B. Dott said the additions to the British Pharmacopœia have already given rise to a considerable amount of discussion and criticism. The question as to what remedies ought to be included in the compendium, has been the subject of the usual diversity of opinion; and that some good things have been left out while some doubtful articles have been admitted, goes without saying. That seems to be the misfortune of all Pharmacopœias. In any case, it is a matter with which we as pharmacists have only indirect concern, the real responsibility resting with the medical faculty. On the chemical and pharmaceutical aspect of the question, the weakness and pointlessness of the criticisms generally may be taken as evidence that the work of the Committee has been fairly well done. Although some faint notes of disapproval have been sounded, I am sure there is general agreement that the new names for certain patented compounds are well chosen. *Glusidum* is a better name than "saccharin," which properly applies to a sugar derivative, and *Phenazonum*, as giving some hint of composition, is a better name than "antipyrin," which must have to many ears a sound of quackery. Exception has been taken to the appending of the systematic names of the synthetic remedies, but surely it must be evident to anyone who has considered the matter, that the definition of these compounds would be quite incomplete without the full systematic names. It has been noted as a new departure that structural formulæ are now given for the more complex compounds, and doubts have been expressed as to its advisability or utility. I think that where the empirical formulæ readily indicate the substance intended they are to be preferred for ordinary use; but it must be admitted that the empirical formula of such a complex compound as sulphonal, for example, is merely a meaningless jumble. A great amount of criticism has been experienced with the apparent object of proving that the Pharmacopœia Committee has in many cases simply copied the characters and tests of the German or U.S. Pharmacopœia. It has evidently not occurred to the critics that the German and British compilers naturally obtained their information from the same source, viz., the papers contributed by the chief authorities on the several subjects, hence an inevitable similarity. It would not be expected that the Committee should undertake an elaborate investigation of all the articles submitted to them, yet there can be little doubt that the principal tests, solubilities and the like were verified by members of the Committee. Another charge which has been brought against the Addendum is that some of its formulæ are little more than transcripts from the 'Unofficial Formulary' of the British Pharmaceutical Conference. This is undoubtedly correct, and to my mind is entirely satisfactory, as I know of no more competent body for its particular duty than the Formulary Committee of the Conference. Turning from general questions to individual items, there is little that calls for remark. It has been insisted that nothing may be used as *Adeps Lanæ hydrosus*, except the patented "lanoline." I do not agree with that opinion. One of the medical journals is much disappointed at not having been told what picrotoxin is, indicating at the same time its own belief that the substance is an alkaloid, a word dear to the medical mind. I remember reading a paper by a distinguished doctor of medicine, in which salicin is repeatedly referred to as an alkaloid. There may be some good reason for the introduction of *Liquor Morphinæ Sulphatis*, but it is not apparent on the face of the matter. It is sincerely to be hoped that its presence is not due to a superstitious belief that the sulphate differs in therapeutical value from the muriate. With reference to benzoate of sodium one writer makes a slip when he says that the residue on ignition is principally caustic soda; it is, of course, principally carbonate, and 3·68 grs. is evidently the calculated amount of carbonate from 10 grs. of anhydrous salt. The tests for nitrite of sodium are very good, though it may be open to question whether a slightly higher standard of purity might not have been demanded. The *Extractum Euonymi Siccum* has been justly commended; and I hardly agree that tests should have been given to guard against the presence of barium salts and other additions. These could not be present in the properly prepared article, and would undoubtedly be regarded as sophistications. Fehling's solution is a useful accession to the Appendix, and although at present only applied as a test for picrotoxin, in future editions of the Pharmacopœia it will doubtless be used for other purposes. It has been urged that Pavy's solution ought to have been adopted in preference. I am confident that the majority of analysts would not endorse that opinion. The claims of Pavy's solution have been particularly pressed, because it is preferable as a test for sugar in the urine; but as that fluid is not likely to be introduced as a remedy into the Pharmacopœia, the force of the criticism is not obvious. My only objection to the Addendum is the fact of its existence, which I think is superfluous and unnecessary. It would, in my humble judgment, be preferable in every way to have a more frequent revision of the Pharmacopœia, bringing out a complete new edition, say, every seven years. In the intervals any novelties could be dealt with in a tentative manner; and unofficial formulæ occasionally published as required by the circumstances.

Next followed some—

Remarks on the British Pharmacopœia, 1885; *Additions*, 1890.

BY C. A. MACPHERSON.

Though we look in vain in the recently issued Additions to the British Pharmacopœia for several articles that might well have found a place, and find a few included that might have been omitted, yet on the whole it must be conceded that the compilation has been well done. The characters and tests given for chemicals, synthetic and others, accord well with our present knowledge of the various substances. Solubilities, however, should be more generally given with some degree of definiteness, as apart from their being minor characteristics of the various substances they would be useful to dispensers. The phrases "very soluble," "freely soluble," "readily soluble," etc., may be very handy, but the information which they convey is meagre in the extreme.

In glancing over the book attention is early directed to the footnotes, and a perusal of them reminds us of Artemus Ward, who, for the enlightenment of an obtuse public, found himself under the necessity of labelling his jokes. The question here arises what is the value of these notes, have they the force of synonyms, or are they educational notes, or only notices that the Medical Council has felt constrained to recognize proprietary articles indirectly? That they are not equal to synonyms may be argued from the single instance of pulvis sodæ tartaratæ effervescens. Thus it is stated that this preparation is commonly known as seidlitz powder, but although this is so, it does not include the converse, because at present there are sold as seidlitz powders articles which are not effervescent tartarated soda powders. And it is to be feared that if the question should come to be decided in a court of law the present attempt of the Medical Council to fix a standard for this popular preparation will prove abortive. Again, take extractum euonymi siccum; if this should be ordered the pharmacopœial preparation must be used, but it is not incumbent to use it if euonymin be ordered, as this, from the tenor of the footnote, includes any dry extract of euonymus which has been in use. Then what reason is there for excluding protected titles from the list of synonyms? The inclusion of these would not necessitate the use of the proprietary articles unless they were prescribed by their protected names, nor would it prevent the use of articles answering to the characters and tests prepared by other processes than those patented, unless it were otherwise indicated. Take for example antipyrin. While all antipyrin would necessarily be phenazone, all phenazone need not be antipyrin if it can be made by other than the patented process.

Turning now to examine the articles in detail, the first one calling for mention is *Acetum Ipecacuanhæ.* This is a preparation of doubtful utility; it is too weak in acetic acid to keep, but independent of that it will deposit in any circumstances on keeping. It also seems a waste of time to continue percolation till twenty fluid ounces are obtained, when it is known that practical exhaustion is reached with half that quantity. If an acetous preparation is desirable as an expectorant an acetous syrup would be preferable. This could be made directly by mixing the powdered ipecacuanha after maceration with, say, three ounces of sugar and percolating the mixture with diluted acetic acid till twelve fluid ounces of percolate were obtained, and dissolving in this, also by percolation, thirteen ounces of sugar to produce one pint of syrup. A palatable preparation would thus be had which would keep and would be free from any large quantity of pectinous or mucilaginous matter, if not entirely so.

In *Adeps Lanæ,* the melting point seems to have too great a range; had it been kept at from 100° F to 102° F. a more uniform product would have been ensured. There is room for improvement in *Emplastrum Menthol*; it is rather soft and would probably be better if the proportion of menthol were lessened. As to spreading it there is no difficulty, as this can easily be done with a warm spatula heated by immersion in hot water; the plaster requires no previous melting.

In the directions given for preparing *Extractum Euonymi Siccum* brevity has been carried to excess. An improvement would be made by giving the first part of the instructions in the same manner as they are given for the preparation of the two following liquid extracts. Then a little more detail might be given regarding the subsequent operations; as the directions stand we are not told what dry extractive means. Does it mean perfectly dry or dry at ordinary temperatures? For while it will be perfectly easy to make the finished product to contain 80 per cent. of the dry extractive it will depend upon the actual state of dryness of the estimated extract whether the final product will continue to contain 80 per cent. of the dry extractive or not. *Gelatinum* has been rightly described as yielding an inodorous solution in hot water, as even the faintest odour indicates inferior quality. The proportion of insoluble matter might have been stated, so as to exclude samples having a considerable amount, though responding to all the other tests. The amount of ash might also have been given. For the new sweetening substance introduced the name *Glusidum* has been fairly-well chosen, but the synonym "Glucusimide" is most descriptive. The description of the substance is defective in that it does not indicate that this is not a pure simple substance, but leaves the impression that it consists of the sweet mide alone, while it is known that it is a mixture of at east two bodies. There has been a slip of the pen in llowing the words "soluble saccharin" to appear in he text.

The formulæ given for *Liquor Cocainæ Hydrohloratis* are nearly alike, though not exactly so; the roportional one should read "100 parts," "1·515 arts," and "994·318 fluid parts" respectively. There ould have been greater accuracy if the quantities had een stated as "33 grains or 99 parts," "half grain or ·5 parts," "362 minims or 990 fluid parts." As well se minims here as grains in, say, sulphur lozenges. gain there is a loss of time in preparing small quantities, according to the present formula the water having first to be boiled, the solution cooled and made up to volume if necessary. The object in boiling the water is to destroy micro-organisms, but nothing is said as to the time necessary to accomplish this, and then the water to make up the required volume need not be boiled, so far as the Pharmacopœia is concerned, thus tending to defeat its own object. The following formula is suggested as an improvement:—

Take of—

Hydrochlorate of cocaine	35 grains or 1 part.
Salicylated water ·15 per cent. sufficient to produce	384 minims or 10 fl. prts.

Dissolve.

This, besides being accurate, would be handier than the official formula, as it would allow of almost any required quantity being made when wanted, whereas at present 6 drachms must be made at once, whether likely to be used or not. The adoption of the foregoing formula would almost certainly entail the officializing of salicylated water, but this would not be disadvantageous, as it would give physicians the choice of another preservative solution besides those already official, which might be useful for other solutions than that of cocaine hydrochlorate, or even as a general vehicle for mixtures where it could be suitably employed. Its formula might be as follows:—

Take of—

Salicylic acid . . .	10½ grains or 1·5 parts.
Distilled water, sufficient to produce .	16 fl. oz. or 1000 fl. parts.

This could be followed with suitable directions for preparing.

Unlike the other morphine solutions of the Pharmacopœia, *Liquor Morphinæ Sulphatis* contains no free acid, an example which might be followed in the others, either wholly or partially. The directions for preparing it seem a little defective, as no note is taken of the temperature at which the solution is to be measured. The mixing of rectified spirit and water produces a rise of temperature in the mixture, and if the remainder of the water be added immediately, the bulk will differ slightly from what it would be if the mixture were first allowed to cool, and then made up to the required volume at the standard temperature. The difference certainly might not be much, but still there is the inaccuracy. This might be obviated by stating in the preface or elsewhere, as is done with volumetric solutions, that all liquids, unless otherwise ordered, are to be measured at 60° F. The temperature is stated in preparing diluted acids, and it is just as important in other preparations.

In *Liquor Trinitrinæ* we have introduced a second preparation of nitroglycerine, and yet strange to say there is no description of this article itself. We are to use pure nitroglycerine, but we are not informed officially what this is. In this solution assurance is made doubly sure that the nitroglycerine shall be weighed, but does not this tend to weaken the meaning of "part" when applied to liquids to be weighed in other parts of the Pharmacopœia? Would it not have been better to have left out "by weight," and given a concrete weight and measure formula, as in other solutions? There would then have been no likelihood of mistake as to the meaning of "part," and a formula like the following would have been handy.

Take of—

Pure nitroglycerine .	3½ grains or 1 part.
Rectified spirit sufficient to produce .	384 minims or 100 fl. parts.

Dissolve.

A caution ought to be added as to care being taken in keeping the solution, so as to prevent evaporation of the spirit.

Mistura Olei Ricini contains too much oil of lemons, and even 2 minims of oil of cloves is a dose which is not relished by many. The maximum pharmacopœial dose of oil of lemon is given as 4 minims, yet a full dose of this mixture contains two and a half times that quantity! The mixture seems altogether a mistake; it does not contain a full adult dose of castor oil, yet it has a full dose of potash solution and is overloaded with flavouring matters; the advisability of using potash solution is also questionable. As an emulsion the mixture, whether made by following the directions given or otherwise is not always a success. Made with distilled water and without the essential oils it is perfect.

On reading the formula for *Pulvis Sodæ Tartaratæ Effervescens*, one is tempted to ask what is "dry powder"? Is something different from the various ingredients as described under their several headings meant? Assuredly not. Yet it will not be surprising to hear of some one drying his powders. There is also an obvious omission in the failure to give a formula for what is known as "Double Strong Seidlitz Powder," which is largely sold in Scotland, at least, and has as much need of standardizing as the weaker preparation.

The tests for *Sodii Benzoas* indicate that a practically pure salt is to be used. Ten grains of the salt ignited is to leave the theoretical proportion of anhydrous sodic carbonate as ash, and this is to be neutralized from 69 to 70 grain measures of volumetric solution of oxalic acid, which is equivalent to from 2·76 grains to 2·8 grains of pure caustic soda; as the theoretical equivalent is 2·77 grains, and is equal to 69·43 gr. ms. of the test it allows very little margin either way. The writer on the Additions in the *Pharm. Journ.* has slipped into error in stating that 3·11 grains of caustic alkali is indicated.

In *Suppositoria Glycerini* the omission of the word "fluid" sufficiently shows that the glycerine is to be weighed, so that the words "by weight" are redundant.

Under *Syrupus Ferri Subchloridi* the synonym syrupus ferri protochloridi has been omitted. Too much iron wire is ordered in this formula, 260 grains would have been sufficient to allow for insoluble matter and provide excess of iron. The filter would have been more easily washed and there would have been less loss of chloride than with the larger amount. The operations necessary in preparing this syrup require to be carefully conducted both to ensure saturation of the acid and prevent loss of the salt. Unlike the other iron syrups there is no mention of the amount of the salt in each fluid drachm. Supposing all the acid is converted into ferrous chloride, each pint will contain 884·6 grains, equal to 44¼ grains in the fluid ounce or a little over 5½ grains of $FeCl_2 4H_2O$ in a fluid drachm. This latter is equal to about 3½ grains of the anhydrous salt so that the syrup is nearly twice the strength of that hitherto used. One fluid drachm is equal in iron strength to 7·6 grains of ferrous sulphate.

A change is noticeable in the *tincture* which indicates an advance in the appreciation of percolation pure and simple as a method of preparing tinctures. It is to be presumed that this is an earnest, that in future editions of the Pharmacopœia methods more in accordance with advanced knowledge shall be employed in the preparations of the various galenicals.

Mr. Thomas Thompson said on reading over the new Addendum he was somewhat struck with the indefinite manner in which gelatine was introduced. It was a most useful adjunct, and although only mentioned officially for use in the preparation of glycerine suppositories it was now much used as a basis for making many other preparations, such as ointment, jellies, bougies, pastilles, capsules, etc. In his experience there was no article in the Pharmacopœia so variable as this substance both as to colour and tenacity. It was almost impossible to get two gelatines of different manufacture to give the same result either in colour or tenacity (or what the makers call strength). This variation was, no doubt, due to the different modes of manufacture employed by the many makers of gelatine, producing it with varying degrees of hydration. Therefore, suppositories or any other medicaments prescribed with a gelatine basis would vary at almost every different place they might be dispensed. In addition to gelatine varying so much in tenacity some varieties were much more hygroscopic than others. He had found suppositories made from different gelatines and allowed to stand exposed, exhibit this peculiarity in a heavy covering of moisture, while some had remained as perfectly firm and dry as when first turned out of the moulds. It was most important that suppositories and bougies should be made sufficiently firm for convenient manipulation, and that they should remain so for continued successful use. He thought that by bringing forward this subject it might be the means of introducing into the mode of manufacture or drying of this substance a definite standard, whereby all such preparations as those mentioned might be uniform wherever prepared. Tests for the absence of deleterious substances used to bleach and "fine" the gelatine should also be inserted in the Addendum.

Dr. Inglis Clark said he ought to feel that a load had been taken off his back. He had thought the criticism would have been more severe. He expected his friend Mr. Dott, for instance, to ban the Addendum, but instead of that he had blessed it altogether. This result he thought might be taken as evidence that in the opinion of most people the work of those responsible for the Addendum had been fairly well done. He did not think it would be difficult to defend the Pharmacopœia Committee against any of the criticisms that had been passed on their work. Of course it must be remembered that there were some parts of the work with which the Society's Committee did not have anything to do. Its opinion and advice were asked on certain specific points, and they were limited to these. With regard to Mr. Macpherson's criticisms they seemed to him to deal rather with minute details and matters of grammar and phraseology. He admitted that generally speaking the Committee had done its work well. It was very easy to find fault with terms and definitions, and there was no book that might not be criticized on these points. He did not think it was unfair to say that even the remarks by Mr. Macpherson to which they had listened were by no means beyond the reach of adverse criticism in this respect. With regard to nomenclature it might of course be said that the Pharmacopœia was very faulty, if one regarded it as a text-book of chemistry, but it was rather an official formulary for the guidance of practical manufacturers. It was also to be remembered that they had, as far as possible, to carry out the old spirit and method of the 1885 Pharmacopœia, otherwise many names might have been altered. With regard to the criticism on dry extract of euonymus, which Mr. Macpherson thought was left within rather wide limits, there should not be much difficulty. He would like to know what Mr. Macpherson meant by absolutely dry. What was intended was, of course, that it should be dry in the ordinary sense. Experiment would show that unless the extract was so dried it would not powder or it would liquefy again. Of course, if any words would make this more explicit and produce more uniform results these should be used. At present there were two or three kinds of euonymus bark offered in the market. With reference to observations in various editorials and elsewhere, he might say that the Committee adopted or accepted no person's process or results until these had been verified by careful and independent experiments by four or five members of Committee. Objection was taken to the expression "very soluble" and the word "about," but it must be borne in mind that it was excessively difficult to determine with rigid accuracy some solubilities, such as that, for instance, of picrotoxin. In some cases experiments extending over days were made, and even then different observers only approximately agreed. He thought when a substance was soluble say in two or three parts of rectified spirit it was reasonable and proper to speak of it as very soluble. Then it might not be possible to say with perfect certainty that a substance was soluble in exactly 250 parts of a solvent, but for practical purposes it was sufficient to know that it was soluble in from 240 to 260. Again, take the melting-point of adeps lanæ, this was well known to vary with different samples and different observers. The Committee aimed only at practical results, while the critics insisted on absolute scientific accuracy in every detail. It was said to have adopted certain melting-points from the German Pharmacopœia; but such was not the case, and the fact that the figures in the Addendum agreed with those in the former work must not be assumed to be evidence that it had done so. It was said that euonymin could be made by other processes than the official one. Perfectly so; it could be made by twelve or fifteen different processes, but it was deemed expedient to have a definite process having official authority rather than allow this substance to be made in any way by Tom, Dick or Harry. He thought the criticisms had been on the whole generous, and he quite admitted that there were defects due solely to want of fuller knowledge. The menthol plaster shown by Mr. Macpherson was very soft, much more so than any he had seen; but of course this plaster must be soft so as to be workable without too much heat, and also because the resin and wax tended to prevent the action of the menthol, which must therefore be present in somewhat large proportion.

On the suggestion of the Chairman, owing to the lateness of the hour, it was agreed to adjourn the discussion till next meeting.

The Assistant Secretary then intimated the following donations to the Museum:—

Sodium benzoate, urethane, sulphonal, monobromcamphor, resorcin, fuchsine, aristol, phenacetin, chloralamide, adeps lanæ hydrosus, amyl hydride, apiol, guaiacol, paraldehyde, creolin, pilocarpine nitrate, sodium nitrite, terpene hydrate and the bark of *Hamamelis Virginica.*

From Messrs. RAIMES, CLARK and Co., Edinburgh.

Palm nuts from Para, fruit of *Balanites Roxburghii* (Bombay colocynth), Ceylon nux vomica seeds, Indian ipecacuan, bark of *Phellodendron amurense*, resin of *Doona Ceylanica.*

From the MUSEUM, 17, Bloomsbury Square, London.

Crystalline substance from sesame oil.

From Mr. J. F. TOCHER, A.I.C., Peterhead.

On the motion of the Chairman votes of thanks were awarded to the authors of papers, and those who opened the discussion on the B.P. Addendum. Thanks were also awarded to the donors to the Museum.

Pharmaceutical Society of Ireland.

SPECIAL MEETING OF THE COUNCIL.

A special meeting of the Council was held on Thursday, January 15, at No. 11, Harcourt Street, Dublin, at 2 o'clock, the President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells, and Messrs. Hayes, Robinson, Beggs, Grindley, Hodgson, Simpson, Dr. Burnes and Baxter.

On the motion of Professor Tichborne, seconded by Mr. Hayes, Dr. W. R. Oliver Barker, 6, Gardiners Row, Dublin, was elected a member; and on the motion of the Vice-President, seconded by the President, Mr. James Wells, 52, Upper Sackville Street, Dublin, was elected a member of the Society.

A report of the Pharmacy Act Amendment Committee stated, in addition to other matters, that certificates from the following gentlemen, who had been in business as chemists and druggists prior to 1875, were accepted for registration:—Messrs. Alexander Mullen, Castlederg; David Galbrath, Londonderry; Thomas McDonnell, The White House, Portaferry; James Hellock, Armagh; Alexander Sinclair, Ballyhackmore; William J. Reynolds, 8, Hardwicke Street, Dublin; and Arthur Burns, Mohill.

The report was adopted.

The following persons were elected Associate Druggists:—

Mr. William Bannister, Victoria Lodge, Cork.
Mr. Samuel P. Boyd, M.A., 18, Leeson Park, Dublin.
Mr. Samuel Clotworthy, 15, Bridge Street, Belfast.
Mrs. Marian J. Flanagan, Granard.
Mr. Samuel Gibson, Montpelier, Belfast.
Mr. W. J. Gibson, Montpelier, Belfast.
Sir James H. Haslett, 18, North Street, Belfast.
Mr. Luke J. Healy, 82, West Street, Drogheda.
Mr. James Hogg, York Street, Belfast.
Mr. Charles Johnston, 27, Upper Sackville Street, Dublin.
Mr. Samuel M'Dowell, 209, Shankhill Road, Belfast.
Mr. Thomas M'Mullan, Victoria Street, Belfast.
Mr. Wm. F. Moore, The Linen Hall, Dublin.
Mr. W. J. Rankin, 171, New Lodge Road, Belfast.
Mr. J. H. Shaw, 60, Beechfield Street, Belfast.
Mr. Wm. Shaw, 186, Grosvenor Road, Belfast.
Mr. Samuel Turkington, Cookstown.

On the motion of Mr. Hayes, seconded by Mr Hodgson, the following persons were proposed for election at the next meeting as Associate Druggists:—Messrs. Samuel Boyd, 46, Mary Street, Dublin; Daniel Brogan, Castlepollard; P. J. Finan, 30, Market Street, Sligo; Frederick H. Harpur, Ballinasloe; Robert Watson, Rathfriland; William Doig, 39, Mill Street, Belfast; Robert Campbell, 40, Hartington Street, Belfast; John Watson, Knock, co. Down; James Gregg, Ballyclare; John McLoughlin, Carrigallin; Thomas W. Reynolds, Scotch Street, Dungannon; J. McConkey, Leadbetter Street, Belfast; Joseph Canavan, High Street, Portadown; Thomas Boland, Ballinagh; and Siddle Thompson, Lisnaskea.

The names of the following licentiates from whom no replies to registered letters had been received were reported:—Mr. Alexander Chapman, 50, Ann Street, Belfast; Mr. Frederick William Devlin, 17, Donegall Street, Belfast.

A letter was received from Sir William Kaye, Clerk of the Privy Council, enclosing the following report to the Lord Lieutenant from Dr. George Duffey as visitor of the examinations of the Society:—

"30, Fitzwilliam Place, Dublin,
"December 22, 1890.

"May it please your Excellency, I have the honour to submit for the information of your Excellency in Council the following report on the examinations held by the Pharmaceutical Society of Ireland during the year 1890. For the Preliminary examinations forty-six candidates presented themselves. This is a smaller number than that for the two previous years, as is shown in the table I furnished in my report for last year. On the other hand the number of candidates for the licence, viz., 45, and the percentage of those who passed, was higher than that for any of the previous four years during which I have been the visitor. Twenty-six candidates (56·5 per cent.) passed, and twenty (43·4 per cent.) failed at the Preliminary examinations. Thirty-three (73·3 per cent.) obtained the licence and 12 (26·6) per cent. were rejected. I regret I am unable to report that any improvement was shown by the candidates at the Preliminary examination in general education, or on the subjects preliminary to special pharmaceutical education. The answering as a rule was indifferent, although the examination papers were by no means difficult, and the marking was extremely easy. The average percentage of the answering of the successful candidates was 54 per cent. The highest percentage obtained was 72, and the lowest on which a candidate passed was 42 per cent. In my report to your Excellency for the year 1888, and again last year, I drew attention to the superficial knowledge of Latin, English and arithmetic shown by the average candidate, and to the fact that candidates were allowed to pass the examination notwithstanding positive failure in one or more of the special subjects, viz., metric weights and measures, elementary chemistry and physics and botany, a knowledge of which is of much importance to pharmaceutical students. By an order of Council of April 18, 1888, 'a percentage of 50 per cent. of the entire marks must be obtained in English and arithmetic, and 40 per cent. on the entire course to entitle a candidate to pass.' The President and Council of the Society in their observations addressed to your Excellency with regard to my report on their examination for the year 1888, a copy of which was transmitted to me from the Council Office on March 15, 1889, assert that 'the possibility of passing candidates on insufficient answering in botany, chemistry and physics is removed by the adoption of minimum marks in all subjects'; and quote as the authority for this statement the order of Council I have referred to. This appears to be an error on the part of the Society as the Order fixes a minimum percentage for two subjects only—English and arithmetic—and for the aggregate total marks. As a matter of fact, however, during the present year three candidates were passed who failed to obtain a single mark out of the ten marks allocated in 'weights and measures.' One of these three successful candidates got only two marks out of ten in 'Elementary Chemistry and Physics,' while the other two scored but one in that subject. Further, one of these two obtained but one mark also in botany. Another passed without a mark in chemistry, and with but two marks in botany. Of the subjects for which a minimum percentage is defined, 12 candidates failed in English and 11 in arithmetic. The subject in which there was the worst answering was 'Weights and Measures.' Fourteen of the entire number of candidates did not obtain an answer in this part of the examination. As regards Latin candidates were allowed to pass whose marks, if marks mean anything, showed they had no satisfactory knowledge of that language. It would appear that the remarks and suggestions I had the honour to make in my last report on the Preliminary examinations of the Society have not as yet received the attention of its President and Council. This being so, I regret having to repeat the observations I felt called upon to make as regards what I believe to be the defects in these examinations. Now that by the Pharmacy Act (Ireland) Amendment Act of this year, the Society is so greatly enlarged, it would seem, even more than formerly, to be its advantage to require that the general and elementary scientific education of those who may proceed to obtain its highest grade should be solid and accurate, and that the examination should be made searching and judicious. I am still strongly of opinion that such an important examination as the Preliminary examination of the Pharmaceutical Society is should not be conducted by a single examiner. I referred to this matter in my first report (January 18, 1886). The Council then objected to a second examiner mainly on the ground of the additional expense such an appointment would throw upon the Society. But from my long experience of examinations and knowledge of the views held by those best entitled to form an opinion, I am convinced that in justice to the examiner, as well as to the examinee, no single individual should have the sole responsibility of passing or of rejecting a candidate. If there is not a second examiner there should I think be a competent assessor present during the entire examination, with power to vote for or against a candidate after perusal of his papers. The results of the examinations for the licence were, as I have already stated, very satisfactory: the percentage of successful candidates—73·3 per cent.—being the highest yet reached. In four cases the examiners, after conference, exercised their discretion in passing candidates. In one of these cases the candidate failed by three marks in obtaining the necessary 55 per cent. on the aggregate marks. In two cases the candidate did not come up to the minimum in pharmacy; and in the fourth case the candidate—who had been rejected twice previously—answered badly in botany, poorly in theoretical chemistry, and did not attain the standard laid down of the aggregate marks. Including the failures in the above cases there were eight failures in botany, six in theoretical, and four in practical chemistry, six in pharmacy, and one in materia medica. Two candidates failed in four subjects, four in two, and nine in one subject. As I previously reported these examinations are conducted with efficiency and care and are of a high standard. At both the examinations, Preliminary and for the Licence, there is still a want of supervision. This is not the fault of the examiners, who are occupied more or less with individual candidates. A regulation providing for the attendance of a member of the Council of the Society at the examinations was approved by an Order in Council of March 21, 1888, but it does not appear to be regularly observed, as on some of the days upon which I visited the examinations no member of Council was present.

"GEORGE J. DUFFEY, M.D."

Mr. Hodgson: Severe.

The Vice-President: The visitor from the Council may be here and Dr. Duffey may not be here at the same time.

Mr. Hodgson: I do not think it is contemplated that our visitor is to be present during the whole time of the examination.

The Vice-President: The bye-law is that our visitor must be present at the examination, but it does not say for the whole time.

Mr. Hodgson: That is different from being present during the whole time. How long was Dr. Duffey here?

The Vice-President: Does he come every day that the examination is held?

Mr. Ferrall (Registrar): He does not.

The Vice-President: I was here for an hour and a half the other day and did not see him.

Dr. Burnes said he thought Latin ought to be eliminated altogether from the Preliminary examination. The candidate could not take it and at the same time score well in the other subjects. It was only a farce to have it in the Preliminary examination.

Mr. Hayes: I do not think so. If a boy does not commence Latin at school he will not make a proper hand of it afterwards.

Dr. Burnes: He should be up in Latin before he becomes a candidate for the Preliminary examination at all. It has been proposed to eliminate it from the medical curriculum. The attention of our candidates at the Preliminary should be concentrated on weights and measures, chemistry, botany and the trade part of our qualification, if I may so say, and not upon the arts part.

The Vice-President: I differ from Dr. Burnes there.

Mr. Baxter said it was most important that the "Preliminary" candidate should be acquainted with Latin, because he would afterwards be too much occupied with pharmaceutical subjects to have time to master it. It should be remembered that prescriptions and the names of drugs were in that language.

Mr. Grindley thought that botany and chemistry might with advantage be eliminated from the Preliminary examination and reserved for the Licence examination. The standard of answering in the other "preliminary" subjects might at the same time be raised.

On the motion of Mr. Baxter, seconded by Mr. Beggs, the report of Dr. Duffey was referred to the School Committee.

A donation was received from the British Pharmaceutical Conference of the 'Year-Book' of Pharmacy for 1890.

On the motion of Mr. Baxter, seconded by Mr. Grindley, thanks were voted to the donors.

Mr. Grindley said the next business on the paper was the following notice of motion by Professor Tichborne:—"That from this date the outgoing President and Vice-President of this Society shall not be eligible for re-election after having held either of the said offices for three years." Professor Tichborne was not present to move that resolution, but he (Mr. Grindley) submitted that it was one that ought not to be entertained, because it would, if passed, create a disability not contemplated by the Act of Parliament at all.

The President: There was some rule passed on the subject.

Mr. Grindley: There was, but it was never sent forward to the Privy Council for their approval. Under the Act of Parliament the President and Vice-President are to be elected every year irrespective of how often they may have served.

The President: Better defer the motion until Professor Tichborne is here.

Mr. Grindley: I do not think it ought to appear on the agenda paper at all.

Mr. Hodgson: It lapses now and cannot be brought forward without fresh notice. If we see that it would be for the benefit of the Society to re-elect a gentleman to either of those offices the re-election should be valid.

Mr. Hayes moved pursuant to notice:

> "That assistants who were at business before the passing of the Act of 1875 be accepted for examination on the same terms as those who subsequently went into business."

This arrangement had been contemplated, but owing to the opposition of the druggists themselves was not introduced in the last Act.

Mr. Grindley: Have we power to amend the Act of Parliament?

Mr. Hayes: No, but we can do an act of justice, and if the Privy Council think that it is not contrary to the spirit of the Amendment Act it can make it legal.

Mr. Hodgson: I beg to second the motion. I think that what it proposes is only fair.

The Vice-President: What is the difference between the two examinations?

Mr. Hayes: There is not a great deal of difference; but they can go in for the modified examination with greater ease to themselves. Some of them are not young and they would not like to go in for an examination in which they might be plucked.

Mr. Beggs: What title will they get?

The Vice-President: Registered druggists.

The motion was unanimously agreed to.

A meeting of the Pharmaceutical Society was then held pursuant to the provisions of section 13 of the Pharmacy Act (Ireland) Amendment Act 1890 for the purpose of electing seven registered druggists or chemists and druggists to be additional members of the Council of the Society.

There were 11 candidates, and for the election, in pursuance of the rule relating to the election of druggists, voting papers had been sent out previous to the Saturday week preceding the present date.

The President mentioned that one of the candidates, Mr. Samuel Clotworthy, was disqualified because in his nomination paper there was no seconder; and another, Sir James H. Haslett, was disqualified because he had not written a letter to the Registrar within the time limited stating that he consented to act on the Council if elected. Two of the voting papers also had been returned without signature.

Messrs. Baxter, Grindley and Dr. Burnes were appointed scrutineers of the voting papers. They reported that the following gentlemen had been elected:—Mr. S. P. Boyd, M.A., 28 votes; Mr. William J. McNeight, 25; Mr. Samuel Gibson, 17; Mr. Charles Johnston, 15; Mr. W. F. Moore, 14; Mr. William J. Rankin, 14; and Mr. John H. Shaw, 8. Their report referred to the disqualification of the two gentlemen, on the grounds mentioned by the President; and it further stated that there were three spoiled voting papers, and that Mr. Thomas McMullen, one of the candidates, had withdrawn.

Mr. Baxter drew attention to the fact that Sir James Haslett had sent in a voting paper in his own favour and signed by himself. That he (Mr. Baxter) contended was a distinct intimation that he was willing to serve if elected.

Mr. Hodgson: Perhaps he meant the voting paper to be an answer to the letter of our Registrar. If so, I think we ought not to be too strict.

Mr. Grindley: The regulation is very distinct. It does not say that a voting paper is to be evidence, but that the gentleman must signify in writing that he is willing to serve.

The Vice-President said the words of the regulation were that the name of the candidate was to be "sent to the Registrar fourteen clear days before the annual meeting, with an intimation in writing from the candidate that he would serve if elected."

Mr. Baxter said that seemed to be decisive of the matter.

Mr. Grindley: It is a great pity that some of these gentlemen have not attended here to look after their own interests.

The seven gentlemen mentioned in the report were declared elected and the meeting adjourned.

Proceedings of Societies in London.

SOCIETY OF CHEMICAL INDUSTRY.

London Section.

An extra meeting to dispose of some of the many papers offered to the section was held on Monday, January 19, Mr. T. Tyrer in the chair.

Mr. J. A. Wanklyn read a paper on "The Constitution of Butter," in the course of which some novel statements were made. Butter fat was heated with calcium hydrate in a platinum dish, on the water-bath for some hours, with frequent stirring. A loss of weight was observed which the author attributed to the expulsion of water. Such loss of water could be due to one of two things; the decomposition of an isoglyceride or the neutralization of a fatty acid. To combat the supposition that the loss was due to the volatilization of glycerin, 1–2 gram of that substance was added to about 500 c.c. of water, the mixture distilled until 250 c.c. had passed over, and the glycerin estimated in the distillate by the moist combustion process, a wholly insignificant quantity being found. The lime salts remaining from the treatment of butter fat with slaked lime were separated into a soluble and insoluble portion, and the latter especially examined. In the author's opinion the upshot of these researches is that butter fat is not, as is usually supposed, a mixture of the glycerides of oleic, palmitic, stearic, butyric and other fatty acids, but consists of about 60 per cent. of the glyceride of a new fatty acid, which it is proposed to call aldi-palmitic acid, and 40 per cent. of some iso-glyceride or isoglycerides; there was not enough glycerin in butter for it to be a true glyceride, as Chevreul had long ago pointed out. The supposed new acid has the formula $C_{16}H_{30}O_2$, and may be regarded as palmitic acid minus two atoms of hydrogen. The author hopes to base a new method of analysis of butter suspected of containing foreign fat on the results of his observations.

In the discussion that followed Dr. Alder Wright inquired as to the character of the butter fat used; was it derived from any definite and well-ascertained source? the reason for the question being the large variations in composition observed in butters of perfectly normal origin. He drew attention to the fact that an acid of the nature of the one whose existence had just been asserted would have a high iodine absorption, and considered that this number should have been determined.

Mr. Hehner said that he felt disposed to receive the statements that had been made with some reserve, because of the untenable character of the positions which Mr. Wanklyn had previously from time to time taken up. He denied that butter contained less glycerin than was demanded of it by the current view concerning its composition, and considered the experimental evidence on which the hypothesis they had listened to to be very flimsy. It was impossible to saponify butter fat completely with lime without the aid of pressure; this incomplete saponification would account for the small amount of glycerin obtained by Mr. Wanklyn. Though it was perfectly true, as he (Mr. Hehner) had shown that dilute glycerin can be boiled freely without loss, yet when it reached a strength of about 80 per cent. it volatilized freely at the temperature of the water bath, and enough would certainly be lost during the treatment of the butter fat with lime which Mr. Wanklyn had described to account for the difference of weight which had been observed, and which on the hypothesis that it was due to the escape of water had been used as a starting point for the new theory advocated. He took exception to the method of separating the supposed aldi-palmitic acid, and expressed his belief that the body called by that name was not homogeneous. The differences in the analytical numbers that had been advanced in support of the real existence of this acid were far from satisfactory; the barium salt of palmitic acid would contain 21·17 per cent. of Ba, while in that of aldi-palmitic acid would be 21·31 per cent.—a discrepancy within the limits of experimental error. In conclusion he must express his astonishment at the Society accepting a paper of this character; he considered it did not come within the scope of its subjects, and would have been better read elsewhere.

Mr. Allen followed, saying that most of his remarks had been anticipated by the previous speakers, whose views he upheld. By direct reference to what Chevreul had said respecting the percentage of glycerin in butter he found that Mr. Wanklyn had been misled by referring to a work in which Chevreul's results were quoted, instead of ascertaining them directly.

Dr. Johnstone agreed with Mr. Wanklyn that butter contained no oleic acid, but dissented entirely from his other assertions; his own researches, which would appear in due course, pointed to quite a different constitution.

Mr. Wanklyn replying said that his critics had judged hastily in condemning the experimental evidence he had to offer, because it was not yet all before them. To attain brevity he had read merely an abstract of what he had done and the chain of argument which had led to his conclusions. He would mention one other fact confirmatory of his views. On heating butter with alcohol no butyric ether was formed; but on adding potash a considerable quantity of butyric ether resulted, although the most natural supposition would be that it would be saponified by the potash. The only method of explaining this phenomenon was that the potash acted upon an iso-glyceride and split it up, yielding butyric acid.

In spite of the late hour Mr. Watson Smith read a paper by himself and Mr. T. Graham Young on "Some experiments on the cyanide process for the extraction of gold from low grade ores," and Mr. Bertram Blount contributed a note on "Experiments on the cyanide process for gold ores," the two papers being dealt with as one in the discussion and arousing interest of a vigorously polemical kind. The matter being purely metallurgical however cannot be gone into here.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, January 8, Mr. W. F. J. Shepheard, Vice-President, in the chair.

A paper was read by Mr. W. B. Hoile on the "Separation of Calcium and Strontium." The author is continuing his experiments, and the paper will probably be published in a future number.

After a discussion on Mr. Hoile's paper, a Report on Organic Chemistry, by Mr. C. E. Boucher, was read by the Secretary in the author's absence. The report referred to the recent discoveries in the sugar group, the preparation of hydrazoic acid, the stereometric value of the nitrogen atom, the relation between the optical dispersive power of alcohols, ethers, and fatty acids, etc.

A discussion followed, in which the Chairman, Secretary, Messrs. Lee, Hocking and Garnett joined.

Provincial Transactions.

CONFERENCE OF CHEMISTS AND DRUGGISTS AT ABERDEEN.

VISIT OF MR. CARTEIGHE.

A largely attended meeting, representative of the chemists and druggists in Aberdeen and the north-east of Scotland, was held in the rooms, 21, Bridge Street, Aberdeen, on Monday afternoon, to consider the Pharmacy Act Amendment Bill. After several letters of apology had been intimated by the Secretary (Mr. Strachan, Aberdeen), Mr. J. Johnston (Messrs. Reid and Sons), who presided, introduced Mr. Michael Carteighe, the President of the Pharmaceutical Society, who was present by invitation of the local Society, and who, he said, might be able to explain away the differences of opinion regarding some of the clauses of the Bill which were expressed when the Aberdeen Society discussed the proposed legislation.

Mr. Carteighe met with a very cordial reception, and after expressing the pleasure it gave him to be present, and complimenting the Aberdeen Society upon being older than the Pharmaceutical Society itself, he explained the functions of the Council of the Pharmaceutical Society, making clear that it had only the power to suggest to the Legislature certain amendments on the law, and then proceeded to sketch the history of the legislation affecting the profession. Afterwards he dealt with the present Bill, explaining its provisions at some length. In the first place, he said it was proposed to divide the examination, so that there might be an interval of three years between the Preliminary and the Minor. That would allow a man who had passed his Preliminary to apply for examination at an intermediate stage, the examination being in writing and conducted practically at his own door. At the end of his apprenticeship he could go up for the final part of the examination. Their notion was to relieve the apprentice of going through a lot of subjects on one day, and to stimulate him to take a certain amount of trouble in acquiring knowledge, so that he would not do as many did now—leave the question of preparing for examination until after his apprenticeship, and the Council's notion was that the result would be that the candidates of the future would pass in much larger proportion than they do now. The Council did not wish to encourage centralization, but to have centres of education in all the moderately large towns throughout the kingdom, where the whole course of study could be obtained by apprentices while they were yet apprentices. The Council proposed to subsidize local bodies where they wanted subsidizing, and to give assistance where men could not be got to teach certain parts of the course. It was believed that their own pharmaceutical men were competent to give a large part of the instruction. In Aberdeen, of course, they were already equipped, having the means of doing everything that was done in London. He believed that education carried on from the very commencement of apprenticeship and continued through the whole period of apprenticeship, finally winding up with a practical examination, would produce better men at less expense and trouble than the present system. The Council wanted to encourage men to regard the examination as a reward for work rather than a question of getting through it by a fluke, and being able to say, "How nicely I diddled the examiners." If examinations were not tests of knowledge they were of no use. Their position in the future depended almost entirely upon their being differentiated from the average tradesman. They could not claim a professional price for their drugs, medicines, prescriptions, and other things, unless they could show at the same time better education than the average tradesman. In Aberdeen and the other large towns the advantages of education were being pushed so far that In the ordinary public schools and in Gordon's College there were opportunities given to the masses of acquiring scientific knowledge that did not exist before, and if a chemist and druggist did not know hemistry and botany he would be plucked by his ustomers. What the Pharmaceutical Society wanted was the evidence of knowledge, and the proposed urriculum was a very small one, to be taken at any ime during the period of apprenticeship. Owing to he differences in location, it was difficult to pitch pon any particular time, but the Council's opinion of he perfect form of training was such as would be arried on in a place like Aberdeen, where apprentices ould attend in their first year a course of lectures, ay upon chemistry, in the second materia medica and otany, or, according to circumstances, materia medica lone, next year botany, and the fourth year practical emistry. If an apprentice was not in a position to that he could take another course when he liked or me into town as an improver. As to expense, it ould be amply repaid by the greater certainty that a an would pass his examination the first time and by e fact that up to a certain point he would be an ucated man. Mr. Carteighe went on to speak of the nstitution of the Society, describing it as the most mocratic corporation in the country, and open to ery person in the trade. To remain outside and umble was not a condition of things that was good r anybody. All those who were in the trade were invited to come in, and if they cared to, they could turn out two-thirds of the Council at the next election. Referring to clause 7 of the Bill, he said they were supposed to be exclusively the vendors and dispensers of poisons, but he knew there was gradually springing up in large towns what he described as a mixed business—people who were to all intents and purposes carrying on the business of chemists and druggists, but who told their customers to leave out the dangerous stuff poison, which never did good to anyone. Much harm was thereby done to the trade. An objection had been raised as to how far clause 7 would affect assistants who were not qualified; but he wanted to point out that they, as chemists and druggists, had a certain power, and it was for them to consider whether they would take care of that and preserve it for themselves or allow the apprentice of six months standing to do what they were supposed to have an exclusive right to do. If there was to be a personal qualification for vendors then it was of no good to any of them if somebody else who was not qualified could do the same thing. The law at present in regard to the sale and dispensing of poisons was that no one but a qualified person could do that, and that if an unqualified person were so employed it must be under the supervision of a qualified person. It was thought that the proposition that was made would increase the cost of carrying on the business. It was not for him to say what was the intention of the Legislature, but it was never the intention of the Pharmaceutical Society to allow one man to have twenty shops with twenty apprentices in these shops. No sensible man could say that that was a safe thing for the public, and the sooner they faced that matter the better. In the next part of his address Mr. Carteighe alluded to the question of corporations carrying on business as chemists and druggists, pointing out the difficulties with which it was surrounded in view of the position taken up by the Legislature, and that the Council could not interfere so long as corporations provided for the safety of the public by having a qualified manager.

Mr. Giles (Aberdeen) afterwards moved the following resolution:—

> "That this meeting of chemists of the north-east counties of Scotland is of opinion that the Council of the Pharmaceutical Society deserves the support of the trade in promoting further legislation in the interests of pharmacy."

In supporting the resolution he said it was over twenty-one years since any measure had passed the Legislature having a direct bearing upon pharmacy, and considering the high pressure under which they now lived and the rapidity with which new developments take place and things that are become things of the past, this was a pretty long interval. Conditions had arisen during this time which could not have been anticipated then, and in order to bring pharmaceutical matters into touch with the progressive nature of the age further legislation was of the greatest urgency and importance. The Pharmaceutical Society had made several ineffectual attempts, but with those they were not now concerned. They looked in hope to the future. Perhaps some explanation would be expected from him in proposing this resolution, he never having been connected with the Pharmaceutical Society. Possibly his reasons for not having become an associate of the Pharmaceutical Society were more illusionary than real, but they were these: first he never could see that his doing so would result in any benefit to himself personally, or secondly that it would in the slightest degree promote the general good. But he gave his hearty support, and he hoped every member of the craft would give his hearty support, whether connected with the Society or not, to the President and his Council in their present efforts to obtain legislation. Many things had happened since the

Draft Bill was adopted by the Council in October last. Amongst those things was the fact that the President had perambulated through England and Wales, and, now having begun a campaign through Scotland, he would return to London a tower of strength in himself, being so fortified by the powerful support of all the chemists throughout the country at his back, that he would, the speaker trusted, be able to get passed into law such a measure as would justify the just aspirations of the trade, and, at the same time, duly conserve the interests of the public. Mr. Giles continued: The draft Bill does not contain all that is generally desired, and from what fell from Mr. Carteighe somewhere in England, as reported in the trade journals, does not contain everything for the benefit of the trade we might expect to find in it when it becomes law. I feel rather diffident, Mr. President, in the presence of such a masterly hand as Mr. Carteighe, but I take it that a little friendly criticism of the sections of the Draft Bill, together with any suggestions which in our humble opinion might lead to the advantage of all concerned, will be in keeping with the object of this Conference. There are twelve sections altogether in this Draft Bill, but clause 2 and clause 7 seem to me to contain the leading provisions. Clause 7.—With regard to this section so much has already been said about it that we are all pretty familiar with the deductions that may be drawn from it. I would prefer an alteration in the phraseology, so that after the word "person" it should read "persons or any association of persons," and so on in the singular and plural. That is a provision which I daresay would be unanimously approved of. By clause 2 power is sought to require candidates, before presenting themselves for a final part of an examination, to lodge with the Registrar certificates of having attended courses of instruction in certain subjects. By clause 3 power is sought to promulgate bye-laws for carrying out provisions of clause 2. I should have liked some information about these bye-laws, and perhaps the President will give us that before leaving this room. A medical qualification can be obtained in four years, and in most places a doctor dispensing medicine has an enormous advantage over a chemist. If this curriculum takes three years' study the expense would be so great, and the difference of time and money between it and what is required for a medical qualification so little, that lads having a notion for the drug business would be induced to become doctors instead of chemists. The average lad who at present finds his way into a drug shop as an apprentice is not in affluent circumstances. I have a great difficulty in this matter. I really do not think it would be justice to the rising generation of chemists to enforce upon them a fixed course of study unless we could secure for them the sole right to distribute drugs, and even then I am doubtful of the propriety of it. The number of doctors dispensing medicines would certainly increase, and I would be afraid the chemists would be almost exterminated. If the Bill, when it emerges from Parliament a fully fledged Act, be ound to have failed to secure considerable advantages over the present state of matters, I think, having some knowledge of the requirements of the business, and some knowledge of the circumstances immediately surrounding it, and of the opinions of those engaged in it in this neighbourhood, we might expect some assurance from Mr. Carteighe that when he applies to the Privy Council for authority to enforce the bye-law to regulate this provision of clause 2, he will not ask for it to be sanctioned for this part of the country. The pharmacists of London might in any case wish this curriculum; the pharmacists of England, or even little Wales, may wish it; but for this part of the country I do not see that it would result under present circumstances in any good whatever either to the public or to the chemists, but would rather have an opposite effect. Now with regard to the examinations. The present methods of examination and registration of resulting titles were adopted more than twenty years ago, and were perfectly suitable for the time being, but a change is now highly desirable, especially in regard to the Minor. In the light of new views, in the light of new readings of the Pharmacy Acts, as evidenced by recent decisions in the courts of law, it is felt by many to be a hardship that a lad, no matter how well prepared he may be, cannot obtain any legal qualification until he is twenty-one years of age, and the suggestion I would make is that a person on attaining the age of eighteen should be admitted to an examination in prescription reading, practical dispensing, pharmacy, and perhaps materia medica, and on passing a satisfactory examination in these subjects should be registered as a "chemist and druggist," or, if it should be considered preferable, as an assistant pharmaceutical chemist, entitled to act as a qualified assistant to a qualified employer, but not to carry on business. Such a person, in order to qualify to carry on his business on his own account, should at twenty-one years of age be admitted to an examination of a much higher standard, which might be divided into parts, and upon his passing the final part should be registered as a pharmaceutical chemist. By this arrangement none but pharmaceutical chemists would be in business on their own account. The idea occurred to me after the Aberdeen and North of Scotland Society discussed the provisions of the proposed Bill. At that discussion the opinion was forcibly expressed and well supported when clause 6 was being considered, that the Council of the Pharmaceutical Society ought to be open, and if it so happened, composed entirely of men holding the Minor qualification. I myself felt a difficulty unless we had unity of qualification. The suggestions I have just made that all in business be pharmaceutical chemists would lead to only one qualification for members of Council, and I think it might with advantage be carried out. Very little alteration of the draft Bill would be required, perhaps a few words put into clause 3, taking power to provide for and regulate the titles of persons registered under this Act. Registered chemists and druggists carrying on business I would be in favour of stopping. Some method might be arranged to convert the present members of that class into pharmaceutical chemists; in any case time would end them. Clause 6 refers chiefly to members of the Society and the election of Council. Another suggestion I have to make is this. No change having been made in the system of electing the Council during the whole existence of the Society since its establishment by Royal Charter in 1843, that system has served its day, and a change is of vital importance to some method more in harmony with the altered circumstances that have accrued in and around it in the course of its history. Following up the suggestion that only a pharmaceutical chemist should be qualified to conduct a business, I would like to see some practical inducement for chemists to become members of the Society. Mr. President, it is a red-letter day to have the President of the Pharmaceutical Society in Aberdeen. I would urge upon Mr. Carteighe to take power to amend the constitution of the Society, and follow that up by adopting some means whereby the entire body of chemists in the country would have a special interest in being members of the Society. If this object were attained, it would give the Society that voice of authority which it ought to have in all matters pharmaceutical, and enable it to fulfil to the best possible advantage the obligations expected of it on behalf of the public in return for powers and privileges conferred upon it by the State. As a starting point it appears to me that district representation would be a step in the right direction. Let every district return its own representative to be a member of Council, and every chemist in the district would have a special interest in getting the candidate returned who would represent his views at the Council, and would thus be induced to become a member of the Society in order to have the power to vote. A simple illustration will show the effect this change would have. There are over 3000 electors in the pharmaceutical constituency, and one vote amongst 3000, what influence has it? Practically none. But were the country divided into twenty-one or more constituencies one vote would be equal to twenty-one or more votes as at present. The number of constituencies would of course be equal to the number of Council, a matter of detail easily arranged. It would be a great ambition to have a pharmaceutical constituency to represent at the Pharmaceutical Council, and I would think little difficulty would be found in getting the very best men to become candidates. Elections could be annual, biennial or triennial. It is dangerous to prophesy before you know, but if this were accomplished I venture to predict that the position of the Society would greatly improve. Money would flow into the coffers till they would be full to overflowing. This increased revenue might be available for educational purposes. The educational facilities are very defective, viewed in the light of a perfect corporation. Everyone cannot go to Bloomsbury Square; indeed, from the outlying districts, very few can go. I look upon it as a duty to establish or subsidize schools of pharmacy at all the leading centres throughout the country, or in some way provide the means of instruction necessary to pass the qualifying examination, which cannot be learned at the dispensing counter. This would be a great and highly desirable achievement, and I am sure you will agree with me that the educational ramifications of a corporation like this ought to be on a basis co-extensive with its examining functions. I do not believe that any alteration of the constitution would improve the personel of the Council. I believe the present members are an admirable body of men eminently qualified for the positions they hold, but I make these observations firmly believing that it is the right and proper course to pursue, and would result in ultimate benefit.

Mr. Clark (Aberdeen) said, in seconding the resolution just moved by Mr. Giles, I desire to express my approval of the Draft Pharmacy Bill under discussion. As has often been said before at such meetings as the present, few object very seriously to the contents of the Bill. What they clamour for is the extension of clause 7 to prevent those modern abominations known as bogus companies and co-operative stores from carrying on the business of a chemist and pocketing the profits which ought to accrue to the *bonâ fide* chemist. No sane man would for a moment doubt the benefit such a condition of affairs would be to the general body of chemists, and it is very evident that the President and the Council are equally cognizant of this fact, but they are equally cognizant of another fact, namely, that to insert a clause striking at stores would certainly prove fatal to the Bill in its infancy. I have no doubt whatever that at the proper stage (if the opposition and apathy of chemists do not squash t before then) an attempt will be made to introduce he much needed clause. If that attempt is successul so much the better. If unsuccessful, then I cannot ee that the chemist has lost anything by allowing the Act to pass—nay, rather I think he will have ained much. It will free all registered men rom jury service. It secures the dispensing f medical prescriptions. This may not mean much in Aberdeen, but it means a great deal in some towns where the chemist is hampered on every hand by uacks, botanic halls, etc. It will enable the Council to regulate education and bring about that very desirable arrangement, namely, division of examination into parts. I consider that six comprehensive subjects, such as are comprised in the Minor examination, are far too many to be examined in the space of six hours. It neither gives the examiner nor the candidate a fair chance. The regulations that prevailed twenty years ago were, no doubt, sufficient for that time, but we must advance with the times, and there is no disputing the fact that education has made rapid strides during these years. Now what is applicable in other cases is equally applicable in pharmacy. You are, no doubt, often met with the argument that the education at present required of the chemist is sufficient for all the remuneration he receives. Granted; but if you have no ambition to rise above the present state of affairs, the chances are that the remuneration will grow still less; whereas if you advance with the times and show your strength, the superior position which you must necessarily occupy by reason of that advancement cannot fail to be recognized and be suitably rewarded. On every hand we hear the cry, "What does the Society do for the trade?" Let me ask another question. "What has the trade done, or is it doing, for the Society?" A small proportion of registered chemists certainly do support it, but the great majority stand aloof and cry, "Do something for us and we will join you." To them I would say, "Come over into Macedonia and help us." Your first duty is to join the Society and have a voice in its affairs. Unless you assist, how can you expect it assist you? By assisting it you assist yourselves. These are some of my reasons for supporting the Society and the Draft Pharmacy Bill, and I beg to second the resolution just moved.

Mr. Ritchie (Aberdeen) referring to the curriculum, said that in Aberdeen they had lectures at their hand, but he was puzzled to know how the case was to be met at such remote places as Wick and Thurso, Portree and Inverary, Newton Stewart, and Stranraer, in a reasonable and economical fashion. He thought it should be imperative to pass the Preliminary examination before any apprenticeship was commenced, but at the same time he questioned very much the expediency of imposing the curriculum. When a young lad entered the drug business at fifteen or sixteen years of age and served an apprenticeship with a master, say at Banff or Fraserburgh, he would cost his parents a considerable amount of money, and at the end of his time would be expected to be able to go into the world and take an assistantship and keep himself. The master he went to serve would expect full service for the remuneration he paid, and how then was the young man to have time to attend curriculum. In the ordinary case one passed from his curriculum to his future occupation, but in this case it was proposed that one should first learn his business and then take the curriculum. That he thought was a point worthy of consideration. He could not see the philosophy of dividing the examination into two or three sections, and said it was not necessary to put the young men through all their examinations in one day. A whole week could be taken to them if necessary, but let them all be done on one visit to the centre. It cost some money to go from Aberdeen to Edinburgh and back again, and he could see no hardship, instead of dividing the curriculum into two sections in separate years to have an examination extending over several days. With regard to candidates who were plucked he thought that if they passed in certain subjects they should not be required to pass in these subjects again. It would also be an advantage if parties who were plucked received intimation not only of the subjects they were plucked upon, but the percentage they were below the average pass. He looked upon it as the duty of the Pharmaceutical Society in its legislative capacity to fix a minimum of the education that they would accept from anyone entering their body.

Mr. James Paterson (Aberdeen) said he was afraid that after they got their Bill, they would not carry out the arrangement shadowed forth in the President's address. As an instance of the same thing, although it was provided in the Act of 1852 that the examinations should be held in Edinburgh, Glasgow, and other places, yet no effort had been made to hold them out of London and Edinburgh. It should be made imperative in the Bill to hold the final examinations once a year or two years in each of the University towns in Scotland; that as a minimum in the Bill the attendance to pass at the University classes of chemistry, botany, materia medica should be held as equivalent to the intermediate examination under the Bill; also that the pass in the advanced section of chemistry, both organic and inorganic, including the practical part of each, under the science and art department, and the advanced pass in botany, should count as equivalent to the intermediate.

Mr. Reid (Holburn Street) questioned the benefit of the curriculum from a business point of view. If it was for the purpose of raising the price of the medicines and articles they dealt in he thought they would be making a rope with which to hang themselves, because those articles that they could put a little price on were pirated by their neighbours round, and no Society could prevent it. Of course the curriculum would give a great advantage to the rising generation, but it would impose a hardship upon the present owners of shops, because it would make apprentices scarce. He also thought it was a wrong policy to restrict the trade to the sale of poisons and other articles, and to exclude things more profitable than the prescription trade. If the sole object was to promote scientific training that was very good, but it must be remembered that there was a number of chemists and druggists who had their bread and butter to make and they must be taken into consideration.

Mr. Seivewright (Cullen) pointed out that the effect of this Bill would be to tie the hands of chemists in small country localities so that they would never be able to get out of shop.

Mr. Shepherd (Aberdeen) thought the examination might be accepted without necessity of apprentices having to pass through curriculum.

Mr. Carteighe then replied on the discussion. He considered it was far better that the assistance a pupil required to pass the examination should be definitely arranged for him than it should be left to your Dick and Harry, and he was satisfied that the plan suggested was the cheapest. It was a mistake to say that one could test by examination, and he could personally say that he was responsible for having plucked many a man who was competent and passing many a man who was incompetent.

After some further remarks the resolution was adopted unanimously. The proceedings terminated with votes of thanks to Mr. Carteighe and the Chairman.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

ADDRESS BY MR. CARTEIGHE.

Before concluding his visit to Aberdeen, Mr. Carteighe addressed a largely attended meeting of the Aberdeen Chemists' Assistants' Association in the rooms, 21, Bridge Street. Mr. Cowie, President of the Association, occupied the chair.

Mr. Carteighe, who was received with enthusiastic applause, said that although he had had many difficult tasks, he was sure the most difficult for him to perform was to address an audience of young people. He did not know if he would succeed, but he meant to try. When he looked round those rooms and saw the facilities they afforded for the study of their calling—rooms that were not to be equalled in the United Kingdom—he could not help saying that the assistants and apprentices in Aberdeen had much to be grateful for. Some of them had served long in the calling of pharmacy; he would not call it a profession, he would not call it a trade, but he asked them to be careful of what he said, and what he desired to say was this: that no man in pharmacy can get a living in the future unless he followed the occupation, or whatever they might call it, in a true professional spirit. He did not believe the public cared two straws what they called themselves, but if they brought to bear in the ordinary associations of life connected with pharmacy those attributes which were supposed to be associated with the higher professional walks he thought they would get professional recognition and professional remuneration. If they got that they would not care by what name they were called. It was true that they kept a shop, but the notion of a shop was not regarded in the same light as it was fifty years ago. At one time bankers were known as pawnbrokers, and their places of business were known as shops, but times were altered now, and what did they find, that the principal of a banking house was now married to a member of the Royal Family. [A voice: "A fine old fellow, the Duke of Fife."] You are right, said Mr. Carteighe, who went on to say that the people were becoming more and more in favour of cultivation and education, and were not having so much regard to the mere manner in which a business is carried on. He was not ashamed to carry on his business in a shop, and he took good care to see that he received good remuneration in his shop. So long as they carried on their business in the true professional spirit, he was certain they would command success for themselves and the respect of their customers and the public. The public was a very hard taskmaster. It was not unlike a hysterical woman, it required to be specially treated. It had money, plenty of money, and in a sense they were entitled to demand the full money equivalent of the services they rendered to the public. The fact of the matter was, the public would not regard the value of brains, until they taught the public that brains were valuable. He himself had travelled up and down the country, from Dover to the north of Scotland; he had kept his eyes open, and he had come to the conclusion that unless they enforced their claims the public would not respect them. Take any profession they liked, the bar, from the counsel to the solicitor, or the medical profession, in all its various grades, it would be found that the individual members of these professions succeeded in their careers in proportion as they exacted from the public the value of their services, the value of their brains. His text that evening, however, was that this was a time of progress and education. The struggle for existence was getting keener every day, and what they had to do was to put on an armour of the greatest amount of accomplishment. The success of every assistant and every apprentice would depend on the amount of armour he was able to put on. It was not an armour of steel or iron, but an armour of intelligence and knowledge; and the value that would be put upon their services would be vastly increased by the amount of intelligence they could bring to bear upon the carrying on of their business. The future of pharmacy in that important district of Scotland rested on the young men before him that night. He advised them not to trust to Acts of Parliament; if he could turn back to their age he would say they were "bosh." He would rather trust his own powers and fight the battles of life with his own hand. Mr. Carteighe then proceeded to give some valuable practical advice in regard to preparing for examinations. He strongly advised them not to confine their attention to the mere schedules, but to make themselves master of all the information that their teachers placed before them. If they confined themselves to the schedules, then the chances were that they would be 50 per cent. behind. The more they could acquire the better able they would be to face the examinations, and so much greater would be their chances of success. Mr. Carteighe gave a humorous description of how an examiner was regarded by those who came before him, and pointed out that passing an examination was not everything. They ought to put themselves in such a position as to be able to look upon an examination as a mere bagatelle. Drawing a comparison between the overcrowding in the medical profession and the overcrowding in pharmacy, Mr. Carteighe said that the expansion of the medical curriculum to five years, and the increased restriction of the studies to medicine and surgery, would throw a greater responsibility on pharmacists, who would have to give greater attention to chemistry and botany. These were the subjects on which they ought to make themselves as strong as possible, so as to make themselves as indispensable to the medical practitioner as a nurse. Pharmacists had something more to deal with nowadays than Epsom salts, sulphate of zinc or blue vitriol; they must go deeper into the study of chemistry. It was not creditable to them to have Germany coming so much to the front, and it was for the young men of the present generation to consider how far this was to go on. He submitted to them that amongst the multitude of pharmaceutical apprentices and assistants there must be men of competent chemical skill able to do what the Germans are doing; but if they measured the value of their brains by the mere amount of pounds, shillings and pence, then they were sure to fail. Sink your brains into capital and he had no fear of the result. There was no reason why any of them should not become, not only distinguished pharmacists, but also distinguished chemists. Mr. Carteighe concluded by paying a high compliment to the efficiency of the rooms they had in Aberdeen for training apprentices and preparing them for examination. There was no town in England where the arrangements were so perfectly adapted to the purpose as in the city of Aberdeen.

Mr. Johnston, President of the senior Association, and Mr. David Ritchie, having added a few observations the proceedings closed with votes of thanks to the lecturer and to the Chairman.

It may be mentioned that Mr. Carteighe was entertained to dinner in the afternoon by the members of the Aberdeen Society of Chemists and Druggists.

CONFERENCE OF CHEMISTS AND DRUGGISTS IN DUNDEE.

A meeting of chemists and druggists in Dundee and district was held on Tuesday afternoon to hear an address from Mr. Carteighe, the President of the Pharmaceutical Society, and to discuss with him the Draft Pharmacy Act Amendment Bill. The meeting took place in the Council Chamber of the Dundee Town Hall, and was under the auspices of the Dundee Chemists' and Druggists' Association. Mr. Charles Kerr, the President of the Association and member of the Scotch Executive, presided, and there was a large and influential gathering of members of the trade in Dundee and the surrounding districts. Among those present were Mr. D. Storrar, Kirkcaldy, Vice-Chairman of the Executive of the North British Branch; Mr. James Hardie, the local Secretary of the Pharmaceutical Society; Mr. J. Miller Hardie, Mr. James Russell, Secretary of the Chemists' Association, Mr. William Doig, Mr. D. H. Ferrier, Mr. James N. Davidson, Mr. John Gray, Mr. A. B. Anderson, Mr. James Anderson, Mr. J. W. Russell, Mr. P. Sandeman, Mr. J. McMillan, Mr. J. B. Mason, Mr. J. Hodge, Mr. D. Mackay, Mr. John Doig, Mr. W. Cummings and Mr. Frank W. Young, Dundee; Mr. J. H. Thompson and Mr. T. S. Peebles, Lochee; Mr. Thomas Harley, Perth; Mr. E. Fleming, of Broughty Ferry; Mr. Robertson, Arbroath; Mr. Davidson, Montrose; Mr. Simpson, Forfar; Mr. W. R. Kermath, St. Andrews; Mr. Hodgston, Brechin; Mr. J. Clark, of Clark, Scott and Co., London, etc.

Mr. Charles Kerr, who was called on to preside, said he thanked the meeting for the honour done him in inviting him to preside. He certainly felt a little nervousness in occupying the seat of the Lord Provost of Dundee, but in that unique position he would try to do his very best to guide the discussion during the Conference. The meeting was to be opened by Mr. Carteighe, President of the Pharmaceutical Society, who had come before them to expound the latest phase of pharmaceutical politics. They were all much indebted to Mr. Carteighe for coming so far north in such wintry weather, to lay before them the new Pharmacy Bill. Mr. Carteighe was a man of marked ability, and had done yeoman service to the Pharmaceutical Society for many years. He looked upon Mr. Carteighe as the Bismarck of the Pharmaceutical Society, and they did not wish to see him lowered over the bulwarks when they saw rocks ahead. He was sure all present would be glad to see their worthy President in person, and he hoped one result of the President's tour would be to increase the interest in matters of pharmacy and in matters affecting the Pharmaceutical Society. It was a melancholy fact that many outsiders never joined the Society and grumbled at its work. The only remedy for that was that all outsiders should become members and then use their voting powers, and thus they would get all they wanted. It was very often said "What is the good of becoming a member and paying a guinea a year for the Journal." He maintained that they ought to become members on higher grounds than mere personal advantage; they ought to become members of the Society as good citizens for the good of the whole profession, and he trusted the time was not far distant when all the registered chemists would be members of the Society, and then they would be a power to move mountains. The Chairman concluded by introducing Mr. Carteighe to the meeting, and said he had no doubt the meeting would give him a hearty welcome and an attentive hearing.

Mr. Carteighe who, on rising to speak, was loudly applauded, said he felt it a very great honour to have the opportunity of meeting so large and so influential a gathering of chemists and druggists in conference. He knew that those of them who were not associated with the Pharmaceutical Society, and some of those who were, had views on many matters which were very different from those which the Council of the Society and which he, as President, held at that time. But he believed the difference between them was only a difference in degree, and that the difference was due in many respects to a want of knowledge of all the facts. It was, therefore, his duty to bring these facts before them in regard to the Pharmacy Bill. Obviously, they were in a position only to talk about it from a point of view of persons who were going to Parliament to obtain further powers. He said obviously, although, perhaps, it was not so obvious to some of them, for many of his friends in the trade imagined that the Council of the Pharmaceutical Society was a Parliament in itself, and that when it came to a definite conclusion about what would be best for the trade, and passed a resolution, the resolution became law. Now he wanted to impress upon them that the Pharmaceutical Society had no such power. The Society fulfilled two important functions, and it was very necessary that the meeting should understand that though both were important they were as distinct as possible. The first function, and most important to the State, was that of holding examinations and practically regulating the examinations of those who wish to become registered as chemists and druggists. The law in regard to that was clearly laid down, and it was the duty of the Council of the Pharmaceutical Society, through its officers, to carry out the law and to see that certain persons who were not competent were not put upon the register. The Society had not the power to make law. The law had to be made by the Legislature, and the power of carrying out the law was in some cases laid upon a Government department, in others, as in their case, upon a voluntary Society. It had therefore come to pass that the Pharmaceutical Society, which had now entered upon its fiftieth year, had in the course of time come to be the means by which the State carried on certain Governmental work, and though the State had given the Society powers to regulate conditions upon certain well-defined lines, it had not given the Society power to make any law. On the other hand, the Pharmaceutical Society was a purely voluntary association of individuals. It encouraged education, and spent money in this work, and he was sure all who were interested in the Society would be glad to see branches established throughout the whole of the United Kingdom, where education would be fostered, and teaching carried on effectually, so that every great city and town in the country could be in constant touch with the central authority in London, as ought to be the case in all great organizations. It was in the Society's capacity as a voluntary association the Council had thought proper to suggest new law. The Council had been told for many years that the Society had not done enough for the trade, that, in fact, it had done nothing for the trade. Well, it had now proposed certain legislation, and the responsibility of carrying it through to make it beneficial or otherwise to the members of the trade would rest not only upon every member of the Society, but upon the trade at large. It was easy to introduce a Bill, but it was very difficult to say how that Bill would come out. The destiny of every Bill lay with the House of Commons, and therefore it was necessary in going to that House that they should approach it under the most favourable circumstances and with the cleanest record they possibly could, in order to get the best consideration. It had been said they should ask for more powers and it had also been urged that there ought to be much greater restrictions than there were to a great many things. He was not there, however, to speak of their personal grievances. He was a working chemist and druggist himself and he knew where the shoe pinched; he knew how his income was affected, and he had to settle matters as an individual according to his own individual interests. But he was not there to deal with that phase of the subject; he attended the Conference as the President of a great Society, entrusted with great responsibilities and powers, and above all he had to take care, and the Council had to take care, of its reputation, and in no case to put it in jeopardy. Mr. Carteighe, after remarking that members of Parliament in these days were averse to giving any privileges whatever, gave a brief outline of the powers that had been conferred on the Pharmaceutical Society, spoke of Jacob Bell, the founder of the Society, and mentioned the efforts which had been put forth to pass various Pharmacy Acts from 1852 to 1868. He declared that the Pharmaceutical Society had always endeavoured to legislate for the whole of the trade, and not for any section of it. In 1867 it introduced a Bill into Parliament, and the moment it did so the United Chemists introduced not a Pharmacy Bill but a Poisons Bill. Both Bills were referred to a select committee, which heard evidence, and got very much mixed up on the whole subject, finally reporting that there should be legislation in regard to the sale of poisons. Mr. Sandford then set to work, in 1868, to adapt himself to the altered circumstances of the Bill under which they had now most of their powers, and although the Council of the Pharmaceutical Society did not like that Bill, which had been forced upon them from the condition of things, it paid the most part of the expense of carrying it through Parliament. The members of the Pharmaceutical Society were still only representative of a fraction of the trade. The majority were outside, and they were crying to the Society to go to Parliament to get additional powers without enrolling themselves in the ranks of the Society, so that the position of the Society at present was a trying one, and the Council deserved more the consideration than the scorn or ill-feeling of the trade. It was not asking for anything unreasonable in saying that combination amongst themselves was essential for their own welfare. The Bill the Council now proposed for the consideration of the trade dealt with the subject of education and of the consolidation of the Society itself. It also asked for certain further privileges for registered persons, and suggested that chemists and druggists should be exempt from jury service. Mr. Carteighe thereafter went over the clauses of the Bill in detail and concluded by referring to the serious manner in which the trade was being affected by trading companies and stores.

The Chairman said they must all have been much pleased with Mr. Carteighe's sketch of the Pharmaceutical Society and his exposition of the new Pharmacy Bill. It was usual at a meeting such as that to pass some resolution, but perhaps before this was done some discussion might be desirable. There were a number of points in the proposed Bill which ought to bring out discussion.

Mr. Ferrier remarked that it was well known in Scotland that when a candidate stood for municipal or Parliamentary honours he underwent a process of heckling. Mr. Carteighe had given them an excellent address, not only historical but also instructive, with respect to the clauses of the Bill, and it was now their turn to give Mr. Carteighe what he might call a heckling. At the same time he had no doubt Mr. Carteighe would be able to answer any question and to give any explanation that might be desired of him. Whatever differences of opinion there might be with regard to the clauses of the Bill, and he presumed that there were some differences amongst them, there could be no difference in regard to the ability with which Mr. Carteighe had explained the clauses of the Bill to them. He did not entirely approve of the whole clauses of the Bill, nor was he prepared to condemn it as a whole. It appeared to him there were some things in the Bill which they could all agree to very heartily. The clause with which he most readily concurred was the one which gave power to divide the qualifying examination into parts. He had known young men who had been completely discouraged with regard to that very matter. They had gone up for examination and had passed perhaps in two subjects, but had failed in the third, and in consequence they were told to go back and study for three or six months and then return and go over the same subjects again. He supposed the Bill meant that when a young man passed, say in chemistry and botany, that he would not require to go up and pass in these subjects a second time, supposing he failed in passing the third subject. The curriculum clause was one which he could not agree to. He could not see the necessity for putting so very hard restrictions upon the trade when the Bill gave so little protection. If they were to curtail the privileges, which he held they were doing, because they were putting heavier burdens upon those who were coming after them, as they were making it far more difficult to pass the examinations, what advantage were the men to get for these heavier responsibilities? It seemed to him that the Bill was an educational Bill, and the chemists as traders would derive very little benefit from the Bill supposing it was passed to-morrow. The only other clause on which he desired to say anything was the seventh clause. It appeared to him to be the most important clause in the whole Bill and was one which had given rise to great contention and divergence of opinion among the registered chemists and druggists of the country. On the face of it, it seemed to confer a privilege, to allow registered chemists and druggists only to dispense and compound physicians' prescriptions; at the same time it left the company or widows' clause remaining. For himself he could not see, if it was illegal for an individual to open a shop and dispense prescriptions, why it should be legal for seven individuals to unite together to do the same thing. When they were going to Parliament at least an honest attempt should be made to get a companies' clause introduced. Supposing they had altered the word *person* to *persons* in the clause would that not have put them in a better position?

Mr. Carteighe: Not at all. There is a short Bill which says in all Acts of Parliament whatever you must use the express word corporation or company, if such be intended.

Mr. Ferrier: When you are going to Parliament some honest attempt might be made to deal with this matter in a way which would give satisfaction to the great majority of the trade.

Mr. Mason said he was somewhat curious to know the exact meaning of clause No. 2, which ended, "to practise pharmacy in that country." It seemed to him, if they took the words exactly as they stood in the clause, a Scotchman could not start business in England.

Mr. Carteighe: That country means any country. It means just that a pupil who has been a registered chemist and druggist in any part of the world, and who can present evidence of that, can come up for examination.

Mr. Mason pointed out that a point of importance was that the examiners should take certificates from other bodies. That he thought might be extended considerably, and he wished to understand what was meant by classes. He was very much concerned to know what kind of classes was meant, and also to what extent these classes might be presumed to go, and further whether it would be possible to continue or extend the idea of receiving other certificates in lieu of the examinations of the Pharmaceutical Society. Since there were many examining bodies of note in the country, it seemed to Mr. Mason that the certificates granted by them should be accepted in lieu of the certificates of the Pharmaceutical Society. If these things could be brought into actual operation and made useful for passing purposes, they would be a great advantage to the young men of the rising generation. On the whole, he thought the Bill contained far more good than evil. It really suggested an excellent set of proposals, and although, to begin with, his own notions were somewhat antagonistic to certain parts, yet after the very able description they had had of it, he must admit that all his objections had been dissolved.

Mr. William Doig remarked that the educational part of the Bill was an admirable change for the better. If he understood Mr. Carteighe aright, there was no desire to lay heavier burdens on their young men. The outcome of the Bill was that the young men should have the privilege of taking the examinations in three or four times, but at the same time they would have a very much stiffer one at the close. That undoubtedly was the tendency of all educational work over the country. Year by year the standard of education was rising, and the Government laid heavier burdens on those who were to pass examinations. If the examinations as conducted at present were to be divided into two or three parts, that would be an admirable thing. So far as Dundee was concerned, with the University College and classes of science and art, her young men had a capital opportunity for an efficient training, and he looked forward to Dundee becoming a great centre for the education of young lads throughout Forfarshire and Perthshire who desired to follow their trade as well as other trades, and it might yet become a centre in which they might hold their examinations. That would be a great boon to their young men. There was not a single apprentice in Dundee who from the advantages he already had should not be able to pass his final examination when he was 21. Mr. Doig was sure they would all agree that the Bill had in Mr. Carteighe an able advocate. He had brought a great deal of robust common sense to bear upon the question of the companies question, but he had only looked on the one side and had overlooked the other side. While it was perfectly true that no one tried to pass an Act of Parliament affecting such powerful classes as co-operative stores, yet if the Council had inserted in the Bill a clause dealing with them, the trade could bring all its influence to bear on members of Parliament and others, and probably in time good results would follow. At any rate, they could all take care that the matter was brought under the notice of their local members, and in this way they could bring an aggregate of power which would have a good effect. Mr. Carteighe, he thought, might have a little more faith in the trade, and if he ventured a little farther in that direction the amount of support he would find would help to get the evil modified. If he would yet recast the Bill so far as the trading clause was concerned, and bring it more in accordance with the wishes of the trade generally, he would get a large amount of support, and indirect influence would be brought to bear upon members of Parliament. Suppose they had to fight two or three years. Very often a much better Bill was got after such a fight than if a measure had been passed at first. If the Pharmaceutical Society acted in that way it would form a splendid opportunity for bridging over the division between the Pharmaceutical Society and chemists and druggists. On the ground of fairness the Pharmaceutical Society might recognize a little more than it had done in the past the fact that chemists and druggists were traders, and that they were making their income as traders. He had no ambition to rise to the status of a profession. He felt as much pride in being an honest trader as a professional man, and he concluded by remarking that Mr. Carteighe might consider whether he should not recast the clause he (Mr. Doig) had spoken of and wait two or three years to carry the Bill. If he did so, it might be better for all concerned.

Mr. Simpson (Forfar) stated that since he had gone to a neighbouring town to Dundee, he had found considerable difficulty in procuring apprentices, and the reason he supposed was that he had been too outspoken in telling all who came to him what was before them in regard to examinations. He considered it his duty to give all who came to him a copy of the *Pharmaceutical Journal* with the Preliminary examination in it to let them know what would be expected of them before he engaged them as apprentices. It would be well if in a large centre, such as Dundee, examinations could be held, because young men from the neighbouring burghs would be able to attend without much difficulty, and the tendency of their leaving the smaller burghs for the large towns, now so prevalent, might then to some extent be checked. Mr. Simpson was impressed with Mr. Carteighe's presence at the meeting, and was surprised that the movement on which he was now in Scotland should not have been started by the Pharmaceutical Society years ago. Mr. Simpson himself was a member of that Society for a long time, but two years ago he severed his connection with it. At that time he had occasion to send a letter to the Editor of the Journal, but whether that letter was worthy of reproduction or not, it never appeared, and he never heard anything about it. After that he left the Society, but after what he had heard of it that day he might be induced to rejoin it.

Mr. Storrar (Kirkcaldy) remarked that perhaps it was out of place for him to take part in the discussion, for in the first place he could scarcely call himself a member of the trade in Dundee and district, and, again, having the honour to be a member of the Council he had already had opportunities and had used these opportunities of criticising the Bill, and he was bound to support the resolution of the Council. Perhaps they would allow him to suggest the manner and scope in which further discussion should proceed. At the outset, however, he had to congratulate the Chairman on the large and very influential meeting—the largest gathering, he believed, of chemists and druggists that had ever taken place in Dundee, and he hoped it would be the beginning of interest in the Society's work, and the beginning of a series of meetings. Such meetings were exceedingly important to the trade, and it was only by free and full discussion of pharmaceutical questions at meetings such as these that the Council of the Society could have any chance of learning the opinions of the members of the trade throughout the country. He was sure they all bade Mr. Carteighe a hearty welcome to Scotland, and thanked him for his address, which showed pluck, ability, clearness and devotion to his work. Mr. Storrar knew that the Society ought to be very proud indeed of its President, because he gave to the work of the Society both his time and his talents ungrudgingly, and he discharged all his tasks with great ability. It was for the meeting to say after what they had heard from Mr. Carteighe whether they were prepared to support the motion of the Council in regard to the new Pharmacy Act. To keep the discussion in order he considered some regular motion should now be proposed either in favour of or against the motion of the Council. From what had already taken place he did not see there could be any severe criticism of the Council, and he might suggest that the discussion should proceed on a resolution in favour of the Council's proceedings. Some legislation was required. Recent decisions in the law courts convinced them that amendments to the present Acts were absolutely necessary, and the question was before them whether that amendment should take the shape of a reanimation of the old Act of 1868 or of a new set of proposals. There were one or two points which should be kept in mind in the discussion. The first one was that the Council and the supporters of the Bill were as convinced as any could be that the legitimate trade was very seriously affected by company trading. All were agreed as to that, and they were perfectly satisfied as to the need there existed for a remedy. Was it to take the shape, as Mr. Carteighe had tried to prove, of increased qualification on the part of the legitimate trader, or rather were they to try for legislative protection? Speaking of the Society Mr. Storrar said that chemists in Scotland had not been doing their duty towards it, and he pointed out that if they wished pharmacy legislation they could only get it by joining the Society and thus increasing the influence of that body, which could urge it on. Mr. Doig had said if the Society did them some benefit they might repay it by joining it. That was not the way to do. They should join the Society, take an interest in it, and vote and help to carry on the work it was instituted to conduct. Why, if the editor of the *Pharmaceutical Journal* rejected a letter when he should not have done so they should try and get another editor, and if they were not satisfied with the President they should vote him out of the position. If the meeting now being held had no other effect than that of renewing an interest among the trade generally, then Mr. Carteighe's visit would have resulted in an amount of good.

Mr. James Russell then moved—

> "That this meeting thanks the President of the Pharmaceutical Society for his able exposition of the Pharmacy Bill, and generally approves of the action of the Council in framing and in introducing it."

Mr. Kermath (St. Andrews) seconded, and added that Mr. Carteighe had been on the war path for a considerable time and had now made the proposals of the Bill very clear to the members of the trade. He was in agreement with what was proposed in regard to education and the companies parts of the Bill. In the country districts it had hitherto been very difficult for boys to get a sufficient education to suit them as apprentices, but now he was hopeful, with the institution of secondary schools, of better times. Mr. Kermath afterwards spoke of the want of unanimity which had up till now prevailed in the trade, and expressed a hope that all in the trade would join the Society and attend meetings such as that as often as possible, so that they might hear what each other had to say and act together to get what they wanted. If they went forward in a solid body they would get what they wanted in time.

Mr. Doig asked whether he was to understand that in voting for the motion the meeting practically pledged itself to support the Pharmacy Bill. If that was so he felt he must propose an amendment.

Mr. Ferrier said he had just to make the same remark. There were some clauses in the Bill he could not see his way to agree to.

Mr. Doig: I cordially support the first part of the motion. That is that the meeting thank the President of the Pharmaceutical Society for his able exposition of the Bill. I am sure we all agree on that, whether we are agreed on the second part or not.

Mr. Ferrier: I second the amendment proposed by Mr. Doig. No one can object to the meeting thanking Mr. Carteighe for his admirable address. I cannot agree to the motion. We are not in a position to do so.

Mr. Carteighe: I do not want to go away from this meeting without saying what you do mean. This is not business, gentlemen. I do not want your thanks. I want you to say one thing or another. I must appeal to you to come to a decision. Let me go back to the Council and say whether you approve or disapprove of the Bill. Merely to thank me is no use whatever. I appeal to Mr. Doig not to make an amendment of thanks to me.

Mr. Doig: Do I understand the effect of the motion to be that if it is passed we are morally bound to back up this Bill in the House of Commons? If so I am not prepared to support the motion.

The Chairman then read the motion and asked all in favour of it to hold up their hands, when twenty-one were held aloft. He then asked any against the motion to hold up their hands, but no response was made, and he thereupon declared the motion carried.

Mr. Carteighe thanked the meeting for giving a definite expression of opinion. He quite agreed with what had been said by Mr. Doig and Mr. Mason as to the examinations, and according to clause 3 of the Bill there would be ample opportunity for carrying out their ideas if it was so desired. What the Pharmaceutical Society was anxious to do was to get the men educated more and examined less, and the probability was that in large centres where University colleges or educational institutions of note existed the examinations which took place in them would be accepted in lieu of the interim examinations. But it was a far cry to raise until they saw it before them. The Bill, however, gave powers to receive certificates issued by examining bodies in lieu of the Preliminary examination. For himself he thought it would be a good thing if there were some sort of local examination corresponding and equivalent to the Preliminary. He believed it would be for the general good of the trade if all the certificates received in lieu of the Preliminary were certificates from other bodies rather than their own. Mr. Carteighe had gathered from what Mr. Doig had said that he was not a member of the Pharmaceutical Society, or if he had been that he had withdrawn; and to him Mr. Carteighe had to say that it was no good putting the cart before the horse. They could not touch the company clauses until every one in the trade was ready, and with one voice entrusted the Executive to go and fight the battle in Parliament. What, he asked, did the miners and other tradesmen do when they wanted a grievance remedied? Why they joined a Union and became strong enough to enforce their demands. And yet the President of the Pharmaceutical Society was told that numbers now outside would join the Society when it had stopped co-operative trading. It was a mockery to talk like that, and if such discussions were reported an intelligent public would see clear evidence of considerable weakness in that body. There was less sturdy common sense among them than was exhibited in the meetings of working men when they met together. Mr. Carteighe concluded by thanking the meeting for the patience which it had listened to him and the kindness with which he had been received.

Mr. Davidson, Montrose, moved a hearty vote of thanks to Mr. Kerr for presiding.

The Chairman, in acknowledging the compliment, remarked that it had been a pleasure to him to occupy the chair at the meeting. The discussion had been interesting, and the result of the meeting pleased him very much.

The proceedings then terminated.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second half of the winter session was resumed on Thursday evening, January 15, Mr. John Forsyth, ex-President, in the chair.

Mr. George Little, Vice-President, read a few "Notes on the B.P. Ointments," in which he submitted many valuable hints, which were much appreciated by the members present. Mr. Little was awarded a hearty vote of thanks for his excellent paper.

Mr. William Mair had pleasure in handing over to the Association a gold medal, which had been presented by Dr. John Stewart, dentist, Dundee, for competition among the students. A special expression of thanks was accorded to the donor, and he was unanimously elected an honorary member.

Mr. Mair had also pleasure in handing over a parcel of materia medica specimens, which had been presented by Messrs. Pinkerton, Gibson and Co., wholesale chemists, Edinburgh, for the Association's collection. The Secretary was instructed to write and thank the firm for the very excellent specimens.

The next meeting on Thursday, January 29, will be addressed by Mr. Frank W. Young, F.C.S., F.R.S.E., on "Putrefaction and Infection."

The second Annual Conversazione of this Association was held in Gray's Rooms on Tuesday evening. There was a large attendance and an excellent programme of music, recitations, etc. The chair was taken by Mr. J. W. Russell, Vice-President of the Association, who n an interval in the programme introduced Mr. Carteighe, President of the Pharmaceutical Society. Mr. Carteighe complimented the Dundee chemists' assistants on their excellent entertainment, and went on to speak of the advantages to be derived from social intercourse and the reading of scientific papers. A vote of thanks to Mr. Carteighe was passed on the motion of Mr. W. Mair, and similar compliments were paid to the Committee on the motion of Ex-Baillie Doig, and to the Chairman on the motion of Mr. Ferrier.

COMPLIMENTARY DINNER TO MR. MICHAEL CARTEIGHE AT EDINBURGH.

On Wednesday evening Mr. Michael Carteighe, President of the Pharmaceutical Society of Great Britain, was entertained to dinner in the Royal Hotel, Edinburgh, by the members of the North British Branch of the Pharmaceutical Society. There was a good attendance, Mr. Wm. Gilmour, F.R.S.E, Chairman of the Executive of the North British Branch of the Pharmaceutical Society, occupied the chair, and Mr. James L. Ewing, Edinburgh, was croupier. On the right of the Chairman were Mr. Carteighe, the guest of the evening, Mr. Alexander Noble, of Messrs. Duncan, Flockhart and Co., Mr. Alexander Kinninmont, Glasgow, Mr. Richard Clark, of Messrs. Raimes, Clark and Co., and Mr. George D. Mackay. On the left were Dr. R. Peel Ritchie, Vice-President of the Royal College of Physicians, Mr. J. B. Stephenson, Chairman of the Board of Examiners for Scotland, Mr. David Storrar (Kirkcaldy), Vice-Chairman of the North British Branch Executive, Mr. Jas. Mackenzie, Edinburgh, and Mr. John Nesbit, Portobello. Amongst others present were Mr. Daniel Frazer, Glasgow, Dr. William Inglis Clark, Mr. Thos. Maben, Hawick, Mr. J. H. Fisher, Dunfermline, Mr. D. Gilmour, Dunfermline, Mr. Alex. Garvie, Leith, Mr. J. R. Young, junr., Mr. Peter Boa, Mr. David Maclean, Mr. Thompson, Mr. Robert Aitken, Mr. Adam Gibson, Mr. G. H. Laird, Mr. J. Rutherford Hill, etc. Apologies were intimated from Ex-Provost Watt, Haddington, Professor T. R. Fraser, M.D., Professor A. Crum Brown, M.D., Professor Sir Douglas Maclagan, M.D., Professor J. Bayley Balfour, M.D., Mr. Alexander Seath, Dunfermline, Mr. A. Strachan, Aberdeen, Mr. J. M. Hardie, Dundee, Mr. Charles Kerr, Dundee, Dr. Cleghorn, St. Andrews, Dr. Stevenson Macadam, Mr. Robert Macadam, Glasgow, Mr. H. Bellyse Baildon, Mr. J. R. Young, etc.

After dinner, which was served in excellent style, the Chairman proposed the usual loyal and patriotic toasts, which were received with much enthusiasm.

Major Storrar, Kirkcaldy, returned thanks for the Army, and Navy, and Reserve Forces.

Dr. Peel Ritchie then proposed "The Pharmaceutical Society of Great Britain." He said he supposed they were all familiar enough with Scottish history to know that a certain king found it necessary to send for a medical practitioner, the medical attendance was eminently unsatisfactory, and the royal personage when he learned the result of the visit said, "Throw physic to the dogs. I'll have none." A question which they might consider was whether if that Royal personage had been spared he might not have thought it necessary to have founded a Pharmaceutical Society, with the intention not only of inquiring into the action and uses of drugs, but to make them less nauseous and disagreeable than he and his wife found them when he thought they were only fit to be thrown to the dogs. Unfortunately the Pharmaceutical Society was not founded so long ago, but in the times of their good Queen Victoria, who inaugurated the Pharmaceutical Society of Great Britain. They were met upon this occasion, he understood, not only to testify to the good which that Society had done, but also to offer their congratulations to the Society, which had reached fifty years of its existence and was now celebrating its jubilee. Since it was inaugurated as a body the

Society had continued to progress step by step in the most favourable and satisfactory manner. Not only had it been a benefit to those who were members and associates, in stimulating them to exercise the different objects of their business to their best ability and to their best advantage, but in doing so it had conferred a great benefit on the general population of the country. If it had not been for the Pharmaceutical Society and the impetus given to the pharmaceutical business, they would still have been labouring under those disadvantages which Macbeth found when he told them to throw physic to the dogs. However, now-a-days things had very much improved, and thanks to the Pharmaceutical Society they had preparations to submit to their patients which could be taken without rendering medicine so disagreeable as at one time it was. But that was only one part of the duty that the Society had discharged, and it had perhaps done a more important work in incorporating the members of the profession into one body. It had introduced a system of admission to the profession by examination that had gone on now for a number of years, but as had been found in regard to other matters it had been resolved to take still further steps in the right direction. The Society had therefore been progressively going on from year to year, always doing something good, always attaining to something, and that something being for the better, not only of the Society, but also for the public at large. In Scotland the Pharmaceutical Society had greatly extended its efforts, and in Edinburgh it had now a most efficient branch, chiefly engaged, he believed, in the examination of entrants to the profession, and introducing qualified members. He recollected the last time he had the pleasure of meeting the members of the Society, it was to congratulate them on the opening of the spacious building in York Place, where the members had an opportunity not only of associating together, but where they had a large and most excellent museum, a comfortable reading room and extensive library. That brought him to think of those who were at the head of the Society, and on this occasion he understood that they were not only met to celebrate the jubilee of the Pharmaceutical Society, but also to extend a welcome to Mr. Carteighe, who was at present on a visit to Scotland. In mentioning Mr. Carteighe's name it seemed to him that Mr. Carteighe was the moving spirit of the Pharmaceutical Society. In one sense in him all the energies of the Society concentrated, and he was here, there and everywhere, discharging those duties which he presumed were so thoroughly performed, and so much to the admiration of the fellows and members of the Society, that they had elected him their President and representative for now, he supposed, over ten years. In Mr. Carteighe, with whose name he desired to associate the toast, they had the type of a man who had been always the same from his earliest days. When he first entered the Pharmaceutical Society he was fixed upon by those who knew him best as likely to take a leading part in pharmaceutical science. From that time till now he had gone on step by step, always improving and advancing his position, until he was the mainspring of the Pharmaceutical Society. He was sure he expressed the feelings of those present when he offered Mr. Carteighe their hearty congratulations, and in expressing their pleasure in seeing him once again amongst them. He knew that Mr. Carteighe was doing a good work in going from place to place in Scotland, stimulating the young men, and advising them and others to join the Society and to be united together, for there was no doubt that if they wished to have strength and all the benefits which the Society could give, it was by their being thoroughly united together in the efforts Mr. Carteighe was making. He was doing not only what was for the benefit of the Pharmaceutical Society at large, but also for the benefit of the branch in Scotland, and he believed also for the community at large. He believed that Mr. Carteighe was not only associated with the Society in its scientific and higher development, but oddly enough he had come across a remark in one of the papers he saw, that Mr. Carteighe had been President of the executive body from time immemorial. It was a great thing to unite pleasure with business, and from what he had seen of Mr. Carteighe he thought he eminently associated these two things together. He worked hard and then he enjoyed his relaxation. He had much pleasure in asking them to fill a full bumper and to dedicate it to "Success to the Pharmaceutical Society and to its President, Mr. Carteighe."

Mr. Carteighe, who was received with loud cheers, said he had to thank the company for the kind manner in which they had received the toast, and especially his friend, if he would allow him to call him so, for proposing it. He was now in Scotland, as the President of the Pharmaceutical Society, to talk about a certain Bill which the Council thought would be good for all of them, and to endeavour as far as he could to explain the difficulties that had to be contended with in any attempt to get important legislation carried out. Dr. Peel Ritchie had spoken eloquently on the claims of the Pharmaceutical Society for services rendered to the public on the one hand and to the trade or profession, whichever they choose to call it, on the other. While he was on the subject he did not care whether they called the occupation a trade or profession. He was sure that his friend the doctor would agree with him that a trade could be carried on in such a professional spirit as to earn the goodwill of the public outside, and that there was not so much in the name as in the course which the individual followed. But it was only fair to say that from the point of view in regard to law they were in a sense a professional body. It was not because the Pharmaceutical Society had done certain things that he said that, but for this reason, that before the Pharmaceutical Society or any other body asked for legislation, it must approach Parliament on some professional lines. It could not go to Parliament without an undertaking that would make itself worthy of the confidence of the public from whom it asked a certain amount of protection. When he said the public he meant the House of Commons as representing the public. It was true that the Pharmaceutical Society was not competent at any moment to go to Parliament and ask it to pass measures which would put money into their pocket at once. No corporation of medical men could do that. The process must be a slow one. They must approach the House of Commons, and show that they were to give good value for what they were asking and then they would be listened to. He did not want to say anything about politics, because they had given him the opportunity of a conference with them on Friday, and he would therefore say nothing about the Bill or the subject of pharmaceutical politics. They were that night the Pharmaceutical Society of Scotland; they were that night the Pharmaceutical Society of England, and they were also the Pharmaceutical Society of Great Britain, every one of them. They were all partners. They were all responsible to the utmost fruition of their ability, of their integrity and of their good name, and if that was so, was it not a serious thing to cavil at the Executive body, and to throw mud on the body that wished to raise the standard of the Society? Was it wise to do so? How did it come about that the Pharmaceutical Society of Great Britain was respected by the medical profession throughout the world, by men of science, by the universities, by the educated classes, and by the Government, and how came it about that its manage-bers respected it so little? Because they did not take a professional view of it. A society could not exist for any one of its members individually, but for the public in the first place and concurrently for the indirect benefit of the body. They knew that the privilege of barrister was very great, they were supposed to be very exclusive, they were regarded as a very close corporation, and so they were well protected in the strict sense of the term, and if they carried on trade they might call it the protection of trade. But why were they protected? They protected themselves. They solemnly swore adhesion to certain propositions and they never swerved from the professional standard laid down. If every member of the pharmaceutical calling, from the humblest chemist and druggist upwards, would take as his standpoint the true professional feeling, the chance of his rising would be immensely increased. But if he would not do that, and although an educated and professional man classed himself with hucksters, what wonder was it that the public would treat him as a huckster? If each man would not stand up for his own individuality to help himself the Society could not help him. He was glad to have the opportunity of talking on the subject, for it was of importance that every word they uttered in public to their customers and the medical profession as to their calling should be in a dignified manner. The Pharmaceutical Society of Great Britain was highly respected all over Scotland, and, as he had said before, in every educated centre. He was sure that the distinguished proposer of the toast would bear him out when he said that there were as many grades in the medical profession as there were in their trade or profession; the medical profession had the same battle to fight, a general struggle for existence, a process that applied to plants and animals—the survival of the fittest. Let them think of the responsibility that lay upon each of them. Let them consider that it was not good for a body composed of educated men to be carping at an executive selected by themselves on the most democratic principles, in which everyone engaged in the trade was invited to come and take part in the voting. That was a condition of things that he, as President, had to face at the present time, to face the criticisms of men who said that they would not join until, as they said, "You have done something for us." Well, he would say that the Society had done something for them. They had registered every chemist and druggist in 1868 without asking him even for the postage stamp telling him that he had been registered. If each had been made to pay five guineas he believed they would have respected the Society much more for that. Amongst those who opposed the Pharmaceutical Society, who were amongst the most bitter opponents on different points? They were not many in number, but they made a great deal of noise. When he traced them out he found that they were registered chemists and druggists, who never have passed any examination or course of training, and were admitted by the stupid action of the Society in 1868. The moral of that was that corporations and individuals should never do work of the kind for nothing if they wished to get the respect of the parties interested. The result must come to this, that corporate bodies could never do for the individual what the individual must do for himself. There was one phase of the Pharmaceutical Society which was always well worthy of note. To the heads of the leading houses in the leading cities was the credit due of having founded the Pharmaceutical Society. The men who founded it in Edinburgh and London, and in certain other parts of the country, were prosperous men, and it was not for their trade interest to do it, but they did it for loyalty to the cause and for the general benefit. At the present time, in every town in Scotland and in every town in England of any magnitude they had chemists and druggists sufficiently able to deal with the most difficult prescriptions for the medical men. He thought that they had every reason to be proud of the Society and to be loyal to it since its founders had so unselfishly devoted themselves to the advancement not only of the interests of the profession, but also those of the community at large.

Mr. J. B. Stephenson then proposed "The Medical Profession." He said he thought that the members of the Pharmaceutical Society were in reality a part of the medical profession. From their association with the medical profession in the daily details of their business he thought that they of all others were most able to appreciate the value of the medical profession to the public and themselves. He mentioned the names of some of the leading medical men and surgeons who had shed lustre on the University of Edinburgh, and he concluded by coupling the toast with the name of Dr. Peel Ritchie.

Dr. Peel Ritchie, in returning thanks, said that the medical profession were under great obligations to the pharmacists of Edinburgh for the attention their prescriptions received, and for the way in which their duties were performed generally.

Dr. William Inglis Clark proposed "Honorary Members of the Pharmaceutical Society." He mentioned several of the former honorary members, such as Professor Sir Robert Christison and Professor Balfour, and amongst the present honorary members Professor Dewar, Professor Crum-Brown, Professor Sir Douglas Maclagan, Sir R. Quain, Flückiger, Hofmann, Hooker, Roscoe, Pasteur, Tyndall, Playfair, Frankland, Crookes, Dragendorff, and others.

The Croupier then proposed "Trade Interests." He said he rejoiced to think that there had always prevailed such a good feeling amongst the members of the profession. He thought that the dark clouds were passing away and they were now seeing the blue sky. He trusted that the good feeling that prevailed in the past would continue in the future, and that whatever trials they might have to encounter they would maintain the honour and dignity of the profession.

Mr. Richard Clark acknowledged the toast and expressed the pleasure he felt in being present on so interesting an occasion.

Mr. Mackenzie gave "The Drug Trade in Glasgow and the West," coupled with the names of Mr. Kinninmont and Mr. Frazer, who replied.

Mr. Boa proposed the health of the Chairman, who, he said, was perhaps better known than any other pharmacist in Scotland.

The toast of "The Croupier" was then given, and the proceedings terminated.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The ordinary monthly meeting was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday, January 14, Mr. H. Kemp, Vice-President, in the chair.

Mr. Kemp inquired whether it would not be a wise thing on the part of the Association to get up a petition or a memorial in favour of the Pharmacy Acts Amendment Bill. The chemists and druggists of Manchester and surrounding districts had already supported the Bill by the vote they gave at the meeting held some time ago, on the occasion of Mr. Carteighe's visit, but he thought they might again put their shoulder to the wheel by getting the members of the whole trade in the district to send up a petition or memorial to the Pharmaceutical Society, urging them to go on with the Bill. Although he was in favour of the Bill as it now stood, he should have liked to have seen the "bogus company" affair handled. However, as Mr. Carteighe had given them the assurance that it was quite possible something of the kind might be done in committee he was quite satisfied to leave the matter where it was.

Mr. George L. Woolley said he thought that they might rest content that if anything could be done in the direction indicated Mr. Carteighe would do it. It was merely a question of what was possible. Of course, if there was anything mooted that was supposed to be antagonistic to the stores they knew what an amount of opposition would be brought to bear against it at once, and with the power the friends of the stores had in the House of Commons they would ultimately swamp any legislation that might be proposed by the Pharmaceutical Society. The Chairman said he did not believe the Legislature would sanction anything that would touch the genuine co-operative stores, by which he meant stores conducted by people for their mutual benefit, but he felt it was desirable and even possible to do something with those concerns which were stores only in name, and which supplied the general public with anything and everything. But whether that was so or not he was quite willing to leave the matter of store legislation in the hands of the Pharmaceutical Council and the Parliamentary Committee.

Some further conversation followed by other members present, and eventually Mr. J. T. Smith, of Radcliffe, moved that the Council of the Manchester Pharmaceutical Association be instructed to prepare and forward to the Council of the Pharmaceutical Society a memorial in favour of the Pharmacy Acts Amendment Bill.

The motion was seconded by Mr. G. Booth (Weaste) and carried unanimously.

Mr. William Arrandale said he had seen a great many letters which had appeared in the *Chemist and Druggist* with regard to the sale of Beecham's Pills. There seemed to be some doubt as to the legality of selling them in broken bulk, and he could not gather from the letters in last week's issue whether it was legal to do so or not, although he saw an editorial footnote to one of the letters, stating that it was legal to open and re-sell the contents of a packet of stamped medicine provided the re-sales were not in boxes, etc. Now were they to understand by that that if they sold Beecham's Pills in broken bulk they were not to be put up in paper?

Mr. Kemp said they must not be put into boxes or sealed packets. That had been definitely settled some time ago by the Revenue authorities. But the latest decision with regarding broken bulk, and to his mind the most absurd, was that the excise authorities said you might sell a packet of Pritchard's teething powder in single powders, but must not sell them two together to one person at the same time.

Mr. Arrandale said he had been compelled to sell such things as Beecham's Pills and Fenning's powders in broken bulk, and they would be surprised at the quantity he sold, but he had been accustomed, for the sake of convenience, to put them into small boxes.

Mr. A. Blackburn said that whilst they were discussing the subject of broken bulk, he might state that if on a doctor's prescription they sold Fellow's syrup alone it had to be stamped. That was the result of a correspondence which had taken place with the Inland Revenue authorities. If anything else was ordered with it you need not stamp it, but if ordered alone you had to stamp it according to its value, whether the bottle from which it was taken was stamped or not.

The discussion was brought to a finish by Mr. Woolley remarking that the whole affair seemed to be in a "gigantic muddle."

With regard to the recently published Addendum to the British Pharmacopœia, Mr. W. Kirkby said he thought it was worthy of note that this was the first time pharmaceutical chemists had been recognized through their Council in the preface to the Pharmacopœia Addendum. The processes for working the tinctures he considered to be a distinct advance in pharmacy, as percolation was now used in the United States, and it was not the maceration and percolation of the late Pharmacopœia. It was also well to know that there was a form for dry extract of euonymus, especially as euonymin had been mixed with barium salts, which of course were deleterious. Acetanilid, antipyrin and phenacetin were recognized in the Addendum, and also there was a formula for a preparation they could not make, namely, hydrous wool fat. He thought that altogether the production was a very noticeable one.

Mr. Kemp said he had wondered whether the word lanoline was simply a trade mark or an addition patented. If it was simply a registration trade mark he supposed it was perpetual.

Mr. Woolley said it had been stated that the mixture of water with wool fat was the subject of a patent. What he objected to was the Pharmacopœia occupying such a position and not taking the lead.

Mr. Kemp said he did not know whether it was not a retrograde step to recognize these proprietary things officially in this way.

Mr. Kirkby said he agreed with Mr. Kemp that it was a step in the wrong direction to put these patented things into the Pharmacopœia, and he thought that it was also a mistake to put in some preparation, on so short a trial. With regard to some of them the medical men were not even agreed as to the dose. He thought these things ought to be submitted to tests in pharmacological laboratories before being put into the Pharmacopœia.

Mr. Kemp said the question was whether the human system is not the best test for them, and such a test would come from a committee of therapeutists. The General Medical Council ought to test these things before adopting them.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The usual monthly meeting of this Society was held on Wednesday, January 14. The President, Mr. J. E. Bradwall, occupied the chair.

The minutes of the last meeting having been read and confirmed, the Chairman called upon Mr. G. A. Grierson, F.L.S., to deliver his lecture on "Some Pharmaceutical Aspects of Digestion."

The chief points of the lecture were explained by experiments, and gave rise to a good discussion and numerous questions.

A hearty vote of thanks was accorded to Mr. Grierson, and in replying he answered the many questions asked.

Correspondence.

A Correction.

Sir,—Will you kindly permit me to rectify an error which appears in your report of the discussion on Mr. Jones's paper at the last meeting of the Midland Counties Chemists' Association? Referring to ext. euonymi siccum, what I really said was that a stronger spirit would not be any advantage, but, on the contrary, the presence of much oily matter would make it necessary to add a very large proportion of some absorbent powder to reduce the preparation to a pulverulent condition.

Birmingham. R. Cripps.

[*** The report in question was printed as received from one of the Secretaries of the Association.—Ed. P. J.].

Communications, Letters, etc., have been received from Messrs. Desborough, Seccombe, Andrews, Brewis, Reid, Wyatt, Walker, Parkes, Humphrey, Rawling, Johnstone, Coulter, Leo.

"THE MONTH."

Active Principle of Castor Oil.

The identity of the active principle of castor oil has been for many years a subject of much dispute, and the opinion of Buchheim that the castor oil contains no especial ready-formed irritant, but that its action is due to the liberation of ricinoleic acid, which itself possesses the properties of a "scharfer stoff," has been repudiated by Husemann, Boehm, Brunton, Schmiedeberg and others. On the other hand, the laxative properties of the oil cannot be due to a poison producing gastroenteritis, contained in the ricinus seeds and called by Schmiedeberg ricinon, since the latter is destroyed at the temperature of boiling water, under which treatment the activity of the castor oil is not affected, as witnessed by its method of preparation both in the United States and in the East Indies, as well as by direct experiment. By comparison of the purgative action of ricinoleic acid and its synthetically regenerated glyceride with that of the natural glyceride occurring in castor oil Professor Hans Mayer (*Arch. exp. Path. u. Pharmakol.*, Nov., p. 145) has obtained results that substantially support Buchheim's assertion. The ricinoleic acid used in his experiments was prepared as calcium salt from castor oil and set free after complete purification of the salt by recrystallization from alcohol. The acid possesses a specific gravity of 0·9451 at 15° C., gives good crystalline barium, zinc and cadmium salts, and may be converted into the glyceride by heating with glycerine at 280–300° C. in a stream of carbonic acid gas. In experiments upon cats and human patients both the pure acid and the synthetic glyceride appeared to be even more active than the ordinary oil. As, however, the non-activity of the isomeric elaidic acid and elaidin, produced by the action of nitrous acid, still suggested that the active principle of castor oil might be an extremely powerful body not removed from ricinoleic acid by recrystallization, but destroyed by nitrous acid, Professor Meyer carried his investigations further. Arguing that the different physical conditions of the isomerides might account for the difference in purgative action, he administered ricinelaidic acid and ricinelaidin mixed with yolk of egg or milk or dissolved in olive oil. The results showed that the ricinoleic acid had not lost the characteristic property of castor oil through the nitrous acid treatment, but that the apparent non-activity of the elaidic acid is due to its solid condition and higher melting point (50° C.), which hinder its rapid distribution in the intestines. This is a necessary condition for its successful employment, since the stimulating influence of the ricinoleic acid upon the mucous membrane of the intestines is of short duration and disappears with the absorption of the acid. Castor oil is not, therefore, as other laxatives, cumulative in its action, and from its brief stimulation of the intestines is to be regarded as a most innocuous purge.

Phenols of Birchwood Tar.

The phenols of birchwood tar form the subject of a communication by Herr Pfrenger (*Archiv*, Dec. 29, p. 713), who worked upon an oleum betulini æthereum rectificatum obtained from Schimmel and Co. The oil was a thin, light-refracting liquid of a yellow-brown colour, acid in reaction and having the odour of Russia leather; specific gravity at 15° C. 0·956. After removal of free acid by treatment with soda solution, the oil was repeatedly shaken with caustic potash solution, the dark brown phenylate layer that formed on standing separated and decomposed with dilute sulphuric acid, and the liberated phenols, amounting to 43·9 per cent. of the oil, purified and fractionated. As a result of examination of the fractions the conclusion was arrived at that the principal constituents of birchwood creosote are guaiacol and cresol, with smaller quantities of cresol and xylenol, and probably traces of phenol. The birchwood creosote examined, therefore, like that from beechwood, would appear to contain two series of homologous phenols:—

C_6H_5OH	Phenol.	—	
$C_6H_4 \left\{ \begin{matrix} CH_3 \\ OH \end{matrix} \right.$	Cresol.	$C_6H_4 \left\{ \begin{matrix} OCH_3 \\ OH \end{matrix} \right.$	Xylenol.
$C_6H_3 \left\{ \begin{matrix} CH_3 \\ CH_3 \\ OH \end{matrix} \right.$	Guaiacol.	$C_6H_3 \left\{ \begin{matrix} CH_3 \\ OCH_3 \\ OH \end{matrix} \right.$	Cresol.

It is considered probable, however, that the relative quantities of the phenols would vary with the quality of the wood and the method of distillation.

Atropamine.

Atropamine, the new alkaloid recently separated from belladonna root by Dr. Hesse (*Pharm. Journ.*, [3], xxi., 162), forms the principal subject in an important communication upon the alkaloids of belladonna (*Annalen*, cclxi., 87). Atropamine is stated to be isolated by dissolving in acetic acid the alkaloids left in the mother-liquor from atropine preparation and adding to the solution sodium chloride until the formation of a milky turbidity, after which atropamine hydrochloride crystallizes out, and can be usually obtained pure by a single recrystallization from boiling water under addition of animal charcoal. The free base is obtained from the hydrochloride by shaking the salt with dilute ammonia and ether, and forms a colourless varnish that does not harden sufficiently in the exsiccator to allow of it being powdered. At about 60° it occurs as a colourless, odourless, mobile liquid, and has a composition represented by the formula $C_{17}H_{21}NO_2$. It dissolves very readily in ether, chloroform, alcohol and benzol; less readily in petroleum benzine, petroleum ether and water. Its alcoholic solution, which is inactive towards polarized light, has a bitter taste, does not change phenolphthalein paper, colours red litmus paper blue and neutralizes acids. Atropamine forms in most cases, especially with hydrochloric and hydrobromic acids, easily crystallizable salts; but if these be moistened with a mineral acid and exposed to sunlight or warmth, they readily undergo change, the atropamine being converted into belladonnine. It possesses no mydriatic properties, but acts as an irritant to the eye. The same change takes place upon the simple evaporation of a sulphate solution, or boiling with baryta water. Both atropamine and belladonnine are split up by fuming hydrochloric acid into pseudotropine and atropic acid, according to the equation—

$$C_{17}H_{21}NO_2 + H_2O = \underset{\text{Pseudotropine.}}{C_8H_{15}NO} + \underset{\text{Atropic acid.}}{C_9H_8O_2}.$$

If, however, barium hydrate or a weaker hydrochloric acid be used the main part of the decomposition takes place differently. According as one or two molecules of water are taken up, an acid represented by the formula $C_9H_{10}O_3$ or by

$C_9H_8O_2$ is split off, but the former is not identical with tropic acid, nor the latter with atropic acid, neither being crystallizable. In discussing the relation of atropamine to the other belladonna alkaloids, Dr. Hesse expresses the opinion that it stands in the same relation to hyoscine as apoatropine to atropine. On account of its slight stability it probably cannot be produced from hyoscine by treatment with nitric acid, but it may be that belladonnine could be obtained in that way. Like hyoscine, atropamine turns out to be not a constant constituent of belladonna. It has not been found at all in the belladonna cultivated in the district, or in the leaves of wild plants, while in the roots of wild plants it is present as a rule only in small quantity. But in belladonna root of unknown origin a considerable quantity was found.

Belladonna Alkaloids.

In the same paper Dr. Hesse refers to the question as to whether atropine occurs ready-formed in belladonna or is a product of alteration in the manufacture. He states that in his experience the herb of cultivated belladonna contains almost exclusively atropine, while it is obtained somewhat less pure from the leaves of the wild plants and in smaller quantity from the roots of both kinds, when freshly collected and operated upon with every precaution to avoid alteration. Referring especially to the statement made by Professor Schmidt that in young belladonna roots only hyoscyamine had been found by his pupils, whilst in older roots, besides much hyoscyamine, there was also a little atropine, Dr. Hesse says that in an old root he found much hyoscyamine, but no atropine. He is of opinion, therefore, that the amount of atropine in belladonna is subject to great variations.

Sabadine and Sabadinine.

Two new alkaloids have been obtained by Merck from sabadilla seeds, called sabadine and sabadinine. Sabadine is extracted preferably in the form of nitrate, from which the pure alkaloid is more easily obtained. The nitrate, after one crystallization from water, melts at 308° C. The pure alkaloid is precipitated by soda solution and taken up from the aqueous solution by ether, in which it is easily soluble in the fresh state. By gradual evaporation of an ethereal solution it can be obtained in crystals like those of sulphate of zinc. The portion remaining dissolved in the ether is left on complete evaporation as a kind of lac, which, although it solidifies crystalline, does not possess a definite melting-point. When crystallized from alcohol the lac-like modification is not produced, but the crystals are smaller and form a porcelain-like mass, unless the alcohol is very gradually evaporated, when the crystals are larger. Sabadine gives a yellowish colour and greenish fluorescence with concentrated sulphuric acid, the fluorescence soon disappearing, and the colour changing to blood-red and violet; nitric acid does not produce any coloration. Both sabadine and sabadinine possess the same characteristic of dissolving in alkalies, carbonated alkalies and ammonia, but separate in a flocculent form when the solutions are heated. The formula of sabadine is $C_{29}H_{51}NO_8$. This alkaloid produces sneezing like veratrine. Sabadinine is prepared from the sulphate by setting it free with an alkali and removing it from the aqueous solution by ether and chloroform. It is difficultly soluble in ether, and upon being allowed to stand quietly in cylindrical vessels, separates from an ethereal solution in hair-like crystals, generally grouped and presenting great similarity to colonies of mould. It is tolerably soluble in water, from which it is most easily taken up by chloroform. It does not show any definite melting point, beginning to soften at 160° C. and decomposing gradually at a higher temperature. With concentrated sulphuric acid it gives a persistent blood-red colour. It is easily soluble in alcohol. Unlike sabadine it does not cause sneezing. The formula given for sabadinine is $C_{27}H_{45}NO_8$.

Muawine.

From the bark of a tree known in Mozambique as "muawi," a poisonous alkaloid has been obtained by Merck, which presents a very strong similarity to erythrophlœine. In physiological action it is found by Professor Kobert to be very near to that alkaloid, but not identical with it. Muawine has been separated in a syrupy form and is believed to be amorphous. It is easily soluble in alcohol, ether and chloroform. The salts of muawine have not as yet been obtained in a crystalline form. The hydrobromate is a white powder, soluble in water, alcohol and chloroform.

Pseudoconhydrine.

A new crystalline base has been isolated from conium fruits by Merck, which has been subsequently examined by Ladenburg, who finds that it is an isomer of conhydrine, and gives the formula $C_8H_{17}NO$ for it. Pseudoconhydrine is separated by fractional distillation in vacuo from the portion of crude coniine which comes over at a high boiling point. When pure it crystallizes in needles, is easily soluble in alcohol, ether and chloroform, and melts at about 98° C.

Laurotetanine.

A new crystalline alkaloid has been discovered by M. Greshoff in several plants belonging to different genera of the Laurineæ. Hitherto only a few alkaloids have been found in plants of this family, and of these only bebeerine can be said to be well known, those occurring in *Daphnidium Cubeba*, *Haasia squarrosa*, *Cryptocarya australis* and *Daphnandra repandula* not having come into use. Laurotetanine is a powerful poison, acting like strychnine on the spinal cord and also producing tetanic spasms. It gives with Frohde's reagent a magnificent indigo-blue colour, which on the addition of water changes to yellow; with Erdmann's reagent a transitory bright blue colour, becoming brown, and with more nitric acid it gives immediately a bright red-brown, and with pure nitric acid a dirty brown. It is soluble in excess of alkali. Laurotetanine has been found in *Litsœa chrysocoma*, Bl., and *L. Javanica*, Bl., to the extent of 1 per cent.; in *Tetranthera citrata*, Nees, *T. amara*, Nees, *T. lurida*, Hassk., *T. intermedia*, Bl., *Notaphœbe umbellifera*, Bl., *Aperula sp.*, *Actinodaphne procera*, Nees., and *Illigera pulchra*, Bl. In *Haasia firma*, Bl., and *H. squarrosa*, G. and M., an alkaloid was found which seemed to bear a similar relation to laurotetanine that brucine does to strychnine, in that it required to be given in a much larger dose to produce similar results. In the fruits of *Tetranthera citrata* the same percentage of laurotetanine (1 per cent.) was found that Braithwaite obtained of an alkaloid from *Daphnidium Cubeba* (*Pharm. Journ.*, [3], xvii., p. 231), and M. Greshoff suggests that possibly the fruits referred by Braithwaite to *Daphnidium* were really those of *Tetranthera citrata*, in which case the alkaloid found would be Greshoff's laurotetanine. But the colour reactions obtained by Braithwaite from the use of sulphuric and nitric acids do not appear to correspond with those of laurotetanine. The alkaloid obtained from *Cassytha filiformis*, L., closely resembles laurotetanine, but differs slightly in colour reactions, and further experiments are needed to prove its identity. Alkaloids obtained from *Hernandia ovigera*, L., *Hernandia sonora*, L., and *Gyrocarpus asiaticus*, Willd., possess apparently paralysant properties, although presenting some resemblance to laurotetanine in the colour reactions with reagents, especially those of *Gyrocarpus asiaticus*.

Lolium temulentum.

The poisonous darnel grass (*Lolium temulentum*) is found throughout Europe, and in wet years has been frequently harvested with oats and barley in sufficient quantity to poison persons partaking of bread, or even beer, prepared from the grain. Previous chemical investigations of the seed have only shown the presence of a bitter principle decomposed by the action of weak acids. Dr. P. Antze has recently examined the constituents of the plant, both chemically and physiologically, and reports (*Arch. exp. Path. und Pharmak.*, Nov., p. 126) the isolation of a volatile alkaloid, "loliine," and "temulentic acid," which by the action of lime yields a base, "temulentine," as a decomposition product. Loliine is said to yield good crystalline salts with sulphuric, hydrochloric, oxalic and acetic acids, but too small a quantity was obtained for analysis. Injected subcutaneously into rabbits it produced a rise in temperature as well as an increase of the pulse, 0·08 gram being a lethal dose, whilst the narcotic and intoxicating action of the lolium plant seems to be due to temulentic acid and the base obtained from it. The acid, which exists to the extent of about 1 per cent. in the seeds, is obtained in crystals melting at 234° C. and possessing the approximate composition $C_{12}H_{42}NO_{19}$, and as well as temulentine yields good crystalline salts. From experiments upon frogs, rabbits and the investigator himself it appears to be twice as toxic as loliine and rapidly diminishes the heart's action, but if the depression, which is accompanied by a marked decrease in temperature, is overcome, the patient assumes a condition of high fever. Dr. Antze recommends in cases of poisoning with darnel grass the administration of emetics and purges, followed by stimulants to raise the depressed action of the heart.

Alkaloidal Constituents of the Pea and Vetch.

From an agricultural as well as physiological point of view it is desirable that the nature and quantity of organic bases contained in the more common food plants should be more fully investigated. Herr E. Schulze has examined the seeds of *Vicia sativa* and *Pisum sativum* and found (*Zeit. physiolog. Chem.*, Jan., p. 140) in the alcoholic extract of the former choline, betaine, and a third unidentified base, as well as the vicine of Ritthausen, whilst from the latter he has isolated choline and a base resembling but not identical with betaine. The quantity of choline observed, 0·02 per cent. in vetches and 0·04 in peas, is not considered by the author, however, to be sufficient to render feeding with these seeds unhealthy. Herr Schulze has also endeavoured to ascertain whether choline and betaine exist in the plant, as such, or are derived from the decomposition of other bodies during the process of extraction, and as neither lecithine nor any body yielding betaine by its decomposition could be isolated, concludes that these bases probably occur as salts of organic acids.

Poison of Toads.

The skin of toads and salamanders has lately been submitted to a microscopical examination by Herr Schultz, who finds that there are two kinds of glands present in the skin of these animals, viz., mucous and poison glands. The former are present all over the body, the latter are confined to the back of the body and limbs, and the ear region behind the eye; and in the salamander are present at the angle of the jaw. The poison glands are larger than the mucus glands in the salamander, are oval and have a dark granular look due to strongly refractive drops of poison, a good reagent for which is copper hæmatoxylin. The poison is secreted by epithelial cells lining the glands, and when the animal is stimulated electrically it is exuded slowly in drops by the toad, but discharged in a fine jet, sometimes to the distance of a foot or more, by the salamander (*Nature*, Jan. 1, p. 209). The anæsthetic action of the poison of the toad and the use to which it is put in medicine by the Chinese have already been pointed out.

Ash-free Egg Albumin.

The elaboration of a method by Professor E. Harnack for the preparation of egg albumen free from the inorganic bases and basic salts that accompany it in nature, has enabled that investigator to determine more accurately the properties of free albumin and to contribute several important observations to the physiological study of the subject (*Berichte*, xxiii., 3745). He corroborates the assertion of Hoppe-Seyler and Sertoli, based upon the elimination of carbonic acid gas from acid carbonate of soda by the action of albumen in vacuum, that albumin is an acid, showing that not only does it redden litmus paper in the free state, but that, like numerous other organic acids with complex molecules, the alkali salts are soluble, but those of the heavy metals insoluble in water. As the conditions of solution must be of fundamental importance in the consideration of albumin in vital processes, Dr. Harnack has especially investigated this point, and finds that the free acid possesses to a very high degree the property of "swelling" in water and thus forming an apparent solution. An increase of temperature within limits favours the assumption of this condition, but at a too high temperature the albumin melts, is converted into the insoluble modification, and is incapable of taking further active part in vital processes, although it may act as a shield to neighbouring living protoplasm against physical and chemical influences. From the apparent solutions, albumin, like many inorganic colloids, is precipitated by solutions of neutral salts and by most mineral but not organic acids. The precipitate is insoluble in excess of the reagent, and no chemical change or production of the insoluble modification of the albumin occurs, but this precipitation of albumin out of its aqueous solution is completely retarded by free alkalies, so that it will be seen that albumin is only able to fulfil its mission as living protoplasm in the presence of excess of bases. The free acid, in moist or dry state, shows no tendency to putrefy, even if pancreatic ferment be added, so that the necessary property of decomposing under the influence of certain lower organisms appears also confined to its basic salts. Dr. Harnack further mentions that attempts to obtain albumin or any of its compounds in a crystalline state have hitherto failed, with the exception of Hofmeister's compound with ammonium sulphate, but this he asserts only contains about 5 per cent. of albumin.

Solubility of β-Naphthol.

The solubility of β-naphthol in water is very slight, not exceeding, according to different authorities, 20 to 25 centigrams to the litre. Recently, in preparing an antiseptic liquid intended as a mouth-wash, and consisting of a suspension of β-naphthol in aqueous solution of boracic acid, M. Anotta noticed that the boracic acid appeared to favour the solution of the naphthol (*L'Union Pharm.*, Jan. 15, p. 1). Experimenting on the subject he found that a litre of water containing 15 grams of boracic acid readily dissolved 50 centigrams of naphthol. With 30 grams of acid to the litre, if 1 gram of naphthol were added to the liquid at a temperature of about 100° C., 75 centigrams remained in solution upon cooling and after keeping for five or six days at the ordinary temperature. With a saturated solution of boracic acid, 40 grams to the litre, only 5 centigrams of naphthol remained undissolved under the same conditions. These solutions were, however, very sensitive to cold, a sudden lowering of temperature causing precipitation of a portion of the naphthol. On the other hand, M. Anotta says there would be no difficulty in getting a solution containing 1 gram to the litre at the lukewarm temperature at which such liquids are generally used in surgical operations. M. Anotta also states that he found a solution of β-naphthol in boracic acid water to act more powerfully as an antiseptic than either a solution of boracic acid or a saturated solution of naphthol in water separately.

Recent Work in the Sugar Group.

The scientific world is now almost accustomed to the periodical publication of fresh information by Professor E. Fischer concerning the chemistry of the sugar group. The contributions from the Würzburg laboratory this month include the identification of two stereo-isomeric alcohols, mannitol (mannite) and sorbitol (sorbite), as reduction products of fruit sugar, and the synthesis of a sugar of the biose or $C_{12}H_{22}O_{11}$ series, isomeric with maltose (*Berichte*, xxiii., 3684). Mannitol has already been obtained from fruit sugar, but from theoretical considerations Professor Fischer thought it probable that a second alcohol might be produced by the reduction of the ketone group of this sugar to an alcohol group, whereby the carbon atom becomes asymmetrical, and that since sorbitol had been recently recognized as the corresponding alcohol to glucose, the isomeric alcohol from fruit sugar might be expected to be the same. This hypothesis proved to be correct, mannitol and sorbitol being obtained in about equal quantities by reduction with sodium amalgam, the result agreeing with the observation of Wallach in the essential oils and Piutti in the asparagine group, that by the synthesis of compounds containing asymmetric carbon atoms optically active stereo-isomeric products may result that do not combine with each other to form inactive modifications, but can be readily separated by crystallization. The formation of bioses from the monoses, or sugars of the $C_6H_{12}O_6$ type, has long been an unfruitful field of work, but from the products resulting from the action of cold hydrochloric acid (sp. gr. 1·19) upon glucose Professor Fischer has at length been enabled to isolate, by means of the phenylhydrazine compound, a sugar that, like maltose, splits up into two molecules of glucose, but differs in some minor particulars, and may probably be identical with the new sugar recently observed by Scheibler and Mittelmeier in commercial dextrin.

Piperazidine.

According to a paper communicated to the Berlin Chemical Society (*Berichte*, xxiii., 3723), the compound referred to last month (*ante*, p. 557) as having been placed in the market under the names of "synthetic spermine," "Ladenburg's ethyleneimine" and "piperazidine," is identical with diethylenediamine $C_2H_4{<}\begin{smallmatrix}NH\\NH\end{smallmatrix}{>}C_2H_4$, obtained some years since by Professor A. W. v. Hofmann as the product of a reaction between ammonia and ethylene chloride.

Rose Oil.

During the last few weeks two communications have appeared upon the chemical composition of rose oil. In the first (*Berichte*, xxiii., 3191) Heir Markownikoff states that the stearoptene, or solid portion of the oil, possesses all the properties of a paraffin; it melts at 36·5°C., is perfectly odourless, and is without any value as a constituent of the oil. The eleoptene, or liquid portion, boils almost entirely within narrow limits; it consists of a mixture of two bodies, having the composition represented by the formulæ $C_{10}H_{20}O$ and $C_{10}H_{18}O$, of which only one, the principal constituent of rose oil, is of an alcoholic nature. This led Professor Poleck to publish the results of some comparative experiments with rose oil of German and Turkish origin that have been made at Breslau (*Chem. Zeit.*, Jan. 10, p. 32). The German oil is described as solid at ordinary temperature and liquid at 28° C., pale greenish in colour, and having a fine odour. It contains 28·9 per cent of stearoptene, consisting of two solid hydrocarbons, melting at different temperatures. It begins to boil at 70° C., giving a distillate that consists, after acetification, of about 5 per cent. of ethyl alcohol. The remaining liquid portion of the oil boils constant at 216°, and consists of a primary alcohol, having the composition $C_{10}H_{18}O$. The entire chemical behaviour of the liquid portion of German rose oil, according to Professor Poleck, corresponds with that of the Turkish rose oil, and is analogous to that attributed by Herr Semmler to Indian geranium oil from *Andropogon Schoenanthus* and its principal constituent, geraniol. Both bodies are primary alcohols and their aldehydes are identical.

Exsiccators.

Although a great variety exists in the forms of exsiccators, it is found that their employment is not attended with great success unless a considerable diminution in the volume of enclosed air is also effected. Herr Hempel (*Berichte*, xxiii., 3566) points out that a gross error is frequently made in placing the drying agent (sulphuric acid, calcium chloride, etc.), at the bottom of the vessel, since the damp air being lighter than dry it remains in the upper part of the vessel. The mixture through diffusion of the different gaseous layers in an exsiccator takes place but slowly, for although diffusion occurs with great rapidity between two gases of widely differing specific gravity, this is not the case when an extremely gradual change in the specific gravity obtains. But if the general order be inverted and a dish containing pieces of calcium chloride, or pumice-stone saturated with sulphuric acid, be placed upon a high tripod under a bell-jar and the substance to be dried upon the bottom of the exsiccator, it will be found according to Herr Hempel that evaporation occurs three times more rapidly than under ordinary conditions, owing to the formation of strong air-currents, due to the dry air streaming downwards and the moist air taking its place in the neighbourhood of the drying material. Herr Hempel also finds that if a mixture of ice and salt be placed upon the top of the bell-jar, water separates in solid form in spite of the presence of sulphuric acid, and violent gas streaming is produced by the great differences of temperature within the exsiccator, so that in this case a low temperature acts as a better drying agent than chemicals.

Mexican Materia Medica. An appendix to the Mexican Pharmacopœia has recently been issued, including some well known articles of materia medica, such as *Aspidosperma Quebracho*, *Rhus Toxicodendron*, and others, and a few which seem to possess powerful properties, inasmuch as they are poisonous in moderate doses. One of these is *Rourea oblongifolia*, Hook. et Arn. (Connaraceæ), the seeds of which possess tetanic properties and are used as well as the roots for poisoning prairie wolves (coyotes). Like *Strychnos Gautheriana* in the east, this tetanizing drug is used in medicine for skin diseases. Another is *Helenium mexicanum*, which contains a poisonous alkaloid called "andrealfonsine." The powdered plant is used as a powerful errhine. A third, *Senecio Grayanus*, Henck., contains, according to Henckel, a glucoside resembling digitalin in its action; and a fourth, *Senecio tolucanus*, DC., yields the crystalline alkaloid toxisenecine, to which the tetanic property of the plant is probably due. The tincture of *Senecio Grayanus* is used externally as an analgesic. *S. cervirariæfolius*, Henck., appears to be used as well as *S. Grayanus* under the native name of "matarique," "maturin," or "guereña" (*Am. Journ. Pharm.*, Jan., p. 1).

Chinese Ginger. In the Kew *Bulletin* for January (p. 5) an interesting account is given of the identification of the plant yielding the rhizome employed to make the well-known Chinese preserved ginger. As long ago as 1878 Dr. E. Percival Wright, of Trinity College, Dublin, called the attention of Mr. Thiselton Dyer to the fact that the preserved ginger has very much larger rhizomes than *Zingiber officinale*, and that it was quite improbable that it was the produce of that plant. The difficulty in identifying the plant arose from the fact that, like many others cultivated for the root or tuber, it rarely flowers. The first flowering plant was sent to Kew from Jamaica by Mr. Harris, the superintendent of the Hope Garden there. During the past year the plant has flowered both at Dominica in the West Indies and in the Botanic Garden at Hongkong. Mr. C. Ford, the director of the Botanic Garden at Hongkong, has identified the plant as *Alpinia Galanga*, the source of the greater or Java galangal root of commerce. Mr. Watson, of Kew, appears to have been the first to suggest that the Chinese ginger plant is probably a species of *Alpinia*, and possibly identical with the Siam ginger plant, which was described by Sir J. Hooker in the *Botanical Magazine* (tab. 6946) in 1887 as a new species, under the name of *Alpinia zingiberina*. Mr. J. G. Baker, in working up the Scitamineæ for the 'Flora of British India,' arrived at the conclusion that it is not distinct from the *Alpinia Galanga*, Willd. The Siam and Chinese gingers are therefore identical, and both are the produce of *Alpinia Galanga*, Willd.

Saffron. It is not often that teratological knowledge is turned to practical account in producing drugs. This, however, is being done with respect to saffron. Some years ago M. Chapellier exhibited before the Paris Horticultural Society flowers in which the stamens and petals bore stigmatal appendages. He has recently shown before the same Society a flower with nine well-formed stigmas. He now proposes to attempt to develop and fix this malformation (*Gard. Chron.*, Jan. 10, p. 50) and thereby increase the yield of saffron.

Manna. *Lecanora esculenta* has long had the reputation of being possibly the manna of Scripture, and a recent record seems to point in the same direction. The director of the Central Dispensary at Baghdad has sent to *La Nature* a specimen which has been identified as this lichen, and which fell during an abundant shower in the neighbourhood of Merdin and Diarbekir in Asiatic Turkey in August, 1890. The inhabitants collected the manna and made it into bread, which is said to have been very good and very easily digested. The specimen sent was in the form of small yellowish spherules, whitish inside (*Nature*, Jan. 15, p. 255). This lichen, however, does not seem perishable, like the manna of Scripture, at all events in the dried state, as it will keep for years. It is possible, however, that in the wet state it may be readily attacked by insects.

Effect of Light on Spines. In a note by M. A. Lothelier (*Compt. Rend.*, cxii., p. 110), it is stated that in *Berberis vulgaris*, *Robinia pseudacacia*, *Ulex europæus* and other plants, the formation of spines is dependent on the access of light. Plants grown in comparatively little light present very few spines, but those grown with free access of it have more numerous, more differentiated and more developed spines. M. Lothelier has observed that the loss of assimilation power caused by the development of spines is usually balanced by the stronger growth of axillary leaves.

Cultivation of Bacilli. In a note by Mr. Edington, read at the last meeting of the Edinburgh Botanical Society, it was pointed out that the appearance of the culture of *Bacillus arborescens* definitely varies according to the amount of gelatine used. In the denser media the arborescence is less marked. The temperature of the room, by affecting the density of the medium, led also to a change in the appearance of growth. A record of the temperature should therefore be kept when experiments with bacteria are being carried out, as identification of species would thus be more readily accomplished (*Gard. Chron.*, Jan. 17, p. 86).

The Pharmaceutical Journal.

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CONFERENCES OF CHEMISTS AND DRUGGISTS WITH THE PRESIDENT.

The meetings that have taken place since those referred to in last week's Journal suggest a variety of considerations which could scarcely be dealt with in the limits of a single article, and therefore while referring to the several reports we propose to confine any remarks upon the proceedings to some of the more salient points brought out by the speakers. At all of these meetings the definite expression of opinion was as fully in favour of the Bill as it stands as it was at Aberdeen and Dundee. In each instance the majority of those present voted for the proposition that the Pharmaceutical Society deserves the support of the entire trade in its endeavours to promote further legislation in the interests of pharmacy. But there was, notwithstanding, unmistakable evidence of considerable difference of opinion as to matters of detail, and also of an undercurrent of opposition that was not precisely declared, and, as we suggested last week, was probably based upon desires that could not well be definitely stated. At the Glasgow meeting, the first note of discord was struck by Mr. KINNINMONT, not so much in regard to the draft Bill under consideration as in reference to the interpretation which the existing Pharmacy Act has received at the hands of the law courts. Mr. KINNINMONT, as our readers are aware, considers this is of less account than the intention of those who, on behalf of chemists and druggists, took part in framing the Act of 1868. He maintains that the qualification of the master or proprietor of a business was the point insisted upon by that Act, and that it is a monstrous error of the judges administering the Act in the interests of the public to decide, on the one hand, that as qualification was required for the performance of certain duties solely in order to protect the public interest, their performance by any legally qualified person, whether master or servant, is sufficient for that purpose, and that, on the other hand, no person without a legal qualification can lawfully perform those duties independently. He therefore demands that the Pharmaceutical Society should endeavour to establish an interpretation of the Act of 1868 which would confer upon registered proprietors the monopoly of the sale of poisons and of the dispensing of medicines containing poison, while also entitling them to delegate those duties to whomsoever they please. This is a demand directly opposed to the view taken by the judges and by the Government as to the meaning of the Act and what is requisite for the safety of the public. Moreover, it is one that does not commend itself in a general way as indicating that respect for logic with which the Scottish mind is credited, and its weakness is rendered evident by Mr. KINNINMONT'S own suggestion of an explanatory clause, specifying "a man carrying on business on his own account" as the person who is to be lawfully entitled to sell poison. If such a provision were made law it would not materially, if at all, alter the present position of the master of a business where there are no qualified assistants, and it would moreover debar registered persons acting as assistants from performing those duties which they are now entitled by their registration to perform. Mr. KINNINMONT'S remedy would therefore be worse than the disease he complains of, and it is as little likely to be approved of as his idea that a registered proprietor should be entitled to delegate his special functions to whomsoever he pleases is likely to find favour with the Government, the judges, or the public.

The feeling of sympathy expressed by Mr. LAING for unregistered assistants who have been many years engaged in the business is not altogether necessary. Even a strict application of the view taken by the judges as to registration being the only criterion of qualification for certain duties would not exclude unregistered persons from employment in the general routine of a chemist's business or in the sale of poison and dispensing of medicine under proper supervision. They would not be compelled to undergo examination, or be crowded out of existence, and their only disability would arise from the fact of not being registered, but that is unavoidable if the responsibility of masters is to have any real meaning in the public interest and if their position in that respect is to be of any value to themselves. It is in fact curious to see the interest taken in unregistered assistants, and in claiming for them certain privileges belonging to registered persons, except that of keeping open shop, and it is probably to the causes underlying that interest that most of the objection to the recent judicial interpretation of the Pharmacy Act must be attributed.

In regard to the subject of education the expressions of opinion at the Glasgow meeting were for the most part in favour of the proposed curriculum, though the disadvantage under which it might place chemists in country districts in obtaining apprentices was not overlooked. But this consideration appears to be exaggerated when it is remembered that in Scotland lads are generally apprenticed in the places where they reside. If the resources of those places do not provide means of instruction during apprenticeship, it would be necessary to supplement that period by taking a position as assistant or improver in a town where instruction could be obtained or by attendance at a school. We cannot, however, think with Mr. Boyd that these necessities would have the effect of shutting up the chemists' shops in country places. The grounds on which Dr. Lees moved an amendment to show disapproval of the whole Bill furnished another marked illustration of the want of logical sequence. The state of things he described as existing in Glasgow may be a reason for his approval of Justice Hawkins' decision, but it is scarcely a reason for decrying the only organization through which the trade can hope to provide a remedy for the evils he spoke of.

The meeting at Edinburgh, last Friday week, was very well attended, and was probably one of the largest meetings of registered chemists ever held in Scotland, the number being not much short of 170. Mr. Carteighe delivered a very full exposition of the functions of the Pharmaceutical Society, and of its relations on the one hand as a voluntary Society to its members, and on the other hand in relation to the Government and the public. He stated the reasons which had led the Council, in framing a Bill, to adopt the draft now under consideration, and to abstain from introducing proposals to interfere with company trading. He showed that the powers sought for by the Council, while necessary for the reform of the educational system, could only be acted upon by the consent of the members of the Society, and with the approval of the Privy Council acting in the interest of the general public. He further showed that the proposed educational system was intended to facilitate the studies of apprentices, to reduce rather than increase their cost, and to make the passing of the qualifying examination less a matter of chance and more an indication of competence than it can be under existing conditions. These he contended were objects not only beneficial to apprentices but calculated to improve the future position of pharmacists, and also to be advantageous in their effects to the public. The proposed reconstitution of the Pharmaceutical Society was shown to open the way for the members of the trade to remove the reproach under which they lie of being a disunited and consequently powerless body. The proposed Bill, if passed, would enable every registered person to become a member of the Society, to have a vote in the election of its executive body, and all the members of the trade to unite in exercising their organized influence for the protection of their general and individual interests. It is only under such conditions that the trade can expect the Society to take the position of its representative, and that it could have the power to act efficiently in that capacity. In reference to the subject of company trading, it is above all things indispensable that the Society should have the support of the entire trade in any steps that may be taken, and it is altogether a reversal of the natural order of things for chemists to say that when company trading is suppressed they will become members of the Society, and give it their support.

The meetings at Dumfries and Carlisle on Monday last were also well attended, although the former had only been hurriedly arranged. In both instances the discussion was directed chiefly to the subject of pharmaceutical education, and there was general concurrence in the opinion that a better system was much wanted. The meeting held at Brighton on Thursday evening before the annual Ball of the Brighton Association of Pharmacy was preceded by a dinner at which Mr. Marshall Leigh entertained the President and a number of Brighton chemists. At the meeting the chair was taken by Mr. Savage, the President of the Association, who proposed a resolution approving of the Pharmacy Bill. After the President had addressed the meeting the motion was seconded by Mr. Histed, and carried unanimously.

KOCH'S REMEDY FOR TUBERCULOSIS.

Great satisfaction is felt in medical circles that Koch has made public in a measure the nature of the fluid popularly known as "Koch's remedy" for tuberculosis. He has also related the steps by which this deeply interesting and important discovery was made. If a healthy guinea-pig be inoculated with a pure cultivation of tubercle bacilli, the inoculation wound generally becomes sealed and seems to heal up during the next few days. In from ten to fourteen days a hard nodule forms, which ulcerates and persists as an open sore until the death of the animal. When a tuberculous animal is inoculated the case is very different; the inoculation wound is sealed from the first, no nodule forms, and a peculiar change takes place at the point of inoculation. On the first or second day the spot and the tissue around become hard and dark-coloured. Gradually the epidermis is thrown off, and a flat ulcerated surface remains, which quickly and completely heals. If instead of active cultures solutions weakened in various ways be used, the results are modified. Such cultures injected in healthy guinea-pigs produced only local suppuration, whereas tuberculous guinea-pigs were killed quickly even by small doses. When the solutions were greatly weakened and injected at intervals in tuberculous animals their condition improved and ultimately recovery followed. These facts led Koch to believe that the therapeutic value of the substance injected did not depend on the bacilli contained in the solution, but on some soluble substance which could be absorbed into the circulation. Eventually he succeeded in extracting this substance from pure cultivations of tubercle bacilli, by means of glycerine. For practical purposes the fluid used for injection is described by Koch as *a glycerine extract of pure cultivations of tubercle bacilli.* Of course the chemical constitution of the active principle can as yet be only a matter of conjecture, and those who have watched the effects on patients of even small doses will readily agree with its discoverer, "that we have to deal with a substance the action of which on the tuberculous organism far surpasses that of the strongest drug known." Koch believes the quantity of active principle present in the extract to be in all probability very small, indeed he estimates it at fractions of 1 per cent. The details of the steps by which the discovery was made, the composition and probable mode of action of the remedy, were published in the *Deutsche medicinische Wochenschrift*, January 15. It is a matter of some interest that the preceding issue of the *Wochenschrift* (January 12) contains a long report of some remarks on the effects of this remedy by the eminent pathologist, Virchow, which was made in the course of a discussion at the Berlin Medical Society. Professor Fraenkel exhibited at the meeting a large number of preparations obtained from necropsies of patients who had died subsequent to inoculations for tubercular disease of various organs. The gist of the Professor's remarks was to draw attention to the fact that the potent effects which we can actually observe the fluid produce on the external parts, such as the skin, as in lupus, also occur in the hidden organs, such as the intestines, membrane of the brain, mucous membrane of the larynx and the like.

It requires very little pathological acumen to see that if a tuberculous patient, suffering from ulcer of the intestine, or latent tubercle of the brain, have these foci of disease suddenly aroused by an injection of the remedy, such severe disturbance will ensue as is incompatible with life. Virchow's remarks are capable of even broader interpretation than this, but the most important outcome will be to teach us that it is not sufficient to ascertain the existence of tubercle in a patient and then at once proceed to treat it by injections of Koch's lymph. Careful examination by expert clinical observers is most important to ascertain, not merely the nature of the malady, but many circumstances secondary to it, which are of the utmost importance in determining the safety and probable effects that will follow the injection of the lymph. Indeed, the precautions necessary to be observed in the employment of this powerful agent are such as should surround the administration of the most powerful drugs recommended in the Pharmacopœia.

THE REGISTERS AND CALENDAR FOR 1891.

The receipt from the Registrar of early copies of the Registers of Pharmaceutical Chemists and Chemists and Druggists and the Calendar of the Pharmaceutical Society for 1891, suggests the opportuneness of a reference to the frequently ignored service rendered to chemists and druggists in the publication of these volumes, and especially the first-named. It is too often forgotten that not only was the Register originally compiled entirely at the expense of the Pharmaceutical Society, but that since 1868 the duty of revising and publishing it annually has been performed by the Society without any assistance from registered persons outside its ranks, although the Register constitutes the sole legal evidence of their qualification. Pending the publication of the exact statistics, which will be presented to the Council next week, it may be stated that the Register for 1891 contains more names than that for 1890, notwithstanding that upwards of 250 names were erased at the end of the year by the Registrar, acting under the powers vested in him by section 10 of the Pharmacy Act. The Calendar of the Pharmaceutical Society is now a pretty well known volume. It contains—besides the Charter and special Acts of Parliament the new schedule and particulars of the examinations, examination papers, and the lists of members, associates and apprentices—a useful collection of the laws, orders in council, excise regulations, etc., that affect the chemist and druggist in carrying on his business. This information is carefully brought up to date, and much of it is, by the courtesy of the heads of various departments, subjected to a quasi-official revision. Among the new items in the present volume may be mentioned the Act passed last session to amend the Irish Pharmacy Act, the new scales of medicines issued under the Merchant Shipping Act, the latest memorandum from the Standards Department on the Weights and Measures Act, and various alterations in the excise regulations subsequent upon the last Revenue and Customs Act. In addition the Calendar contains a full list of the subscribers and donors to the Benevolent Fund and a statement of the votes to which they are entitled.

We have received a communication from the London County Council, calling attention to the fact that the Act now in force relating to weights and measures requires that weighing instruments "used for trade" shall be verified and stamped by an inspector of weights and measures, and that any person so using an unstamped weighing instrument is liable to a penalty. The term "used for trade" is defined by section 19 of the Act to refer to "every contract, bargain, sale or dealing made or had in the United Kingdom for any work, goods, wares or merchandize or other thing which has been or is to be done, sold, delivered, carried or agreed for by weight or measure." Looking to the wide nature of this definition it is suggested that it would be wise of chemists to send in for verification all scales used for business purposes. Information indicating the steps to be taken in compliance with the Act has been advertised in the newspapers and placarded throughout London at police stations, vestry halls, and on hoardings. Regulations, under the Act, for London will be published when finally settled and confirmed, and they will practically be instructions to inspectors how to do their work.

* * *

The Chemical Society, having been founded in 1841, is now in the fiftieth year of its existence, and is the eldest among our chemical societies. Arrangements have been made to celebrate this important occurrence in the history of the Society on February 24th and 25th next. On February 24th a meeting will be held at 3—5 o'clock p.m. at the Society of Arts, where the original meeting took place at which the formation of the Society was decided on. At this meeting various addresses will be delivered, and delegates from other societies will be received. On the evening of the same day, at 8.30 o'clock, the President and Council will hold a reception at the Goldsmiths' Hall, which has been placed at the disposal of the Society for the purpose by the Worshipful Company of Goldsmiths. On the evening of February 25, at 6·30 for 7 p.m., the Fellows and their friends will dine together at the Hotel Métropole.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Wednesday, January 28.

Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Berrill, Edith Annie	London.
Bickerton, Richard Exley	Barnsley.
Birch, John	Eastbourne.
Bruce, William	Larkhall.
Callaway, Alfred James	Salisbury.
Calvert, William	Carlisle.
Carter, Henry George	Birmingham.
Fowler, Frank	Little Lever.
Gladstone, Arthur	Sowerby Bridge.
Harper, Theophilus	Belfast.
Male, Trevan Bersey	Plymouth.
Morris, Edward Joseph	Walsall.
Peet, Major Flintham	Sheffield.
Simpson, Henry	Dunfermline.
Treadwell, Samuel Ernest D.	West Dulwich.
White, Henry Fox	Clifton.

The Report of the College of Preceptors on the Examination held on January 13 was received.

Three hundred and seven candidates had presented themselves for examination, of whom *one hundred and fifty-three* had failed.

The following *one hundred and fifty-four* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Aitchison, David Alex. C.	Coventry.
Aitken, William Paton	Markinch.
Allday, Louisa	Birmingham.
Allgood, Charles Alfred	London.
Ashburner, Harry	Barrow-in-Furness.
Ashdown, Wm. Percy Charles	Brighton.
Ashford, Stanley	Exeter.
Averill, Cecil Hanson	Stafford.
Badman, William Robert	Red Hill.
Barker, Charles	Bishop Auckland.
Bentley, Charles Albert	Chipping Norton.
Bertules, Prosper	London.
Blackmore, Frank	Weston-super-Mare.
Bowker, James Skinner	Radcliffe.
Braund, Henry	London.
Breeze, John Albert Edmund	Pontesbury.
Breeze, Joseph Ernest	Brierley Hill.
Caldwell, Alexander Smith	Shotts.
Carless, Reginald Wallows	Cheadle.
Chalmers, James	Aberdeen.
Chapman, Herbert	York.
Charlton, Tyson Edward	Stocksfield-on-Tyne.
Cheyne, William Alex.	Fordyce.
Cleave, Reverdy	Pontefract.
Cole, Claude	Bournemouth.
Collie, John	Peterhead.
Collier, Frederick Harrison	Erdington.
Cox, Hugh	Eastbourne.
Davis, George Ernest	London.
Davis, John Butler	London.
Dean, Arthur Shiers	Ilkley.
Dobson, George Nelson	Morpeth.
Durance, William Arthur	Sileby.
Eaton, Robert	Sutton, Surrey.
Ellis, John	Leicester.
Fairley, Alexander	London.
Fanshawe, Robert Percival	Leicester.
Fell, Thomas	Newcastle-on-Tyne.
Flitcroft, Thomas Edward	Hindley Green.
Forbes, John	Macduff.
Forrest, Arthur	Sheffield.
Gambling, John Pattison	Sheffield.
Garbutt, Charles Holmes	Shildon.
Gay, Ernest William	Camborne.
Gibbs, Ernest Bromwich	Banbury.
Gilchrist, Adam	Rothie Norman.
Gill, Josiah	Melton Mowbray.
Green, Hugh	Darlington.
Guy, Samuel	Newbury.
Gwilliam, John Everall	Warminster.
Haley, Benjamin Pawson	Bradford.
Hall, Robinson Peverley	Sunderland.
Hamerton, James	Oundle.
Hanson, Thomas Arthur	Huddersfield.
Hare, Harry	York.
Harries, William George A.	Narberth.
Harrison, John George	Sunderland.
Heathcote, Joseph Clee	Winster.
Heworth, James Henry	Leeds.
Hinde, Ernest Lionel	Stoke Ferry.
Hollingworth, John Lawrence	Barnsley.
Hornby, Frederick William	Luton.
Jepson, Ewart	Darwen.
Jepson, Thomas	Nottingham.
Johnson, Albert Edward	Stoke-on-Trent.
Johnson, Jos. Cornelius Trim	Falmouth.
Jones, Benjamin	London.
Jones, Henry Lloyd	Abergele.
Jones, Henry Rogers	Bala.
Josty, Waldemar	Cardiff.
Kearsley, William Thomas	Stokesley.
Keeley, James P.	Blackburn.
Keene, Harold	Bournemouth.
Keir, Robert	Dunfermline.
Kelf, Henry David	Reading.
Keller, Frederick	Glasgow.
Kemp, Leonard John	Southsea.
Kitley, Sydney	Bath.
Knight, William John	Aberdeen.
Laister, John Willie	Wakefield.
Laverack, Clyve Cordukes	Malton.
Lawson, Richard Herbert	Southampton.
Lean, Wilfred	Ackworth.
Lee, Richard	Mexborough.
Leitch, William Alfred	London.
Lewis, Richard	Portmadoc.
Lilley, Arthur	London.
Lindsay, Robert Macintosh	Dundee.
Lisle, Francis Rouget de	Cambridge.
Lofthouse, John Willie	Oughtibridge.
Lyle, James Alexander	Bradford.
McBride, Alexander	Moffat.
McBryde, James	Stirling.
McMillan, David	Glasgow.
McVitae, John Brough	Melrose.
Marshall, Gervas Gilbert	Cheadle.
Martin, Henry Arthur	Lincoln.
Martin, William Francis	Leith.
Mennie, James	Golspie.
Merrikin, Sidney Herbert	Louth.
Michie, James	Tillicoultry.
Miller, Harold	Grantham.
Moate, Edgar Vernon Ben	Birmingham.
Morrison, John Lawson	Insch.
Morrison, William	Insch.
Newman, James Joseph	Cardigan.
Nicol, Thomas	Tain.
Nield, Walter	Tarporley.
Nuttall, Maurice William	Alfreton.
Officer, Colin	Montrose.
Palmer, James Marsh	Wymondham.
Parsons, Alfred Clive	London.
Peacey, Ernest	Tewkesbury.
Penman, David	Lochgelly.
Perkins, Catherine Susan	Birmingham.
Philip, George T.	Aberdeen.
Pilling, John William	Halifax.

Priestman, William	Penrith.
Pye, Harry	Walthamstow.
Racine, Frank Gerald	Southampton.
Ravell, Matthew	Billinghay.
Read, Thomas	Bristol.
Roberts, Arthur Jno. Herbert	Pontypridd.
Rockliff, John Thomas	Crewe.
Rossiter, Benjamin	Amlwch.
Round, William Henry	South Stockton.
Rutter, James	Tarporley.
Sales, Charles Henry	Chichester.
Samuel, Harry Thomas	London.
Seaborne, Herbert William	Barnsley.
Seagrave, William Edward	Clevedon.
Short, Richard Edward	Swinton.
Simpson, James Hill	Market Drayton.
Smith, Charles Edward	Lower Tooting.
Smith, Henry Edmund Lee	Leek.
Stonham, Douglas	Maidstone.
Taylor, Thomas Rolf	Leyton.
Teale, John Oliver	Rhyl.
Thompson, Wilson	Nottingham.
Todd, William Oliver	Cornhill-on-Tweed.
Tripp, Philip Nassau	Hull.
Varey, Maynard	York.
Ward, Ernest Baker	Leicester.
Walker, James Davidson	Kenmay.
Watt, Robert	Glasgow.
Weale, William John	Brynmawr.
Williams, John Foulkes	Ystrad.
Wilson, George McLanachan	Old Cumnock.
Wood, Francis Henry	Liverpool.
Wormald, Willey Battye	Leeds.
Wrather, Thomas Edward	Bewdley.
Wroe, Harry	Wakefield.
Wybom, John Gerald	Bromley, Kent.
Yates, William	Shaw.

The questions set at this examination were published in the *Pharmaceutical Journal* for January 17, p. 624.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	17	9	8	Inverness	5	3	2
Aberystwith	1	0	1	Lancaster	2	1	1
Birmingham	15	10	5	Leeds	17	10	7
Brighton	6	4	2	Lincoln	5	3	2
Bristol	7	4	3	Liverpool	14	6	8
Cambridge	3	2	1	London	40	19	21
Canterbury	1	0	1	Manchester	20	9	11
Cardiff	10	5	5	Newcastle-on-T.	11	6	5
Carlisle	4	1	3	Norwich	3	1	2
Carmarthen	5	2	3	Nottingham	14	8	6
Carnarvon	7	4	3	Oxford	4	3	1
Cheltenham	1	0	1	Penzance	2	2	0
Darlington	6	5	1	Peterborough	4	1	3
Douglas	2	0	2	Sheffield	8	6	2
Dundee	10	3	7	Shrewsbury	3	1	2
Edinburgh	17	7	10	Southampton	9	5	4
Exeter	2	1	1	Worcester	4	2	2
Glasgow	13	5	8	York	8	5	3
Hull	7	1	6				

Provincial Transactions.

SOUTHAMPTON CHEMISTS' ASSISTANTS' AND APPRENTICES' ASSOCIATION.

On Wednesday, January 14, Mr. King (one of the Vice-Presidents) read the first paper of the session of the above Association.

Mr. T. Poslethwaite occupied the chair. The paper was upon "The Medicinal Official Plants of Hampshire."

The lecturer commenced by saying that Hampshire possesses a somewhat extensive flora. The number of species enumerated by Mr. Townsend in his 'Flora of Hampshire' as occurring in the mainland of Hants and in the Isle of Wight, amount to about 1100, inclusive of ferns and grasses. According to the same gentleman Hampshire takes rank among the southern counties before Sussex, Surrey, Dorset, Berks and Wilts as possessing a greater number of species of plants within its borders, the respective positions of the several counties in this respect being as given. His intention was not, however, to speak of the flora of Hampshire generally, but to make a few remarks upon such official medicinal plants as are to be found within the borders of Hants; his object being mainly to point out which of the plants mentioned in the B.P. are likely to be met with in country rambles, and to give some general idea as to the parts of the county and the situations in which they have been already found. Many of the data as to the occurrence of these plants, the speaker said, had been drawn from Mr. Townsend's flora, and some also from Dr. Bromfield's "Flora Vectensis," an excellent work on the Isle of Wight written about fifty years ago. The only official medicinal plant really native to Britain that could not be included in this list was the bear-berry (*Arctostaphylos Uva-Ursi*), which was not, he believed, found to the south of Yorkshire. The number of plants to be referred to was about thirty. Some few of the plants to be mentioned were merely naturalized in the county, but were included, as it was quite possible they might be met by some present during their rambles about the county. Mr. King then gave a brief history and outline of the following plants:—Aconite, belladonna, hyoscyamus, stramonium, digitalis, opium poppy, red poppy, lettuce, dandelion, chamomile, coriander, caraway, fennel, hemlock, mezereon, black and white mustard, horseradish, linseed, hop, peppermint, pennyroyal, colchicum, oak, willow, elder, rose, Scotch fir, juniper, black alder, broom, valerian, male fern. Mr. King concluded by remarking that besides the official plants of Hants, hundreds of other plants were growing in their midst, which either have been or still are used for the various diseases that flesh is heir to, but of these time did not permit him then to speak, his main object having been to arouse fresh interest in the studies of botany and materia medica, and to induce those who might be interested in these subjects to go and seek for themselves, and thus to gain a more vivid acquaintance with the various forms of plant life.

A hearty vote of thanks was then passed to Mr. King for his long and interesting paper, which Mr. King acknowledged by some further remarks.

Then several members entered into a discussion upon various plants and their preparation.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The first annual dinner of this Society was held in the Falcon Restaurant, Lord Street, on Thursday, 15th inst., the President of the Society, Mr. H. Wyatt, junr., being chairman.

The company numbered about seventy, and included Dr. F. C. Larkin, Dr. Symes, Mr. Ed. Evans, jun., Mr. W. P. Evans, Mr. Overton (Sumner and Co.), Mr. M. Conroy, Mr. J. T. Conroy, B.Sc., Mr. J. S. Ward, Mr. J. R. Bain, Mr. W. Wellings and other well known pharmacists.

After dinner the usual toasts were given, viz., "The Queen," "The Pharmaceutical Society," "The Medical Profession," "The Wholesale Trade." and "The Visitors." During the evening an attractive programme of vocal and instrumental music was rendered by members and friends.

MEETING OF CHEMISTS AND DRUGGISTS IN GLASGOW.

A meeting of the chemists and druggists of Glasgow and neighbourhood was held on the evening of the 22nd inst., in the Waterloo Rooms, Glasgow, to consider the draft Pharmacy Act Amendment Bill, approved by the Council of the Pharmaceutical Society and hearing its provisions explained by Mr. Carteighe.

There was a large attendance.

Mr. M'Adam, Manager of the Glasgow Apothecaries Company, who presided, said:—You are all aware of the object of this meeting, namely, to hear from Mr. Carteighe an address on the draft Pharmacy Act Amendment Bill and kindred subjects, after which the meeting will be thrown open for any one to ask questions and make remarks on proposals, but before I call on him I feel it due to you, to Glasgow and to myself, to say a few words. After the last Committee meeting here, a report of which appeared last week in one of the trade journals, some explanation is necessary as to why we are here. It was only on receiving the notice calling the meeting that I learned we were to have a meeting after all, and only then learned I was to be Chairman, though the Secretary has since informed me that he called at Virginia Street and found me absent. It seemed that when Mr. Rutherford Hill heard the result of that meeting he came through from Edinburgh, and saw one or two of the Committee and urged them to have a meeting, the result being that the Edinburgh circular was copied and issued. On observing that the circular invited registered chemists only, I intimated to the Secretary that I would take the chair only on condition that the meeting was open to any one connected with the trade, as assistants and apprentices are equally interested in the proposed Bill. Upon that understanding it was agreed to invite Mr. Carteighe to Glasgow. I would have even liked to have with us a fair representation of the medical men interested in the questions to come before us. But they seem to be asleep. It would be better that they knew now what the proposed changes are, rather than that they should wake up to know them only after the Bill has passed, if pass it does. The same may be said as regards chemists; too many, I am afraid, remain, if not ignorant, at least passive, forgetting that now is the time to approve or disapprove of the measure, and not wait till it should pass and then raise a howl and say that is not what they wanted. You are to-night to consider and say if the draft Bill is what you want. Look at it not in any narrow or selfish way; look at it as to how it will affect not only ourselves in the larger towns, but also as to how it will affect our country brethren. It is not for me as Chairman to enter into a criticism of the various clauses, that I leave for you to do, after you have heard the President's address, but I would say, that whilst our young men cannot be too highly educated, I am bound to ask myself if what is sought in the way of compulsory curriculum is what is wanted. Is it, for instance, what the chemists, their assistants and their apprentices in the smaller towns of Scotland want? This and other questions arising out of it must be faced. Then there is the dispensing clause, No. 7. Are you prepared to say that the assistant you leave behind you when you require to leave your shop to come to any future meeting to be addressed by your President, or to have to leave it for any other reason, must be not only competent but registered? If you are, have you considered how the provincial chemists will be affected by this clause? I am sure we are at one in being pleased at seeing Mr. Carteighe among us, for we have heard so much of him otherwise and have learned to admire him for his genius and courage. He needs no introduction from me. I simply ask you to give him a patient and attentive hearing, and a hearty welcome.

Mr. Carteighe then proceeded to explain the provisions of the Bill, and at the close said he had come to Glasgow because he thought his brethren in the trade did not understand the Bill, and further it was a pleasure to make their acquaintance. He was himself a chemist and druggist and had had a long apprenticeship at the whole business. He had given the Society a fair part of his time, and it was proposed to get rid of every feeling of jealousy. He asked whether they and other members of the trade would not come into the Society. If this Bill was to pass, it would require the support of the whole trade. The time of the House of Commons was absorbed with political matters, and chemists must show some accord before there was the slightest chance of the Bill passing. There were 4000 members in the Society, but if it had 12,000 their weight would tell upon the Legislature. He wished they would during the next few months decide for themselves, because if they did not support the Pharmaceutical Society there was an end to legislation. That Society was the only means through which legislation could be obtained. If they would not do as the miners, compositors and other men did, be earnest in the matter in which they were particularly interested, there was no hope of a good Bill.

Mr. Kinninmont said that Mr. Carteighe had made an eloquent exposition of the Bill, and he was a very pleasant man to debate with. He never struck below the belt, but was always an honourable opponent. However, there were some points upon which he wished to be enlightened. He remembered all about the Pharmacy Act when Mr. Buott was in Glasgow. The Act of 1868 gave them everything they wanted. He thought Mr. Carteighe would agree with him that the point which was insisted upon was the qualification of the master. Otherwise it would be monstrous to say they had only 177 men in Glasgow who were able to take up the position of qualified assistants. They would not dare to ask the power to restrict the trade to that small number of men. To make the request would be an insult to Parliament. Many hours of debate did that Act cost them, the proceedings sometimes lasting till one and two o'clock in the morning. Indeed some gentlemen were asleep whilst the discussion was proceeding. The railway strike would have been nothing to it. If they were to act upon the decision of the judges the trade would be paralysed. The Pharmaceutical Society should endeavour to establish the Act of 1868 upon its original lines, and he thought that for that purpose an explanatory clause mentioning the words, "A man carrying on business on his own account," should be inserted. It was curious that in the Act these words were omitted. If this decision was upheld then the unqualified assistants were entitled to demand to be placed upon the Register. He would like to see "selling" restored to its common sense and original meaning.

Mr. Carteighe: Could we not deal with the Bill, because all this argument of Mr. Kinninmont was before the judge? If you want to alter the law we must apply to Parliament. I was one of those who constructed the Act, and my recollection differs from yours. I interpret that language differently. Who is to decide? You wish that assistants should do what the master is qualified to do?

Mr. Kinninmont: Yes.

Mr. Carteighe: Was it intended that a man should be able to open fifty shops and put in assistants?

Mr. Kinninmont: Yes. People had the impression that a man could open many shops. For the benefit of assistants I advocated that.

Mr. Carteighe: If we had doubts we might propose to make definite the new legislation.

Mr. Kinninmont: There is no trace of responsibility upon assistants. I think there should be an appeal to the Privy Council. If it is the law, let us have an explanatory Act to restore the original meaning. The Arsenic Act was not passed to prohibit the sale of poisons, but to trace poisons by whomsoever sold. The person purchasing the poisons must be known to the seller, that is the master.

Mr. Carteighe: May I ask whether you will not have this Act unless this is not included?

Mr. Kinninmont: I would rather have no legislation at all. I would rather have the trade free. Freedom of trade in drugs would not touch us at all.

Mr. Carteighe: We are partly tied up. If we could go back and not be tied up we would be better, but the Government restricts us in the sale of poisons. We must either go back or go forward. The judges' interpretation of the Act is not in accord with your interpretation.

Mr. Laing thought they should keep to the point. He did not want to go back to 1868, and he preferred to refer to 1891. In Glasgow the profession of pharmacy had been lowered; but it was now on the rising tide. Mr. Kinninmont did not care about stores; but by and by they would be all one vast store. Until that happened the stores were no doubt injurious. The trade did not fear fair competition, but the competition of stores was unfair. He believed the clergy had done much to establish these stores; they injured traders by their surplus capital. He did not think that was very good spiritual teaching. Hence he would certainly disestablish the stores. The Bill before them, although it might not be for the interest of individual pharmacists and druggists, would be to the interest of pharmacy as a whole, and it would be to the interest of druggists' assistants at the present day. The assistant went about his studies with uncertainty; but this curriculum would remove it. In Glasgow they had the best curriculum. But he thought great injustice had been done in the past by taking on apprentices without regard to their educational requirements, and by the employer taking little interest in them outside of getting as much work as he could out of them. When they finished their apprenticeship they were cast out to do the best they could for themselves. The longer a young man was from school the more difficulty he had to pass an examination. He had seen men in England and Scotland, especially in the former, who had been long in the trade, who were married and settled down. They considered that they were quite entitled to act as assistants, and that the law should recognize their right as such, because the law had never done anything to make them alter that opinion. He thought that it would not be just to crowd them out of existence. The time they had been in the trade was a guarantee that they were fully qualified to act as assistants. It would be only just if the Bill embodied a clause to that effect. He thought that soon there would be no unregistered assistants, but they should not endeavour to crowd out men up in years. To make them go through the ordeal of examination would be doing an injustice, and it would be a keen blow to them. Many were too nervous to pass an examination. It should also be stated in the Bill that it shall be unlawful to apprentice one who has not a certificate that he has passed his Preliminary examination. With that addition it would be impossible for anyone to get in who was not qualified. He begged to move that an addition to the effect he had indicated be incorporated in the Bill.

Mr. Walker, in seconding the motion, said he did not speak for himself but for a number who had asked him to bring the matter, if not under the notice of the meeting, at least under the notice of the Council in some way or other. Why had the Council been so long in putting the Act of 1868 in force if it was to be read in the sense that it was now read? Why did the Council not do anything until compelled by some coroner in England? The duty of prosecuting lay with the Pharmaceutical Society or the Registrar, but it did not lie with the public prosecutor. Why did the Society not take action this year if it was a new reading? The Council had allowed assistants to go on for twenty years whilst knowing they were doing an illegal thing. But none present thought that they were doing an illegal thing, and it would be unfair to wipe them out. The addition now asked was that a clause should be inserted, so that they should be allowed to continue to act in the shop of a duly qualified proprietor, that was all that was asked. In pleading for that, he did not plead for himself, as he was not affected, being connected with the wholesale trade. The Journal in a leading article said: "Let them qualify; nobody is to prevent them," but they never considered they had to qualify to be assistants, but to qualify to open shops. The President knew well it was not so easy for a married man, who worked from eight in the morning till ten at night, to begin Preliminary work again. He asked any one present whether he would like to commence his rudimentary Latin and all the other things again at the age of 40, as some of them were; it became a serious business. His name having been mentioned in the Journal as a representative case, he had received letters from England wishing that something like this should be done. He thought he had done all that was necessary to support the motion. If the Bill proceeded, there should be a clause to that effect.

Mr. Cairncross said that he had the sole charge of a business in 1868 in Glasgow. It was a retail dispensing shop, and he thought it would be very hard if he was to be in the position that Mr. Carteighe mentioned. He was at present connected with the wholesale trade. But some day he might wish to go behind the counter, and it would be very hard if he were not allowed to do so, especially having had such a large experience.

Mr. Currie said that seeing Mr. Kinninmont had been quoting largely from the Act of 1868, he wished to say a word about that gentleman's position. Mr. Kinninmont laid stress upon the words "carrying on business on his own account." Any one who read section 3 of the 1868 Act could not but think that the words, whether expressed or not, were distinctly implied. He admitted it was not easy for a man of thirty-eight or forty, with a wife and family, to begin to prepare for an examination, but these men had had time and opportunities. He did not think there should be any distinction nor did he see why they should be admitted twenty or twenty-three years after the Act was passed.

Mr. Walker: They are not asking to open shops on their own account.

Mr. Currie claimed the privilege for having passed an examination, though it were a Minor. He had been at business for twenty years. His employer, Dr. Robertson, impressed upon him at that time the propriety of getting through the Preliminary examination at once. He was pleased to see him present. He did not know what his opinion might be of the Bill; it was not for him to say whether the Bill affected Dr. Robertson or not; but Dr. Robertson and his assistants and apprentices saw the importance of passing the Preliminary examination at once. He not only tried to encourage them to do it quickly, but gave them time, and in some cases paid the expense of the classes. What Mr. Laing said with regard to the Preliminary examination before beginning one's trade or profession was the proper thing, and he (Mr. C.) hoped to see the time when no apprentices would be taken till they had passed the Preliminary examination. Mr. Carteighe was right when he said that no legislation could be backed up unless there were numbers. The numbers of the

Pharmaceutical Society were not such as to warrant it in going on with a Bill. If the chemists and druggists desired complete legislation they must become a combined body. Fourteen or fifteen thousand men could compel legislation, which a fourth of that number could not do. Therefore he thought all should join the Pharmaceutical Society. He heard it said, "What had the Pharmaceutical Society done?" He replied what could it do till it got numbers? Therefore he recommended everyone who was not a member to join the Society. With regard to the doctors' shops there would be a sore point if the doctor's assistants were practically exempt, and he was glad that Mr. Carteighe had said they were not exempt. He understood how Mr. Carteighe ignored the companies, but let the Act of 1868 be enforced, because he, Mr. Currie, knew that in Glasgow there existed businesses belonging to widows carried on by unqualified men. They could not expect companies to be restricted so long as the widow's clause existed. He supported that part of Mr. Laing's motion, particularly with reference to the apprentices being compelled to pass a Preliminary examination before entering upon business. But he could not support him in claiming registration for assistants who had been fifteen years at business.

Dr. White said the less legislation they had the better. They would come to their natural level even with the stores and with their cutting of prices. Competition drew out the keener business qualifications of men, and the man with the best knowledge would succeed best. He sympathized with the suggestion with reference to the large number of competent men who were unregistered. He affirmed these men were not incompetent, and to throw them out would be to paralyse the whole trade. They must have sympathy with these men if they wished to draw in members to the Pharmaceutical Society and improve the trade.

Mr. Laing put his motion as follows:—

> "That this meeting approves generally of the Pharmacy Act Amendment Bill—that is, the Bill of which Mr. Carteighe had given an eloquent exposition—and is of opinion that the Council of the Pharmaceutical Society deserves the support of the entire trade in its efforts to promote further legislation in the interests of pharmacy, and further that it should be compulsory to pass the Preliminary examination before apprenticeship, and that unqualified assistants over fifteen years standing should be admitted to the Register as assistants."

Their position should be recognized; he wanted to make them qualified assistants.

Mr. Carteighe: Mr. Laing needs no further explanations. We know what he means.

Mr. Laing: The Bill is in the interest of pharmacy as a whole. The Pharmaceutical Society should have all the support it can get. I am sorry I am not a member; but whether this Bill passes or not we should be all members. When it has taken up the prosecutions it has met with little sympathy or support. The trade has allowed the Society to do all the fighting.

Mr. Walker did not wish it to be said that the meeting approved of the Bill.

Mr. Finlay then said he would second the motion.

Dr. Lees proposed as a direct negative that they should show their disapproval of the whole Bill that night. He maintained that if the judgment of Justice Hawkins was not a correct judgment, then the sooner it was made so the better. He knew plenty of unqualified chemists in Glasgow. He could speak from experience. For years he had entertained the hope that the Pharmaceutical Society would do something to protect the interests of those who were qualified, and put down those who were unqualified. He remained a loyal supporter of the Society for thirteen years, until he had to give up the hope that anything was going to be done. He saw unqualified men getting larger salaries than qualified men, and he then asked himself the question, "What was the use of the Pharmaceutical Society when it allowed that to go on?" If they went over Glasgow they would find in all parts shops conducted by boys and girls possessing no qualification and no security for the safety of the public. Yet nothing was done. The Dundas Street prosecution was a mere farce; it did not touch the condition of things in the west of Scotland. The Society should show that it meant to protect the qualified men and then there would be unity. They should remember the old adage, "You may bring a horse to the water, but you will not make him drink." Dr. Lees concluded by reiterating that he disapproved of the measure.

Mr. Boyd, in seconding, remarked that he was against an enforced curriculum, because it would prove a great hardship to many. They might not feel it in Glasgow, but chemists in the country districts would, because they had no classes to which they could send their apprentices. They would simply shut the shops up. Would that be for the benefit of the public to have no shops open at all? It was better to have these moderately educated men able to dispense prescriptions than to have no shops open.

On a vote being taken, eight voted for Dr. Lee's amendment, the rest and the great majority of the meeting voting for Mr. Laing's proposal.

The usual votes of thanks were given, and the proceedings terminated.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The ordinary meeting was held on Wednesday, the 21st inst. The subject of conversation was "The New Pharmacy Bill."

The President in introducing the discussion said that the subject for consideration that night was one very much before them just now. They had no intention of taking the wind out of the sails of the meeting to be held on the following evening, but simply to take up the subject set down on their syllabus long before such a meeting was thought of. He thought no one should consider the subject from the point of view of being unable to qualify, however long that might have been delayed. As unexamined assistants they might properly consider the changes proposed in the Bill with regard to examinations. They would also consider the Bill, not as assistants only, but as possible masters. They had been told that the Bill was a practicable Bill, if not a perfect one. They might consider if it contained anything which ought to be left out, or omitted anything which it might contain. Some (notably in Glasgow) thought there was already too much legislation, and that the best thing would be to sweep the whole of it away. That was not possible now. The trade, or a section of it, forged the bands which control it. These had been somewhat altered by judicial interpretations, and it might be worth while to consider if, and in what direction, they may be amended.

Mr. Laing thought the present Act could and ought t be amended. Great injustice had been done by taking apprentices without requiring them first to pass the Preliminary examination. He would make this requirement compulsory under a penalty. The long inaction of the Pharmaceutical Society had led to the belief that it was not necessary to qualify previous to opening shop on one's own account. Numbers of assistants had for various reasons taken advantage of this state of affairs, and having got into suitable situations had delayed qualifying so long that to make no provision for them in the Bill would entail great hardship on them, if not do them injustice. Otherwise the Bill was feasible and might be beneficial.

Mr. Robertson was unfavourably disposed towards the curriculum and saw no use for it, particularly in chemistry, botany and materia medica. If the candidate was able to pass the examination there need not be too close an inquiry as to how he came by his information.

Mr. Cartwright thought the curriculum perfectly practicable and not more exacting than the conditions which at present obtain. The provisions for putting it in force were not to take effect for five years; so that no one at present need be affected. Besides, the difficulty of providing suitable schools in many centres would be considerable and probably lead to very great delay.

Mr. Bruce thought the Bill would perhaps do neither much good nor much harm, but was a step in the right direction. It would be a mistake to attempt too much, and it would be necessary to put their own house in order in many things before attempting to legislate against stores, doctors' shops and the like. He approved of the curriculum, for though it might be a source of some hardship to country lads that would no doubt be got over.

Mr. Gilmour concurred with previous speakers in their general approval of the draft Bill, and proceeded to notice the clause dealing with membership and increased representation of chemists and druggists on the Council of the Society. This he thought a just concession, considering their increasing intelligence and growing numbers. He considered exemption from jury service of doubtful benefit either to the druggist or to the community. Their claim for increased privilege on account of superior intelligence due to improved educational methods could not be supported by a demand for relief from a duty where intelligence was of special value. He believed it to be a good thing to fulfil the duties of citizenship and would not seek exemption from jury service.

Mr. Watson was doubtful about the interpretation that might be put on the phrase "immediate supervision," because that would naturally affect dispensing business.

The President said the main points of the Bill had been pretty well gone into and he thought the conversation a satisfactory one. They had been told that the Bill asked for all they could possibly get. What he (the speaker) would insist on was that all business should be conducted under the same conditions so far as these might be legislatively regulated. A doctor might dispense his own prescriptions in any way he liked, but if he carried on an ordinary retail and dispensing business (as was not uncommon) and entered into competition with his shopkeeping neighbours, then let him be subject to the same conditions as to qualified assistance, etc., as they were. Every class desirous of exercising influence, political or otherwise, combined now-a-days. Beggars even had done so. They must do the same, and it would be a good thing if the Bill by its provisions for membership and representation should draw the members of the trade into closer union round the nucleus of the Pharmaceutical Society.

The meeting then separated.

At the meeting on February 4 a paper will be read entitled "Some Suggestions for Pharmacy Students," by J. Rutherford Hill, Edinburgh.

GENERAL MEETING IN EDINBURGH OF REGISTERED CHEMISTS.

Address by Mr. Michael Carteighe.

A general meeting of registered chemists was held in the Pharmaceutical Society's house, 36, York Place, Edinburgh, on Friday, the 23rd inst., for the purpose of considering the proposed "Pharmacy Acts Amendment Bill." There was a large attendance. Amongst others present were Mr. Carteighe, President of the Pharmaceutical Society; Mr. J. L. Ewing, Mr. J. H. Fisher, Dunfermline; Mr. Peter Boa, Mr. G. H. Laird, Mr. Geo. D. Mackay, Mr. Jas. Mackenzie, Mr. John Nesbit, Portobello; Mr. Daniel Frazer, Glasgow; Mr. Thomas Thompson, Mr. Alex. Noble, Mr. James Heron, Mr. Thomas Maben, Hawick; Mr. David Storrar, Vice-Chairman of North British Branch Executive; Mr. J. B. Stephenson, Chairman of the Scottish Board of Examiners; Mr. Wm. Gilmour, Chairman of the North British Branch Executive; Mr. Peter Morison, Junr., S.S.C., Mr. Donald Mackenzie, Mr. Adam Kennedy, Mr. John Bown, Mr. Wm. S. Glass, Mr. J. R. Young, Junr., Mr. Adam Gibson, Mr. James Paton, Mr. Rutherford Hill, etc.

Mr. Gilmour moved that in the unavoidable absence of Mr. Young, Mr. Ewing be called to the chair.

Mr. Ewing, on taking the chair, called upon—

Mr. Rutherford Hill, who read letters of apology from Mr. J. R. Young, J.P., and Mr. ex-Provost Watt, Haddington.

The Chairman said he had first to thank the meeting for placing him in the position in which he then was. He deeply regretted the absence of Mr. Young, whose age and past services to the Pharmaceutical Society had all along pointed him out as a proper person to occupy the chair. He was sure they would that night miss his wise counsel, and they all hoped for his speedy restoration to health and strength. The duty of introducing their friend, Mr. Carteighe, was, he was happy to say, an easy one. There had been many eminent Presidents of the Pharmaceutical Society in the past, but he did not think that any one had exceeded Mr. Carteighe in what he might be allowed to term "go." He was the embodiment of the Pharmaceutical Society, and he thought they all owed him a debt of gratitude for coming to address them that night, especially when they considered the inclement nature of the season. He wished to add one word of caution to Mr. Carteighe. He might perhaps think them rather cold in their reception of him. Mr. Carteighe was of a singularly vivacious temperament, while they were proverbial for their caution. They were rather sceptical about improvements in legislation, and they liked to be convinced in regard to such matters, but he could assure Mr. Carteighe that if he once obtained their assent to his plans he would meet with a loyal and hearty support. Mr. Carteighe, in coming amongst them, did not only do so for the purpose of discussing the Bill but also to awaken interest in the Society. He might point out that while there were about 15,000 persons on the Register, of these only about 30 per cent. were in connection with the Society. No less than 70 per cent. were therefore outside the Society, and he thought it was from these outsiders that Mr. Carteighe wished chiefly to draw attention to his plans. Those outside the Society were very often the most active in grumbling; and Mr. Carteighe was aware, as they all were, that unless they were united, they could have no prospect of success. He had been so suddenly called upon to take the chair that he had not had time to prepare a speech, and he would therefore only make one or two observations as to the educational proposals in the Bill. Education had always been popular in Scotland. They owed it to the genius and foresight of John Knox, and to his incomparable system of education that Scotchmen had been able to occupy the high positions they had done. Unless they fostered and developed the same system of education they would not be able to hold their own with other nations, especially with Germany; but he had no doubt that by doing so, and by exerting themselves they would continue to be able to fill the positions they occupied. Perhaps it might help Mr. Carteighe to discuss the matters that lay before them if he mentioned some points that had been spoken of by one or two gentlemen. The first question was that of the qualified owner and unqualified assistant. The difference in the interpretation of the Pharmacy Act from what it was at first, as to the qualification of the owner, was a very serious one, but it was not so serious, to his mind, as the unqualified master and the qualified servant. Through the chicanery of the law, men had been allowed to evade the Pharmaceutical Act, not for the public benefit but for their own aggrandizement, and that without passing through any curriculum or any examination. The second observation he would make was in regard to clause 7. He would speak of its application to the small chemists in the large towns, and especially to their country brethren. He meant the question of personal supervision of the establishment, and he would point out that there was a considerable difference between the state of pharmacy in England and in Scotland. In England the dispensing part of the chemist's business was often limited and he had recourse to other branches of trade. In Scotland, he was proud to think, they practised pure pharmacy, and they were anxious that nothing in the Bill should be the means of masters and chemists in the country being so confined to their business as to have it turned into what he might call slavery. In most of the towns in Scotland it had been the custom for qualified owners to train apprentices with a view to their subsequent qualification, and it would be a very serious matter for them if it was necessary that they must either be present themselves or have a qualified person at their back. He hoped that nothing would occur which would prevent such gentlemen from earning an honest, though, he feared, a somewhat precarious living. With these imperfect observations, he had now the pleasure of introducing to the meeting Mr. Carteighe, the President of the Pharmaceutical Society, and he would ask from them a courteous and attentive hearing.

Mr. Carteighe, who was received with loud applause, said he wished to be allowed, in the first place, to thank the Chairman and his colleagues for the honour which they had done him in asking him to make a few observations on the Pharmacy Acts Amendment Bill. He observed that in Scotland they were good enough to use the word "address" in regard to his series of observation, whether they were short or long. He was afraid that his address would not be quite so connected as addresses in the South were supposed to be; but as the object he had in view was to make himself plain he hoped they would excuse his remarks if they were not quite in the form of an essay. He felt he was much in the position of a schoolmaster who had to enlighten his pupils, and to enforce certain points as he went on. He did not know how far he was entitled to assume that everybody knew what was in the Bill. He should like the meeting to give him some indication as to whether he should explain the clauses of the Bill, or whether he should assume that they were all already well acquainted with its provisions. [A general feeling was expressed that Mr. Carteighe should explain the clauses and take them in order.] Well, the first thing he had to say was that the propositions that had to be put before the meeting were propositions for an Act of Parliament. He wanted them to understand that the Council of the Pharmaceutical Society was not a law-making body. It was an executive body. Law had been vested in it; powers had been vested in it of very considerable responsibility; but the Society could not depart from the law in any way, nor could it make law, and while it was part of the government of the country as to the examination of persons who presented themselves for examination, it was on the other hand a voluntary society of individuals desirous of working in harmony with the whole trade, and of improving its condition both educationally and in other respects. It was always necessary to keep before them the important point that the Society's duty was a public duty; that it had in the first instance to take care of the safety of the public and not in the first instance to take care of its pockets. That was not what some of them would wish, or what he himself might wish. He wanted them to realize the situation, because so many of their brethren in the trade imagined that the Society had powers it did not exercise which would improve the trade very much; but that was not the case. In matters affecting their own special calling, in matters in which the Society went to Parliament for further powers, it was in the hands of laymen who had to be satisfied; and not only that, but the Government had to be satisfied that what the Society sought to get was essential for the public good. Any attempt, as they knew, to go to Parliament for special class privileges, or for any increase in their income—anything of that kind done in a direct way—would be scouted by such a House of Commons as there was at present or was likely to be. Let them remember that the Society asked for certain restrictions on freedom of trade; and freedom of trade had become so ingratiated in the minds of all statesmen that the Society had to satisfy them, and doubly satisfy them, that if they put on restrictions it was for the safety of the public. Statesmen thought a great deal of that, but they thought very little of what, in the shape of gain, was put into the pockets of those persons who were to do the work. So that the Society was not a Parliament; it was not a state; and it had to go to Parliament like ordinary individuals, and ask and knock at the door before it would get anything to remove those difficulties in advancing the trade interests in regard to which so many of them were rightly complaining. Consequently the Council of the Pharmaceutical Society had framed a Bill on the principle that the House of Commons must be approached on the basis he had mentioned; nay, he was going to say, that it could not get a Bill introduced into Parliament dealing with some of the burning questions of the present day, except under certain special circumstances. He would say something about that at the conclusion. But he wanted the meeting to be impressed with the fact that the sympathies of the House of Commons, elected by everybody as well as by chemists, by those who were competitors in trade—and some of them had unfair competitors in trade—and by customers who insisted on the utmost pound of flesh. Those men returned to Parliament, had interests themselves, and they had votes. Consequently, when the Council measured its strength it found chemists and druggists to be literally a drop in the ocean in regard to the great public, and it must therefore take care that it proceeded gradually, otherwise it would have no chance of making progress. It might be told that it was a pure trade union and not fit as a Society to carry out the important powers that Parliament had placed in its hands. Clauses 2 and 3 might be taken together. These dealt with the subject of dividing the examinations and the periods of time between the parts of study. At present there was no power to have intervals of time between parts of the examination, and it was proposed to ask for powers to do that. He might explain that what he meant by powers was that the Bill simply asked for powers to make bye-laws. If the Bill passed, no bye-law in regard to the subject of education would come into operation until the lapse of three or four years after the passing of the Act. The process of making bye-laws was a public process. The Council of the Pharmaceutical Society had to agree to them three times and then they had to go before a special meeting of the members. As to making alterations in those bye-laws, they must remember that in anything they did the Privy Council stood between them and the public, and between them and any aggrieved persons, and therefore the Society must exercise the powers vested in it with the assent of the Government of the day, after due consideration. Everything could not very well be set down in a Bill, and it was not desirable to tie the hands of the body and make arrangements which might answer now, but which fifteen or twenty years hence might be unworkable. It was better that the Bill should be suited to the times in which they lived, and it was necessary to have the power of undoing certain things as well as of doing them rather than to tie up their hands and those of their successors for ever. What they proposed was to make it as far as possible essential that a Preliminary examination should be passed either before or immediately after the commencement of the apprenticeship, that the Minor examination should be divided so that a part of it could be passed by the pupil before he was twenty-one, in the form of a written examination carried on in different parts of the country, so as not to take the pupil any very considerable distance away from home. And when he was twenty-one let him come up for the final examination, which would be a practical one. This would benefit the masters in regard to the pupils, and the pupils would be benefited by giving them a direct interest in their work. He knew that pupils who went on with systematic work in that way were generally the best in the shop. Then, any time before the final examination, it was proposed to ask the pupils to go through a course of education, such as a course of lectures on chemistry, botany and materia medica, and a certain amount of demonstrations in practical chemistry. It was not proposed that these should be taken as a matter of course together. It was known to be the common tendency of men to get the education outside the shop at the end of the period of apprenticeship. What was proposed would encourage men to take the education by degrees, year by year, wherever they could get it. It might be asked, "Where are they to get it?" In Scotland, in all the great cities there were ample opportunities. In other places, where there were no such opportunities, it was proposed to subsidize or assist any teachers who might be teaching science, and it was suggested, in fact, that the pharmaceutical chemists themselves would be more efficient teachers in out of the way places, and that it would not be a bad thing either for the pupils or pharmaceutical chemists, or for education generally, if they took a part in that work all through the country. He wanted to impress upon them that the two clauses, which had been described as his pet clauses, were intended for the future benefit of the chemists and druggists in the widest sense. These clauses suggested that the future chemist and druggist should not be registered unless he was educated. It was a restriction for education, a restriction for knowledge, and a restriction that would do good generally. It was far better to let a young man go early through the Preliminary, as was suggested, than that he should be a burden on the trade, and when he did pass the Preliminary only be crammed through it. Otherwise he must begin an uphill work, which it must necessarily be, to go through the course, with the morally certain result that he would fail, not once but many times, and then he would be stranded on the world, incapable of carrying on a business, and waiting for every opportunity to find little loopholes in the statutory powers in order that he might catch some of the bread and butter that really belonged to them. He thought that as a matter of business the proposed scheme of education was good for the trade, apart from its general educational advantages; and he asserted, without fear of contradiction, that the expense of the proposed condition of things would be no greater than it was now. The average chemist and druggist could not afford the time—it was unreasonable to suppose that he could give the whole time—necessary to teach his pupil. The pupil must expect to go for certain subjects outside, and he did so now, but after the period of apprenticeship, and without the knowledge of how he was to do it; and the Council thought that it would be of advantage that it should be made plain. These recommendations were the result of the observations of the Government officers who had to deal with the examinations. They deplored the difficulties in the way of the future chemist and druggist. They said that he passed his Preliminary so late that it was no test of his skill, and the way that the Preliminary was got through was often of a most deplorable kind. On these facts they had a good case to go to the Government. He submitted that as the basis of all the privileges they had obtained had been on the score of education and qualification, it was good policy to approach the House of Commons and the Government, who were ever ready to listen to educational matters and never more ready than at the present time, and to introduce into the Bill the educational part of their business. He knew Members of Parliament who would listen to the subject of education and take an interest in it, but he did not know any who cared much for their trade privileges. They must remember that the tribunal before which they had to plead their cause was a cold-blooded House of Commons and House of Lords and that it was indisposed to give privileges to any body. Practically all the professions were more or less open. That of the solicitor was practically open. Any one could make agreements without going to a lawyer. A lawyer had certain little special things, just as they had as to the sale of poisons, but, broadly speaking, the whole of the lawyer's business was not protected. On the whole it was certainly necessary that they should approach Parliament cautiously. The next part to which he would refer was as to the consolidation of the Pharmaceutical Society. They knew exactly how they stood in regard to their organization as a pharmaceutical society. They knew that it was something like forty years ago that Bell addressed a meeting in Edinburgh, and he (the speaker) felt it a great honour that he should have the privilege of addressing a meeting in Edinburgh, in a building which he hoped was doing great service to everyone in the trade. It was forty years since Bell went round about organizing and asking further powers, and he went into Parliament for the purpose of endeavouring to get further powers. He proposed to get all that had been put down in the present proposals and a great deal more, but he was defeated. The trade was too strong for him, and although he spent many thousands of pounds in contesting two constituencies before he entered Parliament he failed in getting more than a Permissive Bill. Now Bell thought that was worth a good deal. He thought—"Now I shall be able to appeal to the chemists and druggists, and say to them—'Come in and enrol yourselves and attack the enemy.'" At that time the Pharmaceutical Society was a very small body. By and by laws were passed, and every druggist and chemist was told that he might, within two years after the 1852 Act, become a member of the Pharmaceutical Society. They did not come in in great numbers, and the strength of the Society was not very materially increased. When he said materially increased he meant in proportion to the number of persons in the trade. In 1868 further legislation was obtained, after a good deal of fighting with the United Society of Chemists and Druggists, which opposed certain proposals made, and the Pharmacy Bill was converted into a Poisons Bill. After coming to terms and getting a Select Committee to report on certain provisions, the Committee reported that the legislation should be as to poisons. In 1867, George Webb Sandford, who after Bell deserved their greatest respect and admiration, for he was thoroughly devoted and most unselfish, resolved to try and get what legislation he could on the basis of poisons. So that in 1868 a Bill, which was little more than a Poisons Bill, was passed; but the clauses of that Bill were the result of a compromise brought about by the opposition of the trade. He pointed out that as an indication of the importance of union. He did not wish to complain of what happened then. Perhaps the trade might regard himself and his colleagues as foolish people and aiming at things that were undesirable; but he submitted to them that they should take a note of warning from this fact, that at the present time, twenty-two years after the passing of the 1868 Act, they were still a disunited body. Yet, while three-fourths of them were outside the pale of the Pharmaceutical Society, they asked it to do that which in order to its being done they would require the three-fourths to be in, and every soldier amongst them ready to fight. They taunted the Society with being too cautious. It was cautious because it was weak. Working men managed to demand what they wanted. A working man did not ask how much he was to get for his 4*d.* a week to the Union, but chemists and druggists did so. The working man said, "My Union is to do good for the whole of my class, and I place my confidence in the executive." The chemists and druggists would not give fourpence a week with the same readiness, and often they would not trust the men whom they elected. To do public business on these terms was not easy, and therefore it was necessary that the Society should be cautious in what it was about. It was asserted that one of the reasons why a large number of the trade did not join was that Minor men who were examined were not admitted to the full privileges of the Society. That was admitted to be a defect. The Council not only admitted it, but he believed that those in the Society would look on the whole condition of things in a broad, liberal and comprehensive spirit, and would not oppose in that matter. He would appeal to every one in that room not to do so. It was essential not only to conserve what they had got, but that the chemists should be united; and while the Council was constituted chiefly of pharmaceutical chemists, it nevertheless held out the hand of friendship to every chemist and druggist to come in on the same terms as themselves. When that was met they had no reason to say that they had not the same privileges. They proposed that every man who had passed the Minor examination should be a member of the Society, and that in the Society, amongst men in business, there should be perfect harmony in regard to title. The Minor man was a man who could keep open shop with all the privileges that the others had, and as the Act of 1868 fixed on the Minor as a standard instead of the Major, they thought that both men should have all the privileges of sitting in the Council. The only difference was that they thought it desirable to divide the Council; that the Council should not at any time contain more than ten members who were not on the Register of pharmaceutical chemists. If chemist and druggist members were on the Council to the full number of ten, and objected to what their brethren did, they would carry their point. It was desirable that there should be that little piece of precaution as to education and other matters, and to satisfy the Privy Council, which had a voice in this Bill. Let them remember that before any member of Parliament took up the Bill they had to get the Government to approve of it. Well, then, they would have by this Bill, if it passed, an opportunity for every person to join the Pharmaceutical Society, as, indeed, he had now, although not as a titled member. He would have an opportunity of turning out the President and thirteen of his colleagues every year till he got a Council to his liking, brimful of trade interests and pledged to get something. If they did not want to exercise that power he had nothing more to say. If they wanted to get rid of him there was their opportunity. If they wanted to get rid of his colleagues then they could get rid of them also. If they would not join the Society and exercise the power, could they expect the Society to go and do for a disunited body what they could do for a united body? Clause 7 dealt with the question of compounding medicines. They would remember that their privileges were confined to the selling and compounding of poisons, and they asked for the right of compounding medicines. There was a great deal in these clauses for their advantage, a great deal more than appeared on the surface, and he was not going to tell them what it was. If he said more he would be only preparing the way for opposition from interested persons. Some of them might say, as his friend the Chairman had said, that there was a difficulty as to the matter of personal supervision. Now in regard to that he thought the difficulties of the clause would be much reduced if they omitted the words as to "personal supervision." The object of this Bill—the object of all previous Bills—was, from the point of view of the Legislature, the protection of the public. Prosecutions were carried on by the Council of the Pharmaceutical Society, and he thought it was well that the Society should have a certain amount of discretion as to how far they should prosecute. But he found it difficult to meet his friend's observations, because he thought he would recognize that if they claimed certain special powers it was exceedingly difficult to say that these powers should be delegated to someone else. It was a difficulty that could only be met by the fact that the twenty-one men must be the prosecutors, and in carrying out their public duty he hoped they would never send inspectors to see if a man went to his dinner and left a qualified man behind. He had no doubt they would proceed on broad lines, that they would consider the question of danger to the public, and also each case on its merits. It was important for them that from the point of view of the legislature their privileges should be tied up as much as possible; otherwise they might be so laxly drawn that they would not be worth much. Some of them might think that the Bill would work a little hardship here and there, but he asked them to consider it on the ground of benefit to themselves and of benefit to the public. It would be for the Council to consider the clause as to supervision before it proceeded to Parliament with the Bill. He believed that the words were better out. It was difficult to define supervision. He thought that the best way was to leave the amount of supervision that was dangerous to the public, to the prosecuting body, and the prosecuting body was elected by themselves. The Pharmaceutical Society must take proceedings when anything was done which was dangerous to the public. If any one of them was unfortunate enough to have an accident then the Privy Council or any Governmental authority might call upon the Council to take proceedings, and it would be bound to do so, otherwise it would lose the general sympathy of the public and of the Government, and the power of prosecution would be handed to the Privy Council Department without any control from the chemists and druggists. He hoped he had made himself clear in regard to that. With regard to clause 8, as to penalties, he had nothing at all to say, but as to clause 9 he understood that the Juries Act did not apply to Scotland. Mr. Nesbit had reminded him of that. In England, pharmaceutical chemists were exempt from serving on juries under an Act passed in 1865. The chemists and druggists of England missed the advantage by not joining the Pharmaceutical Society. He understood that the Juries Act did not apply to Scotland, and therefore he took it that they would all not only not object to the clause being in the Bill, but, on the contrary, would approve of it. He would say in conclusion that there were certain things not in the Bill, such as what related to corporations—the great cry of the day—and which affected not only chemists and druggists, but every hard working trader in the United Kingdom. It had produced very much bitterness. They found themselves as traders face to face with the fact that great men who considered themselves philanthropic statesmen, civil servants, ministers of State and members of the House of Commons and House of Lords, were all in favour of this great company arrangement. Nay, many of them were directors of these concerns. Although not wanting articles cheap themselves, yet because they had ample means, they were associated with these places because they thought it a good thing to reduce the price of articles for those who were not so well able to pay as themselves. It was asked of the Society that it should apply to members of the Houses of Parliament to stop these companies for the sake of the chemists and druggists. How did they ever think the demand would be listened to? Let them apply their common sense to the matter as citizens and tell him their answer. Some of them said that the Society had never attempted anything in that direction. That was not a correct statement. The first and second year he was President of the Pharmaceutical Society a Bill was drafted, dealing with this very question as well as others which struck at the root of the evil, and as the Council thought justly. The Government was asked to introduce the Bill, or failing that to support it. In connection with that their President had to see the various Members of the Government and of the Privy Council Department in regard to the Bill. The final reply of the Lord President and members of the Council was that they would not only not introduce the Bill, but that they would object to it if it was introduced by anybody else. They said : "My Lords consider that the duties of the Pharmaceutical Society should be restricted to educational examinations and not directed to matters relating to the sale of poisons and to the dispensing of prescriptions. These are matters which are very properly within the domain of the Government, and should be legislated upon by it." Those who understood public matters knew that was pretty straight. The Government soon made it plain what was meant by introducing a Bill which recognized companies as useful institutions, and endorsing the terms of a celebrated decision in the House of Lords, and of a judgment which had been more or less repeated within a few years—if he mentioned Lord Young's name they would all remember it. In the spirit of the judgment referred to the Government came to the conclusion that it was perfectly safe for the public if in these companies the man who handed over poisons was a registered man, so that in the Bill it was proposed that in all such places there should be a registered employé who should put his name over the department of which he had the charge and also over the shop. The Bill also proposed several other things that were objectionable. The Council of that day thought that Bill should not be allowed to become law, but should be stopped, and accordingly the President and Law Committee of the Society were ordered to do what they could to kill the Bill. The Bill was remitted to a select committee which never sat, and the Bill died a natural death. It was comparatively easy for their President and his colleagues to stop any objectionable legislation which might affect the trade. But while the process of stopping legislation was easy, the process of getting practical legislation was a very different thing. He might refer to what was done with regard to the sale of methylated spirit in forty-eight hours. The Chancellor of the Exchequer had received so many telegrams on the subject that it was said that the House was filled with telegrams from disgusted chemists and druggists. That was a reason why they should all be as far as possible associated with the Society. As a means of defence it was of great advantage. Without the existence of the Pharmaceutical Society he believed they would have Poison Bills brought forward every year by every cranky member of Parliament. Prior to 1868 and before 1852 there was scarcely a year passed without a member of Parliament proposing a Bill in regard to poisons, which it would have been very difficult for the members of the Society to have carried out. They never heard now of a private member bringing in such a Bill, and no Government could carry a Poisons Bill or any such Bill against the Society. But he was satisfied that the Society was infinitely too weak to get legislation passed to stop those companies. Why many of their own people in the trade approved of these stores, and many were engaged in them. Let them do as professional men; let them keep their bond and not serve in the companies' places. If they were a united body and could trust each other, it would be of the utmost advantage, but in the face of difference of opinion as to company mongering it was the height of folly to ask the Society to try to shut them up. They might be asked to regulate them, but to think of shutting them up was absolutely impossible. The powers which they had in the existing Act—he did not mean in the Bill now before them—gave a certain control over these companies. It was sufficient for his purpose if he told them that the Council had been successful in shutting up one of these companies, and another was in process of being so. The plan adopted by the companies was that a man who might be a grocer associated himself with six other persons, and that man was hit as the seller. This had been done in Birmingham and a company shut up. To a certain extent the Society had power; but if it went to Parliament and tried to bring up this question he was afraid that, as a matter of judgment, it might be wrong. Of course he would be told by learned people that was only his opinion, but it was also the opinion of a majority of his colleagues, and he was afraid that into any clause proposed the principle might be introduced that anybody should keep an open shop if he employed a qualified person. It was easy to start with a modest Bill, and sometimes easy to get beneficial amendments put into a Bill in Committee, but it was also possible that a Bill which was intended to benefit them when introduced into the House should come out one of a very different kind. The trade was in a bad enough position now in regard to the matter to which he had referred; but there was further danger ahead, and if they did not take care they might be worse off. His advice and that of his colleagues was not to move, but to leave this matter where it was now.

The Chairman said he wished to ask if there was anyone prepared to move a resolution in support of the Bill.

Mr. Stephenson said he rose without any hesitation, although with a little diffidence, to propose the following resolution :—

> "That this meeting approves generally of the Pharmacy Acts Amendment Bill, and is of opinion that the Council of the Pharmaceutical Society deserves the support of the entire trade in its efforts to promote further legislation in the interests of pharmacy."

In supporting the motion he said he had not the least misgiving as to what was in the Bill, and so far as it went it was good. He thought the contemplated regulation about the Preliminary examination was excellent, and there should be no objection to that as to the curriculum proposal. As to the consolidation of the Society, that also went without saying. It had been a great blot on the Society that it was not more united, and any endeavour to make it a homogeneous body should meet with universal consent. As to the proposal regarding the Juries Act he did not think there could be any exception to it. So far as the Bill went he felt, as he was sure that they all felt themselves, at one with the President and Council of the Society. But his difficulties began when he had said that. He had followed their President, not only in the eloquence and force of his arguments, but also in his recent campaign. He had been very much struck with the force of his arguments throughout, but he was sorry to say that he was not convinced. He did not think that he differed very much from the President. It was not protection for chemists and druggists that he ever dreamt of getting, but the protection of the public. That was the principle on which the 1868 Act, was founded. It had been rendered a nullity, and he wanted it re-instated as it was meant to be. The recent interpretation of the 1868 Act, in which the House of Lords discovered that the qualifications in that Act might reside in a servant and not necessarily in the master, appeared to him like dissociating qualification from responsibility. As far as he could see the servant could not be the responsible party. The qualification and responsibility must go together. The servant could not exercise his qualification for the good of the public. The servant must do as he was told. He had an illustration of a qualified servant who was in a company which he had to leave. What protection had the public in such a case? He held that the Act of 1868 was intended to associate qualification with responsibility. Then there was the widow's clause, of which a great deal had been said. The clause was introduced for the purpose of allowing, in an exceptional case, a servant to exercise his qualification. Did that not prove that in ordinary cases he could not do so. He held that an abstract qualification was not a sufficient protection. A man who managed a widow's business was for all practical purposes placed in the position of the master. He must buy the goods and he must do all the details of the business, which, he held, no servant, let him be in any company or store, could do. As to branch shops he thought that if the qualification and responsibility were to go together he would let them go. Let there be a proper man in each, but he would not let that stand in the way of any further legislation. Their President had given them a little insight into a Bill in which the Government proposed that limited liability companies should go on, but that the drug departments should have registered persons to manage them. That was the master and not the servant, and he thought that Bill would be a great boon to them, if they could get it so arranged that in stores the manager should be held responsible and held before the public as a security. That was what the Act of 1868 demanded from them. He thought that if they had a Government Bill providing that every place of the kind should have a registered manager, with his name properly displayed to the public, that would go very far to meet the difficulty. [A voice: "What about firms?"] The members of firms must be qualified, every man of them, and they could ascertain that these were carried on by a registered man. There was no such power in regard to a limited company. He did not know that the Society had power to go and demand the name of the resident manager, but he thought it would be important if there was a registered manager. These remarks did not detract from his thorough concurrence in the Bill, but in Edinburgh they had felt the evil of companies more than in most towns. The theory was that the thing would go on further and further, that it would become a big leviathan and swallow them up. So far as the Bill went he thought it was on the right lines, and it was as to what the Bill did not do that he objected to it. He had much pleasure in moving the resolution he had proposed.

Mr. Mackenzie seconded the motion. He said that he agreed not a little with what Mr. Carteighe had said and also with a great deal that Mr. Stephenson had said. They were at a point when he thought the first thing they should have was greater union, as to which they should take an example from the working classes. They wanted unity before law. So long as they had traitors in their ranks they could never be able to act as they ought to do. Consequently if they had parties not true to themselves and to the trade to which they belonged, they were not in the position that they ought to be, and the sooner they all were impressed with the value of unity the sooner would they realize the importance of a class embracing great responsibilities, but, unfortunately, not getting that remuneration which with such responsibility should be associated. It had been stated that there were fears that Mr. Carteighe and the majority of the Council were not at all so much at one in regard to what were called his own pet clauses. Perhaps Mr. Carteighe would tell them whether he was as firm in regard to the first clause as the last? [Mr. Carteighe: "Hear, hear"]. That being the case, it would help the meeting to approve of the Bill. On the first view of the Bill he did not think it would suit, but after carefully reading it he altered his opinion, and he came to the conclusion, that with a little strengthening of its backbone they should be glad to take it. If they were supported by the chemists and druggists throughout the country, he thought it would do very well. If every chemist in the country would exercise his privilege and bring the subject under the notice of the members of Parliament in their localities he believed it would be of great advantage. There was no knowing how soon an election might come round, and it was wonderful how ready members were to give assistance at such times. He thought that such efforts should be made, so that no stone should be left unturned, in order to attain to the objects which they had in view. He then referred to the proposal made in London to double the fee for the Preliminary examination, and said he hoped that there would be no attempt to do that; those fees were quite high enough already. Mr. Carteighe said that the fees would not be more, and if they were kept as they were at present they would do very well. The Preliminary was a paying concern. He was not quite so much struck with regard to the curriculum. He thought that in certain centres there would be a difficulty in getting young men to attend the course of lectures, and he thought that the proposal to enforce that was rather premature, although a few years hence that might come about. He thought that on general principles they should be safe in supporting Mr. Carteighe, and they should place before him their views, so that the Bill would be made as elastic as possible in order to benefit the greatest possible number.

The Chairman asked if there was anyone who wished to propose an amendment.

Mr. C. A. Macpherson moved the following amendment—

> "That the meeting approves of the object of the Bill, but considers that it requires re-drafting; requests the Council to do this, and to add new clauses, providing (first) for the re-affirmation of the right of registered men alone to the title; for the repeal of the exemption in favour of executors, etc., of deceased chemists; and for the enactment of other provisions for the accomplishment of the object of said repealed exemption."

The Chairman said he thought that the amendment was more in the nature of a rider than a separate motion, and he asked Mr. Stephenson if he would accept it as such.

Mr. Stephenson said he did not see his way to accept of it as a rider to his motion.

Mr. Macpherson then pointed out several alterations which he thought should be made in the clauses, and some omissions which should be supplied, but Mr. Carteighe pointed out that the Bill sufficiently met the suggestions Mr. Macpherson had made.

Mr. Macpherson said he thought it would be a great mistake if they were to push legislation with reference to corporations, as they were almost sure to be defeated.

The Chairman said that Mr. Macpherson had not made any reference to the subject in his amendment.

Mr. Macpherson then referred to the subject of titles, and said he thought they would be well worth fighting for, and that they should conserve them for themselves. He did not see why the widows' section should not be repealed.

Mr. C. F. Henry seconded the amendment. He said that the amendment was to the effect that the Bill should contain a clause entitling them and them only to use the titles of pharmaceutical chemist or chemist and druggist. It would be in the knowledge of the meeting that traders and companies used these titles. Some might think that the titles were not important, but the public did attach a certain importance to them. How often was it the case that they were told by people with reference to certain men, "Oh, they are not chemists and druggists," but it was said they were, and if they were not chemists and druggists, why should they not try to stop them? Power should be given to stop them taking the titles in order to show which was a proper chemist's shop, and which was not. As to the doing away with the 16th section, he thought that before they went into any legislation attacking the stores and any movement for doing away with companies, they should do away with the widow's section. The clause said that it would be lawful for any executor, administrator or trustee of an estate to continue such business. They objected to stores because they were carried on by certain unqualified men with qualified servants, but here they had a section by which an executor could carry on a business with a qualified assistant. It had been pointed out over and over again that they must get quit of that. All that had been said in favour of it was that it was a widow's section. But it was not merely a widow's section, for it allowed an executor or trustee who knew nothing about a drug business to carry on the business of a chemist and druggist. Therefore he held it was inconsistent. He thought that, while approving of the Bill, the matters referred to in the amendment might very well be taken into account.

Mr. Nesbit, Portobello, said he rose to support the Bill. He believed that the Bill, if passed into law, would confer great advantages on pharmacists and on students coming up for examination. It gave the Council power to divide the examination. It was often felt to be a very great strain to have five or six subjects on one day. He saw nothing in the Bill except what would be greatly to their advantage. As to the jury clause, as the President had told them, pharmaceutical chemists were exempted in England; but it was not so there. He had had to be on a jury one or two days, and he was actually kept in the hotel in Princes Street the whole night. It was a criminal case, and the witnesses were not allowed to communicate with the outside world. He was not allowed to write home unless by an open letter. He thought that if there was nothing else in the Bill but the jury clause it was worth fighting for. He sympathized with the proposal by Mr. Stephenson, and he thought it was their duty to regulate the supply of medicines by whomsoever they might be. If the stores were not legal why did they not try to put them down? When the Society was first established it was for the election of members, but when the Poisons Bill was passed there were certain administrative functions delegated to it, namely, duties of examination and of seeing that the public were served by qualified men. They should go to the Privy Council and say, "You have given us certain powers. Limited liability companies have arisen which were not provided for in the 1868 Act, and you must give us powers to regulate the sale of medicines." The men managing these companies should be registered men, and it should be insisted on that these men's names should be on the doors of the premises. He did not know if that would prevent them carrying them on. He almost thought that a man would think twice before he invested his capital, and then put another man's name above the door and on the labels. That would make the man the master of the establishment there and then. Had that become law which the Government proposed some years ago, would the companies have started and put a man's name above the door? The man could say, "The business is mine, not yours; the customers know me, not you." He thought there should be some such clause as was suggested, although he would not put it as a motion. He never knew a man who had not the qualification commence a business and carry it on. Did they think he would do that when he would be loaded with this, that he would require to have a qualified man to put his name above the shop? He did not think he would do so. He was much pleased with the Bill, although he would like to see some things added to it. He would, however, leave that to the Council. As to the widow's section, he was altogether against doing away with it. He believed that Parliament would not do away with the property of any individual. A man's money was often invested in the business, and if the clause were done away with the shop would require to be shut up at once. ["No, no."] They would be under the necessity of shutting up the shop. He thought that Parliament would never do that; and, besides, they would have immense opposition to the proposal.

Mr. Gilmour said he would put the following question, to be answered by Mr. Carteighe when he again rose to speak:—Is there not a possibility of affiliating the curriculum of education with the university system?

Mr. McLaren said he thought that after the very eloquent address which Mr. Carteighe had delivered they had wandered a good deal from the point. The question was whether they would give a hearty support to the Bill so far as it went. He had not read a word of what had been said for or against the Bill, but the more he read the Bill the more he liked it. He thought that it would be wrong in them to separate without affirming by their votes that the Council, so far as it had gone, had gone in the right direction. He thought that the principle involved was this: that in the Bill it was made compulsory that no shop should be kept open except under the charge of a qualified man. The public certainly wanted nothing else. They would demand that they should get goods from people that they could fully trust. He hoped that Mr. Carteighe's words would be borne in mind, and that the next time he came to Edinburgh all the registered chemists would be members of the Pharmaceutical Society.

Mr. Carteighe said it would not be difficult for him to answer some of the suggestions which had been made. He might say that the point raised by his friend, Mr. Stephenson, about the widow's section being exceptional was an argument they were apt to use when they were in an occupation and probably with a feeling engendered by it. It was perfectly true what Mr. Henry said, that under the widow's section two, four, six, or seven persons might delegate the powers to an assistant who was not responsible for the acts of the partnership. He would not be in any sense the owner but a servant. He did not wish to say anything on that point, he only wished to clear the ground. They did not want to split hairs, but everybody knew that the weak point in their armour was int hat clause. He knew of businesses being carried on, not for one year but for many years, and there was no limit to it. They had practically all the privileges that the companies had had. Although he said that, yet the trade was not with him, the interests were so great. Until the mixed character of the chemists and druggists was a little more differentiated, he could not get the support of a majority of the trade. He was there for business, and his judgment was that the majority of the trade would distinctly object to any interference with the widow's section, and that they would prefer to take the evils they had rather than others that they did not know of. Perhaps they would not press the point in any way when it came to a division. It would be very gratifying to him if in the capital of Scotland and before so large a meeting they could give him their unanimous support. As to the question of titles, that had been put before them once or twice before. Supposing they could without the slightest difficulty get a clause inserted in the Bill to the effect that no company should call itself a chemist and druggist, his difficulty was this; that if they had a registered chemist and druggist in their place, and if they were debarred from using the title over the door, and the Pharmaceutical Society prosecuted them, he believed the judges would not inflict a penalty. Let them think if they had to come before Lord Young and his compeers what he would say about it. Having had to do with a lot of prosecutions he might say that they hardly knew what the judges would do. They could not tell how the Act would be interpreted by lawyers until the cases came into court. If the judges thought that a company had broken the law they would probably put a penalty of *6d.* upon them. It was not because he did not value the title of chemist and druggist that he said so, but because he did not see how they could take back that without the whole thing. But was the wholesale store question not affected by themselves? Did not their chemists and druggists have to do with them? They had registered men in London who conducted drug stores. They not only said that they sold cheaper than anybody else, but they abused the whole of their brethren for charging so much. As to the widow's section he would remind them how much property was involved in the whole of these transactions and the difficulties in the way. He was there as President of the Pharmaceutical Society, and he was anxious to get them all to agree to the proposals, and not to ask them to put things into the Bill which they knew would not be accepted by the trade. As to the regulation of stores the Council would be glad to consider the matter. He thought that Mr. Nesbit was very wise when he said he would leave it to the Council. Up to the present time the Council thought it was better to follow the course that had been adopted, and a large number of the trade had also taken that view. He might remind Mr. Nesbit and others that this was not a final piece of legislation. If the trade would give the Society its support, the influence of the Society, like a snowball, would grow larger and larger as it rolled on every year. As to the question put by Mr. Gilmour, as to the affiliation of the curriculum with the Universities, he said the suggestion had been made from time to time that some association with the Universities in regard to the qualification of chemists and druggists and pharmaceutical chemists might be arranged in such a way as medical degrees were conferred. He quite conceived that a university board, to which two pharmacists or chemists and druggists might be attached, would be perfectly competent to examine. There were some who thought that the colleges and universities might perhaps start a degree in pharmacy. There were a good many chemists and druggists who were keeping open shop who were Bachelors of Science of London. He had to thank them from his heart for the courtesy and good feeling that had been shown towards him, and he left the decision in regard to the resolution entirely in their own hands. He was not there to influence them, although they might feel a certain amount of influence in what he had said. If they were not satisfied with what he had said, let them vote against the Bill; but if they were satisfied that what he had said was reasonable and business-like, showing a certain amount of benefit to all concerned, then he hoped they would unanimously approve of the Bill.

The Chairman asked Mr. Macpherson if he would withdraw his amendment?

Mr. Macpherson said he would like to support Mr. Carteighe in his desire that the meeting should be unanimous, although he wished that the views expressed in the amendment should be put before him. He would withdraw the amendment.

Mr. W. S. Glass moved:—

> "That the 'immediate supervision' provided for in clause 7 of the present Pharmacy Act Amendment Bill be made to mean that a registered person shall have the supervision of no more than three unregistered assistants or apprentices."

The Chairman asked if Mr. Glass wished to insist on his amendment?

Mr. Glass said he had proposed it more in the way of suggestion.

Mr. Carteighe said he would take care to consider the suggestion.

The resolution approving of the Bill was then unanimously agreed to.

Mr. Noble moved that a hearty vote of thanks be awarded to Mr. Carteighe for his presence, and for his able address. They were greatly indebted to him. They would long remember that evening, and would think of the Bill when it came forward in its different stages. He was glad that the proposal to approve of the Bill had been carried unanimously.

The motion was cordially adopted.

The Chairman, addressing Mr. Carteighe, said he had much pleasure in conveying to him the thanks of the meeting—the motion having been carried unanimously and with acclamation.

Mr. Carteighe said he had simply to thank them most heartily for their great kindness to him, and not only them, but every Scotchman he had come across during the week. Wherever they differed they had only differed in kindness, and had shown to him the greatest consideration.

On the motion of Mr. Storrar a cordial vote of thanks was given to the Chairman and the meeting terminated.

EDINBURGH CHEMISTS' ANNUAL BALL.

The Edinburgh Chemists' Eighth Annual Ball took place on the evening of Thursday, January 22, in the Assembly Rooms, George Street. Dancing commenced at 9 p.m., and at 11.30 an adjournment was made for supper, at which Mr. David McLaren presided, being supported by Mr. Michael Carteighe, President of the Pharmaceutical Society of Great Britain.

The toast of the "Queen and Royal Family" having been duly honoured, the Chairman proposed the "Health of Mr. Carteighe," and said they had been drinking the health of the Queen, but they had among them to-night one who was the king of pharmacy, and he would say of Mr. Carteighe that the man whom they could fully trust was at the head of the Pharmaceutical Society. The toast was drunk with great enthusiasm.

Mr. Carteighe, whose rising was the signal for a renewal of the applause, said when you and your colleagues, as you have been doing for some years, asked me to associate myself with this ball I felt that it was your desire to bind together the north and the south. I can assure you the desire of the south and my personal desire is that the north and the south should be associated in the closest possible way, not only for the purpose of self-interest, but also for the purpose of social enjoyment. I have made several attempts in former years to come to this gathering, but until this year I have been unsuccessful. Let me further say that I consider it eminently desirable that you in Edinburgh should make this ball a conspicuous success, and if need be increase its numbers and enjoyments. And now I am privileged to propose a toast, which is "Success to the Edinburgh Chemists' Ball and the Health of the Ladies." I would like to say that though delighted to see here to-night so many of my young Edinburgh friends, I confess I am a little surprised not to find a few elderly fogies like myself. You know that in London the annual ball, the silver wedding of which was celebrated a few days ago, is always looked forward to with pleasure as an occasion when social intercourse takes place between all, and I am quite astonished that a larger number of the principals in Edinburgh are not here to-night. I make it a point to be present at our Ball in London, and only something unforeseen would prevent my being there, and I would willingly do anything if it tended to promote that joyful, friendly intercourse between apprentices, assistants, and principals, their respective lady friends, wives, and daughters at times of recreation. In nine cases out of ten we chemists forget that it is necessary to throw off the yoke and absolutely revel in enjoyment to get the full benefit. At the same time we do not want to be over frivolous, and the presence of a few elderly persons would tend to prevent too much frivolity. We had some difficulty in London in the early days, for at that time many leading pharmacists belonged to the Society of Friends, who, as you know, object to dancing as a form of amusement. But now all that is gone, and many of us, from the President down to the youngest junior, have made many friends in London, so that we are now a series of little families, interchanging visits and enjoying ourselves to the intense satisfaction of everybody. We have been able, too, in our enjoyments to help our less fortunate brethren, for during the last twenty-five years we have managed to hand over £500 to the Benevolent Fund of the Pharmaceutical Society. The toast is, "Success to the Edinburgh Chemists' Ball and the Health of the Ladies."

The toast, having been duly honoured, was briefly acknowledged by Mr. Maclaren, and dancing was then resumed, the President entering heartily into the enjoyments. The supper room was beautifully decorated by Messrs. Cranston and Elliot, the effect being heightened by a number of plants kindly lent by Mr. Richard Raimes, Bonnington Park.

There were over seventy couples present, and a highly enjoyable evening was spent, the arrangements being under the charge of Mr. Duncan McGlashan, Convener. Messrs. J. Blenkiron and J. P. Thomson acted most efficiently as masters of ceremonies.

MEETING OF CHEMISTS AND DRUGGISTS IN DUMFRIES.

The President of the Pharmaceutical Society spent Sunday night in Dumfries, and on Monday forenoon he met in the Station Hotel the members of the local branch, of whom there was a good attendance, including two gentlemen from Annan, in addition to those resident in the town. Mr. Martindale, a member of the Council, also travelled from Carlisle, where he was on a visit, in order to attend the meeting.

Mr. Ewing, Chairman of Dumfries School Board, was called upon to preside.

In opening the proceedings the Chairman said they were much indebted to Mr. Carteighe for coming there to discuss with them the Pharmacy Acts Amendment Bill, which was a measure of great importance to gentlemen engaged in their business. In seeking to raise the standard of qualification they were just moving in the same direction as other professions. A higher standard of attainment was required even of ministers than that which sufficed for their fathers; the dry theology that served twenty years ago would not do now. And all professions had to keep pace with the advance of the people in education. He could see that there would be a difficulty in the way of getting education for their apprentices; but there was a movement among leading men for an improvement in the secondary schools, and he had no doubt it would come earlier than they expected. Under the new system he anticipated less time would be bestowed on Greek and Latin, or even on modern languages, and greater prominence would be given to the teaching of practical science. He had now been fifty years in the business, and during that time a remarkable improvement had taken place. When he was a boy, for example, it was quite a usual thing for a boy to use the lancet. It was considered necessary that every person in the spring of the year should be bled. He had seen also the prescriptions of eminent men at that period, and found there were just three agents with which they dealt—calomel, opium and bleeding. All this had passed away. There had been a great development of pharmacy, and they must take care to make themselves familiar with all the new discoveries, to know the strength of the different agents, and not to dispense anything that was injurious. They had considered it their province to supervise the prescriptions of doctors sometimes, who in a hurry might make a mistake. He had known such mistakes pointed out, and the doctor expressing his gratitude to the chemist. In 1848, when cholera visited Dumfries, the medical profession could not cope with it at all. Sometimes, amid the depression that settled on everybody, one's curiosity was aroused to see the different things that were prescribed. They changed from calomel to opium and camphor; and from one gentleman who had just arrived in the town, he received a prescription of thirty grains of calomel. He sent to ask how many powders it was to be made into, and he received a pretty sharp answer "None." He dispensed it. The doctor said it was a cure. But he never dispensed another thirty grains of calomel except as a dose for pigs.

Mr. W. Allan, Secretary of the local branch, to whose efforts it was chiefly due that the visit of Mr. Carteighe had been arranged, read a letter of apology for absence from his partner, Mr. R. B. Carruthers, of Huntingdon Lodge, who had been called from home by the illness of a relative.

Mr. Carteighe then addressed the meeting and was accorded a very hearty reception. He was delighted, he said, to hear a gentleman of Mr. Ewing's long experience talking in this broad, youthful way in regard to education. It was perfectly refreshing, because there were so many people in this world who croaked about it and thought we were going to destroy everything by education. Mr. Ewing had shown clearly, from his own experience, how opposite this was to the truth. Probably the improved higher education of which the Chairman spoke would be available in the secondary schools before the educational portion of the Bill came into force, for that would take five years even if the Bill should pass this session. The tendency to teach elementary botany and chemistry in the schools was so strong now that the Council thought these subjects should be put into the Preliminary examination. He was gratified to find that in Scotland, which owed a very large part of its prosperity to its excellent educational system, the educational provisions of the Bill commanded approval. He should have been shocked indeed if he had been obliged to go back and say that the Scotch objected to education. In their competition with Englishmen in the colonies and all over the world Scotsmen experienced the advantage of a good early education. Good education could not be got late in life; it must be got early. The great thing for them was to get those to come into their craft who were fairly educated; to exclude those who could not pass the Preliminary examination. Proceeding to discuss the provisions of the Bill in detail, he pointed out that the Society proposed to ask for power to regulate the curriculum and examinations by bye-laws, so that they might be changed with the times, and also that the constitution of the Council was a matter entirely in the hands of the members of the Society. Some of his friends had suggested that there should be a law making it penal for a chemist to take an apprentice who had not passed his Preliminary examination; but the parties, he observed, could easily contract themselves out of such a law. The Council proposed to make the pupil keep work steadily before him, and so to divide it that only the practical part of the examination would remain to be undergone when he reached the age of twenty-one. This, he argued, would enable the work of examination to be more thoroughly and satisfactorily done, and it would also be fairer to the candidate than to require him to submit to examination on six subjects, practical and theoretical, on one day. The Council proposed a curriculum of chemistry, botany, and materia medica. It was said this would be expensive. But at present the apprentice went through the same course, by means of private schools or otherwise. The Council wished to put the curriculum before him in a systematic manner. In various centres, like Dumfries, for instance, they would probably have at some of the schools, or among themselves, one who could undertake the teaching of chemistry, and one of themselves, he had no doubt, was quite able to teach botany and materia medica. If they wanted a little preliminary help in the way of apparatus, the Pharmaceutical Society would be happy to supply it. That was the way they conducted their education in the States; and he did not see why it should not be done here. Why should they not develop an *esprit de corps* and raise the standard of education of their own class after they had entered the business? Adverting to the suggestion of Professor Fraser, of Edinburgh, that some of the Scotch, and perhaps also some of the English universities, might institute a degree in pharmacy, he said he saw no difficulty about that, provided two competent pharmacists formed members of the Board. That would stimulate high-class pharmacy and would be looked upon as a more honourable mode of getting certificates than the others. This Bill gave the Examiners power to accept degrees from other bodies. They did not want to do the work of examination themselves more than was necessary, but only to secure that the education had been received. He expressed the opinion that under the present hurried system of examination many passed who had not fulfilled the necessary condition of three years' dispensing or pupilage, mentioning as example the case of young gentlemen who might be attached more or less to the wholesale department of a business and do only a little dispensing towards the end of a year, or go to a "coach," by whom they would be taught the typical prescriptions, as surgeons used to be taught chemistry. Clause 6, he went on to say, would leave no chemist and druggist of the future an excuse for not joining the Pharmaceutical Society, and he urged the importance of possessing a strong and thoroughly representative organization for mutual defence and as a lever for obtaining further concessions. The most important clause to the trade was clause 7. The Council proposed to ask Parliament to give chemists power to dispense medicines as well as poisons. They were not prepared to be swamped by people who started next door to them and did the whole of their business, quietly leaving out the poisons. Having alluded to the extent to which dispensing was being carried on by unqualified persons, he said they should approach the medical profession and say, "Now, gentlemen, do not you think it is better for us jointly to attack the ignorant public and point out to them the danger of this, and that it is best that you should write the prescriptions and we should dispense them?" He believed the medical profession, if approached in a proper spirit, would be glad to fall in with this suggestion. The physician dispensed not because he liked it, but because he was obliged to do so in order to satisfy the ignorant public, who did not think they got value for his moderate fee unless they received not only his advice, but the tangible result in a bottle of physic. And they would get rid of the stable-boy dispenser in surgeries. In many surgeries the dispensing was well done; but it was not always so; and it would be well that this separation should take place. But it could not be done until chemists had the statutory right to dispense medicines, which the medical men had under an old Apothecaries Act, but which the chemists did not yet possess. The President noticed next the proposed exemption from service on juries. Coming next to the question of company dealing, he explained that they had tried to attack that in various ways, and had come to the conclusion that in the interests of the trade nothing but the personal qualification of the vendor would meet the case. He pointed out the difficulties in the way of securing any legislative interference with company trading, and mentioned several instances in which the Society had recently taken action successfully against companies who were infringing the existing law.

Mr. Sutherland said he was sure he was only expressing what all thought when he said they had listened with the greatest pleasure to the President's able and lucid address on the new Bill. He knew no one who had done more for the Pharmaceutical Society than Mr. Carteighe, and they felt highly honoured by his visit to Dumfries. This Bill, he thought, would be for the decided advantage of the whole trade. At present they were practically under its educational provisions, for during the last five years, or seven at the most, there had arisen in Scotland a system of preparing for examinations in Scotland which did not formerly exist. That system was in many cases a great deal more expensive than it would be under this Pharmacy Bill, if they should get it passed. With an academy such as they had in Dumfries they might be perfectly able to prepare all their young men there to pass the examination without even leaving their own town. When all other bodies were advancing so rapidly in their educational facilities they should not lag behind, for the public were certainly much more enlightened than they were formerly. Unless they could command the support of the whole trade they could not hope to advance. He would certainly extend to all outside, freely and honourably, the privileges of membership if they could get them to come into the Society, for unless the whole body of chemists and druggists were represented by the Society, they could not look for assistance from legislation. They could not look for protection, the time had passed for that. Their best protection was to respect themselves and raise the tone of the whole trade to a higher level. They would be able to command the confidence of the public and of the doctors, and to gain, he thought, very materially in more points than one. He expressed approval of the exemption from jury service clause, which already existed in England, but not in Scotland. In a business where so much responsibility rested on the shoulders of the principal, he thought they should be spared the time and expense of attending on juries. They were flattered with the idea that they were a highly educated class of men who could not be dispensed with, but they were willing to forego the compliment if they got free. He also strongly approved of the proposal to divide the examinations. The chemist and druggist must be both a business man and a professional man. Let him be educated by every possible means. And he thought that the question of expense that was raised in some places was a question that ought not to be raised at all. If they were more particular in admitting their apprentices—in admitting only those who were likely to be suitable chemists and druggists—there would be a great deal less discontent in the trade. It was the men who had served their apprenticeship with doctors who were creating this discontent. It would be found as a rule that those who had passed through an apprenticeship of three, four, or five years, if the master had interested himself in them at all, had done credit to themselves and to the trade. In concluding, he assured Mr. Carteighe that had the hour been a little later, to permit of the attendance of chemists from adjoining towns, they would have welcomed him in larger numbers. He submitted the following resolution:—

> "That this meeting of chemists of Dumfries and neighbourhood approves generally of the Pharmacy Act Amendment Bill, and is of opinion that the Council of the Pharmaceutical Society deserves the support of the entire trade in its efforts to promote further legislation in the interests of pharmacy."

Mr. Daniel seconded the motion, remarking that there was not a clause of the Bill with which he disagreed, but expressing the hope that the trading interest would not be overlooked in dealing with the educational.

In reply to a question which he put, Mr. Carteighe explained that it was proposed to abolish the entrance fee at present charged on members joining the Society.

The motion was unanimously adopted.

Mr. Martindale afterwards made a few remarks in supplement of the President's address. He emphasized the importance of a laboratory course in addition to an apprenticeship, and pointed out that if they did not inspire confidence by their educational attainments the trade would very probably be put under irksome police regulations, as was the case with some others.

The Chairman subsequently proposed the health of Mr. Carteighe and thanks for his visit, and Mr. Allan paid a similar compliment to Mr. Martindale.

Mr. Carteighe in turn proposed the health of the Chairman, remarking on the pleasure which it had afforded him to make the acquaintance in Edinburgh of Mr. Ewing's son, a member of the well-known firm of Duncan, Flockhart and Co., and remarking that the chemists of Dumfries might be proud to have as their Chairman a gentleman who took such an influential part in public affairs and in educational work.

The health of Mr. Allan was also toasted on the motion of Mr. Boyd, Annan.

It being the day on which the anniversary of the birth of Robert Burns was being observed throughout Scotland, the party drove to St. Michael's churchyard during the short interval that remained before the arrival of the train for Carlisle, in order to visit the poet's grave, and inscribed their names in the book kept in the mausoleum.

CONFERENCE OF CHEMISTS AND DRUGGISTS AT CARLISLE.

A conference of registered chemists resident in Cumberland and Westmorland was held at the County Hotel, Carlisle, on Monday afternoon, with regard to the Pharmacy Act Amendment Bill, Mr. M. Carteighe, President of the Pharmaceutical Society, and Mr. Martindale, London, attending with the object of giving information concerning the Bill, and of obtaining an expression of opinion upon the subject. Mr. A. Thompson, Carlisle, presided, and there were also present Mr. Hallaway, Mr. Anthony Nichol, Mr. Sawyer, Mr. W. H. Pattinson, Mr. Flynn, Mr. Hallhead, Mr. Simpson, Mr. W. Parker, Mr. Robson, Mr. Richardson, Mr. Parker (Botchergate), Carlisle; Mr. Bateson, Mr. Farrer (Kendal), Mr. Boyd (Annan), Mr. Kirkbride (Penrith), Mr. Hayton (Wigton), etc.

The Chairman having mentioned the receipt of several letters of regret for non-attendance

Mr. Carteighe, in the course of a speech, referred to the history of the Pharmaceutical Society, leading up to the proposals of the Society as embodied in the draft Bill now being considered by the meeting. He alluded to the Society as a body which, while on the one hand it was empowered by law to exact certain qualifications in those who became its members, and did work for the Government in protecting the public, on the other hand was a voluntary society, doing all that could be done to further the education of the young chemist and druggist, with the view to benefit him in his calling, and to give him such a position in the world that he might claim a higher price from the public than the ordinary huckster and general dealer could. He related the fortunes of the Society in regard to previous legislative efforts, and said the Society must carry out its public duties to the satisfaction of the public and of the Government, whether the trade liked it or not. If the Society did not do so its powers would be taken away and given to the Privy Council or the Medical Council; and the Society thought it better to retain them in its own hands rather than let them get into the hands of persons who did not understand the business so well. So that the Society had to behave itself towards the public and the Government on the one hand, and on the other towards its own members. Though the Society had opened its doors widely, comparatively few had availed themselves of membership, and while the trade was crying out for increased powers, increased restrictions to be placed upon the sale of certain preparations, the Society was actually crippled in its endeavours, because three-fourths of the trade were outside the body. Not only that, but they criticized in an unfavourable way everything the Society did, and the Society was hardly able to move. If any present were inclined to laugh or criticize, he had only to remind them of the situation in 1866, when opposition assailing their Bill then before the House. a minister said, "Gentlemen, I do not understand these things, but if your own body cannot agree upon what they want, you must go away until you are agreed." So there they were—a disconnected, disunited, grumbling body. It was no good grumbling; they must put their heads together and see if anything was to be done in constructive legislation which would benefit them, and this Bill had been drafted with that object. It did not fulfil all the conditions many would wish. In many cases the sins of omission might be greater than the sins of commission from the point of view of some in that meeting. It was a Bill which the Council thought it could get the support of the Government for; and if passed it would give very great advantages—it would be one step on the rung of the ladder to ensure professional recognition and advantage in the shape of compounding prescriptions which chemists never had before. Their Irish brethren had had this advantage for a long time, they had a monopoly in the compounding of all medical prescriptions, while in England they had only the monopoly of compounding poisons. He saw in the Bill from a trade point of view the prospect of very great gain; but for their own interests he did not want them to ask him to go much into detail as to where and how he saw this. The 7th clause was one of very great advantage to every chemist and druggist in the future. The Society had been in existence fifty years, and still was unsuccessful in obtaining from Parliament any interference with the principle of free trade to a further extent than with regard to the selling and dispensing of a limited number of poisons. Some asked for restriction on the sale of simple drugs, some on the sale of compound preparations, and so on. But the Society had the Government to deal with, and the Government would not listen to anything of the sort. They said, "No thanks; it is free trade." Simple drugs are out of the question. But it was possible, sooner or later, that the Society might attack the question of compounded preparations in regard to the Pharmacopœia—especially if successful in getting this Bill into Committee, because it was proposed to restrict dispensing to proper persons, and seeing that every preparation of the Pharmacopœia was compounded from prescription they might logically ask for this power. He pressed upon the meeting the difficulties which were sure to meet the Bill, and asked for their hearty support. If opposition was intended, and was likely to prove an effectual bar, it was no use wasting time and money in trying to fight for the Bill in Parliament and for privileges which were not esteemed. With regard to legislation affecting company traders, he pointed out the difficulty there was to promote legislation affecting them. The rage for companies and company formation now-a-days was so great that any voice raised in Parliament against them he believed would be lost. Besides there was the reply that the companies benefited the poor, and were good all round, and they were the best thing possible for young registered chemists and druggists, giving them a chance of getting a decent salary and getting along in cases where they had no capital. Naturally the Society hesitated to attack this subject in the Bill. It was more than probable if a clause had been introduced it would be tinkered by some member, and they might be told to take back the Bill, as they only wanted to increase their own incomes, and they had better go about their business. Proceeding to comment upon the various clauses of the Bill, by clauses 2 and 3 it was expected that the relations between masters and apprentices would be improved, and the latter would be encouraged to work in the shops. The Council hoped also to kill a great bugbear of the trade, where an apprentice put off all preparation until he had finished, and then went to some centre, where he went to school, tried a three months' course of coaching and failed, tried coaching again, and failed once more, and so on. There was an enormous number of such cases. And what became of them? They became pirates upon the legitimate drug trade. A great deal of unseen piracy was carried on by men of that sort. The struggle for existence was very great; they must have a living somehow, and they formed the basis of large establishments, medical halls with no names, dispensaries with no names. These were the men who practically sapped the foundations of decent business, and it was right that the number should be kept down to the smallest possible limit. They did not want to grow men to become brigands, but rather men to work and trade and compete with their fellows in the usual way. The clauses would give the Society the power of obtaining a recognized three years' qualification. The present certificate was useless for the purpose; it was impossible to ascertain a man's proper qualifications from a rapid examination in six subjects in one day, some of them only occupying three-quarters of an hour. What was proposed was a system of decentralization which would prevent that perpetual running to the centres to cram up for an examination and get through, and then disgorge all they had, and then suddenly start business. Why in Carlisle should they not have the means of teaching and preparing their pupils? Some could teach chemistry, some the materia medica, some botany; and pharmacy was best taught in the shop. Why should they not have here that arrangement for teaching, concurrently with technical education? The masters might be the teachers for fees or a consideration. Sums of money were themselves qualifications for going into any calling, and they should not be set aside. In clause 7, he observed, he saw a great advantage. The words "under immediate supervision" might be objectionable, and might be left out, but the clause covered a number of cases which would be a very great boon to the trade, and he had reason to believe the Government would assent to it. He briefly alluded to other clauses of the Bill, and went on to remark upon the general question of ethics, referring to prosecutions by the Society, and dishonest practices amongst a certain class in the trade. He concluded by asking for a united expression of feeling on the subject of the Bill, whether they would join the Society in the promotion of this Bill, or leave legislation alone for another twenty-five years.

Mr. Hallaway said the education clauses of the Bill were very important, if not the most important, part of the Bill. Soon after entering the trade, forty years ago, he came to the conclusion that it was right and proper in the interests of the public and the welfare of the trade that chemists should be an educated body of men, and that they should stand the hall-mark of examination. For many years he had advocated a compulsory curriculum, something after this kind. For the last ten or twelve months an apprentice should be compelled by indenture to attend at Bloomsbury Square or some other recognized school of pharmacy, the Preliminary, of course, to be passed before entering his apprenticeship. He did not see any hardship in the proposed curriculum, for practically there was at present a "voluntary" compulsory curriculum; for he saw that from 95 to 99 per cent. of the young men, before presenting themselves for examination, went through a course of study at some school of pharmacy. But there was this difference between compulsory and voluntary compulsory, that in the latter it was not so much to gain knowledge or to educate as to pass the examination, and this in the shortest possible time; while in the former, by being compelled to attend for a lengthened period some school of pharmacy, the study was spread over the whole of the apprenticeship. The student who worked must of necessity be a fuller man, more thorough, and consequently a better man. Nos. 4, 5 and 6 clauses referred to the constitution of the Society, and he thought they would be approved of and agreed to. As regarded the 7th clause, which he had no doubt with many was the plague spot in the Bill, he could only say they had no choice in the matter. The judges had decided that the seller must be qualified, and they could not get over it unless they could get this decision reversed. He thought it was better as it is, both for the public and for the trade; and if they could get the dispensing or compounding of medicines, in the interest of the public, given to them, they would get a great boon. He could not see what difference it would make to chemists if they employed a qualified assistant in place of an unqualified one. The difference of salary would not be great; and in all probability there would be fewer businesses, the existing businesses would be better, and they would be able to pay more. Then, what a great comfort it was to know that when one was out or away, there was left behind a competent man; and should unfortunately any accident or mistake occur, what a much better position the master was in—having done his duty and the best that he could do. One could not help feeling sorry for young men who were unqualified, and to some extent they had a grievance, because, for the past twenty years they had been led to believe, as had also their masters and even the Pharmaceutical Council, that if the keeper of a shop was qualified, it covered all in his employment, either in branches or in the chief shop. It seemed strange they should have been living in a fools' paradise so long; and he would be very glad if some way could be devised compatible with the interests and safety of the public—and their duty to themselves—by which unqualified assistants could be affiliated. This should be left to the legal advisers of the Society on the Council. The only difficulty he saw was that to allow them to remain assistants as at present and to dispense and retail poisons the law would have to be altered; also, they said they must not commence business because they were unqualified. The ground was cut off for allowing them to go on as they were doing, because if it was said they were unfit to begin business they were unfit to be left in charge. It was a difficult point, and would require some consideration for its solution. At the same time there would always be unqualified assistants, as there would be lots of businesses where several assistants were employed, and where supervision could easily be exercised, such as wholesale businesses, travelling, &c. As to company trading, he scarcely knew what to say or what to advise for the best. He had the opinion that it was not much use competing with them, and had acted with that view since their troubles in Carlisle began. One opinion he had was that they had suffered quite as much, if not more, within their own ranks as from without, and if the companies were quashed to-day there would still be "cutting" chemists and underselling going on to-morrow. Perhaps education, a code of ethics, a high moral standing to which they should be loyal, might to a large extent get rid of it amongst the trade. He would be very glad to see the companies prevented from selling poisons and dispensing, for it was morally wrong for seven men to do what one could not do. In conclusion he begged to say that he quite approved of the proposed legislation, and he proposed for the acceptance of the meeting the following resolution:—

> "That this meeting expresses its confidence in the Council of the Pharmaceutical Society, and pledges itself to support it in its endeavour to pass the proposed Pharmacy Amendment Acts Bill. At the same time, this meeting suggests and would advise that the Council insert a clause making it compulsory for apprentices to pass the Preliminary examination before entering on their apprenticeship, when clauses 2 and 3 come into force."

A question was asked if it was proposed to make it imperative on apprentices passing their examination before they commenced their regular apprenticeship?

Mr. Hallaway answered in the affirmative. In reply to an observation that an apprentice would have to pay 10*s*. 6*d*. immediately he becomes a student of the Pharmaceutical Society, Mr. Hallaway said it was not necessary he should become a student if he passed his Preliminary examination.

Mr. Carteighe said that was not proposed in the Bill, though Mr. Hallaway thought it was desirable. If there were compulsory powers, the feeling was that it would relieve masters from a difficult position in many cases where they had pupils and apprentices.

Mr. Boyd, Annan, seconded Mr. Hallaway's motion. The only difficulty he found was regarding the curriculum. He could not understand the proposal for every apprentice to go to London for the last ten months and finish his course. It only left it to those who could afford to do so.

Mr. Hallaway said he had advocated that for many years; but it was not advocated in the Bill, which spread it over a greater length of time. For the first two or three years it was expected he would get his education at home.

Mr. Boyd: He can attend a course of instruction anywhere he chooses for his Minor examination.

Mr. Carteighe: He would have to get his instruction in a suitable place, from people who had the means of teaching.

Mr. Boyd: That is the only difficulty I see. You cannot send them away.

Mr. Hallaway: It will be like this. Parents and guardians will have to select a business they can pay for. A man going to be a doctor counts the cost first.

Mr. Boyd said a man might be able to give his son an education at an academy at home and fit him for a business of this kind, and then for him to be thrown out in the cold was scarcely the thing.

Mr. Hallaway said that young men going to Bloomsbury Square or some other educational establishment must spend a good deal of money at present as it was; they could not go there for nothing.

Mr. Boyd said that was one of his contentions. A great many failures were due to their having to go such a distance to get that instruction.

Mr. Sawyer said he did not see how a young man was to get the requisite education in a place like Carlisle. He had sent round the town to try and get other chemists to help him to teach young men, but they did not do it, and where were they to get their education? It was a deal of expense. At Annan they were worse off than at Carlisle. It was a great consideration for young men when they went to a business to think that they would have to spend twelve months, after serving five years and learning very little, in getting crammed. Apprentices ought to see before they joined any business that they were going to have a regular course of instruction in the town they lived in during their apprenticeship. Chemists ought all to be in a position to take classes and in that way to assist them.

Mr. Martindale said that during the first three years there would be a period in which the candidate who had passed his Preliminary would have opportunities of getting elementary knowledge in these three subjects—chemistry, botany, and pharmacy. These, it was imagined, would be taught at many technical schools in the towns throughout the country, in a way that would meet the Society's demands. Such subjects were taught in connection with the South Kensington School; he understood such a school was being started at Carlisle and also at Dumfries. The present system of one day's examination was hardly right, and they wanted to make it easier for the candidate who, during his apprenticeship, must have gone through a system of teaching by his master, if possible, or of teaching in some one or other of the towns in the neighbourhood, or in a neighbouring town as improver. This would not come into force until 1895, so that apprentices coming into the trade after that period or during the interim would have a chance of knowing what their prospects were. By a course of instruction in a chemical laboratory the status of the young men would be raised. It would be a great advantage if masters would regulate this matter, and say they could not take an apprentice who had not had an elementary education fitting him for a scientific training. If this could be carried out it would necessitate an indenture stating that the apprentice, before coming to the master, had passed a Preliminary examination. A uniform system of education was wanted, and part of it should comprise working in a chemical laboratory for at any rate six months. He went on to allude to the compounding clause.

Mr. Boyd asked: Would you consider a registered chemist and druggist a proper authority to give a course of instruction? Would you consider the master a proper source to give the apprentice instruction?

Mr. Carteighe: You mean for his own pupils? I hardly think we should.

Mr. Boyd: There is where you would have a bone of contention in the country.

Mr. Carteighe: You cannot deal with that without having absolutely free examination.

Mr. Boyd: That compels these lads to go to London or some other centre, or go out of the trade. There are just two courses open to them.

Mr. Carteighe: In the case of an outlying place he would clearly have to go somewhere, but it would not be the case in Carlisle.

Mr. Sawyer: I am sorry to say it is.

Mr. Carteighe: But what if you had compulsory power? What you teach now is not recognized except in results.

Mr. Sawyer: I think a short time in London would be quite sufficient if thoroughly grounded by the masters beforehand.

Mr. Carteighe: No need to go to London at all.

Mr. Hallaway: There may be classes for teaching here.

Mr. M. H. Pattinson: The difficulty is in the smaller towns, like Brampton, Wigton and Penrith.

Mr. Boyd said that was it. There was another matter also he should mention. It was from only one class they could get apprentices in a country town; and they were not the class who could afford to go to London or elsewhere for their instruction.

Mr. Bateson said at Kendal they found the apprentice difficulty a very serious one. If the foundation was laid right with regard to apprentices considerable difficulty would be overcome. The Preliminary examination should be made compulsory. He knew lots of cases where likely lads had been taken, in the expectation that they would qualify themselves for their Preliminary examination in a few months' time, but who, not being compelled to undergo an examination, dallied and put off until they were twenty-one, and had then gone to wreck at the last. In matters of legislation, it had struck him that the Legislature would never enfranchize any class of people which would mean the disfranchizement of others—as, for instance, in regard to the compounding of prescriptions. He understood the new Bill provided that this must be done by qualified men.

Mr. Carteighe: "Or under the supervision of"—those are the words. I could employ five unqualified men or apprentices, but they must not substitute the master.

Mr. Pattinson said it was a great hardship that the master must be upon the premises superintending every prescription. If the Bill was going to disfranchize all the assistants who were not on the register, but who had had large experience, it would be a great hardship and a great injustice.

Mr. Hallaway: They are already disfranchized.

Mr. Pattinson: Will it make any difference in their present position?

Mr. Carteighe: The present state of the law is that no unregistered person can take charge of a branch shop now. The alteration in the future will be that no person will be able to take charge of a shop where poisons are sold or where prescriptions are compounded, unless he is registered or under the supervision of a registered person.

Mr. Pattinson said they had to work their businesses with apprentices, and there were always one or two just passing out of their apprenticeship who were considered competent to carry on the business in the absence of the master.

Mr. Nichol said the objection Mr. Sawyer made against the Bill might be met by the explanation given by Mr. Carteighe. He (Mr. Nichol) expected that the masters of the chemist's shops in towns like Carlisle would be competent to teach pharmacy, botany, and chemistry, and that they would be recognized by the Pharmaceutical Society. Mr. Sawyer lodged a charge against the chemists of Carlisle with regard to assistance in teaching. They had been in rather a peculiar position in Carlisle, and he hoped the feeling that had existed was subsiding. They could not get anybody to move; one would take action and ask another to assist, with the result that failures were predicted, and there was a general holding aloof. Two or three had joined together and promised to give lectures; a few kept their promises, but others did not turn up. Nobody would take their classes for them, the lads got tired and would not come, and added to this there was the question of expense. As to students from Wigton and round about, he thought the Council would recognize an attendance of once a week, if he put in the whole of his lectures, at a centre like Carlisle.

Mr. Carteighe said he thought such a thing would be permissible. The exact conditions were not yet worked out in detail, and it would be a matter which would be regulated when the bye-laws came to be made.

Mr. Nichol said as to the 7th clause, it was the only protective clause the Society had. If they wanted protection for themselves as qualified chemists and druggists, they must concede something to get what they desired; and he was of opinion that the benefit they would derive would far outweigh any concessions they might make. He was perfectly agreeable to the Bill, but certainly objected to Mr. Hallaway's attachment. They could not get apprentices to do these things. People said it was no good for these lads to pass the Preliminary until they knew whether they liked the business or not. Let the lads go on trial. If they liked the business they could read for the Preliminary; if they did not, they would throw it up and go in for something else.

Several questions were asked and answered relative to the question of responsibility in the sale of poisons, and the course taken by the Society in the institution of prosecutions—this having reference more particularly to cases mentioned by Mr. Bateson concerning the sale of poisonous sheep dipping.

Mr. Hallaway, at the request of Mr. Carteighe, divided his resolution into two, so as to obtain a complete expression of opinion with regard to the first part.

On being put to the vote the motion expressing approval of the Bill was carried with only two dissentients.

The second motion:—

> "That this meeting would advise the Council to insert a clause making it compulsory for apprentices to pass their Preliminary examination before entering on their apprenticeship, when clauses 2 and 3 come into force,"

was seconded by Mr. Hallhead, and was carried, there being three votes to the contrary.

A vote of thanks to Mr. Carteighe, Mr. Martindale, and Mr. Thompson concluded the business.

ABERDEEN CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the present session was held in the Silver Street Hall on the evening of Friday, January 23, Mr. G. Cowie, President, in the chair.

The minutes, in which were recorded the Association's high appreciation of the address which Mr. Carteighe delivered to it, when on his visit to Aberdeen, having been read and approved,

Mr. J. Clark, Hon. President, read a paper on "Urine Analysis." He brought under notice the various reagents requisite, accompanied with demonstrations, and expressed the desirability of chemists being able to carry out such analysis.

A short discussion followed, in which the Chairman, from his experience, spoke in favour of Pavy's solution instead of Fehling's, for the estimation of sugar.

A hearty vote of thanks having been accorded to Mr. Clark for his paper, the meeting terminated.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION BALL.

The twentieth annual Ball of the Midland Counties Chemists' Association was held at the Edgbaston Assembly Rooms, on Thursday last, January 22.

Before dancing, the band of Mr. A. Gregory performed a selection of music, while the arrivals promenaded the hall. Dancing began at 8.30 and was kept up until about 2.30 a.m. next morning. Over a hundred sat down to supper. Many well known medical and professional gentlemen were present who were received by the President (Mr. A. Southall), with whom was Mrs. Southall. Many of the leading members of the Midland Counties Chemists' Association and neighbouring pharmacists were also present.

The Ball was a success numerically and financially. Mr. Reynolds acted as M.C., and the hall was tastefully decorated.

BRIGHTON ASSOCIATION OF PHARMACY.

The members of the Brighton Association of Pharmacy held their second annual Ball at the Royal Pavilion on Thursday evening, the company numbering about one hundred and fifty, and owing to the excellent arrangements made by the sub-Committee, Messrs. E. Histed, Marshall Leigh, J. Shepherd, T. H. B. Long and J. Williamson (Honorary Secretary), the reunion proved very enjoyable. Previous to the Ball a small party were entertained at dinner in the Masonic Room by Mr. Marshall Leigh (Honorary Secretary of the Brighton Association) to meet the President of the Pharmaceutical Society of Great Britain (Mr. Michael Carteighe). After dinner a few toasts were honoured, and the President gave an exposition of the Pharmacy Acts Amendment Bill.

Mr. Marshall Leigh presided, and among others present, in addition to the President, were Mr. W. D. Savage, J.P., President of the Brighton Association; Dr. Newsholme, Medical Officer of Health, Brighton, Messrs. H. R. Costerton, J. R. Gwatkin, E. Histed, T. H. B. Long, F. F. Shelvey, J. Shepherd, J. Smithson, W. Goyne Stevens, H. Goyne Stevens, Kilby Pears, H. Kilby Pears, Harris, Brown, Barton, Mills, and Aston, and R. J. MacDermott of Worthing.

Loyal toasts having been honoured, the health of the Mayor was drank.

His Worship, in reply, remarked that he was very pleased to meet a body of gentlemen, highly respected in the town, among whom he recognized many old friends, and in particular Mr. Savage, a borough magistrate and a former member of the Town Council. He was happy to be able to express appreciation of the benefits chemists rendered to the town.

The Chairman next proposed the "Health of the President," observing that he first had knowledge of Mr. Carteighe when he was a student, and Mr. Carteighe was then the bogie man of his dreams. Since he had come to know him, the more he knew of him the more he appreciated and honoured him. No words could express the services he had rendered to the Pharmaceutical Society, and, as a natural result, to the craft throughout the country. For, just as the Pharmaceutical Society was held in the estimation of medical men and others in the country, so was the craft respected by medical men and the public. Without depreciating former Presidents, Mr. Carteighe had done more than many of them in establishing a research laboratory, which raised their standing, and new examination rooms, which were a monument to his energy and industry. The extension of their buildings had done much to give that standing so desirable for the craft as a whole. Mr. Carteighe had just returned from a tour through England, Little Wales, and far off Scotland, and had been discussing with hard headed Scots the provisions of the Pharmacy Acts Amendment Bill and various ideas for improving the status of chemists. He had been most successful in his tour, and there was no doubt that as a result a large number of people would begin to see that the Society was doing something for them, was endeavouring to do a great deal more, and would therefore become members. It was said of John Bright that he realized the whole of his hopes, and that during a long lifetime people most opposed to him gradually came closer to him in thought until they were just about in agreement with him at his death. Might the same fortune attend their President. Might his hopes in regard to the craft and for increasing educational facilities of the Society and raising the whole trade be realized.

The President, in acknowledging the toast, said the object those interested in the Pharmaceutical Society had at heart was to make the corporate body as potent for good as possible. Every individual must exert himself to fight the battle of life, but the corporate body he represented was anxious in the widest possible manner to encourage and strengthen every individual member of that body. It was desirable that members of the craft should be associated together more closely throughout the country, and that not only they as pharmacists, but that every branch of the trade should be more or less organized, so that its real wants might become known, and that in regard to many things which affected the public, the public should be approached, or the Legislature should be approached by a united front of the craft. There was no compulsion about the Society. All members were voluntary members, but they asked every pharmacist to join them, not for their good but for the good of the individual himself who came in, and for the good of the whole body when he came in. Mr. Carteighe then proposed "Health, Long Life, and Happiness to their Host, Marshall Leigh."

Having responded, Mr. Savage, as President of the Brighton Association, took the chair, and said Mr. Carteighe was there to expound the new Bill introduced into Parliament, and would be pleased to answer any questions which might be put at the conclusion of his speech. Very few probably knew the amount of good that had arisen from Mr. Carteighe's efforts on behalf of the Pharmaceutical Society, but he knew what anxiety and exertion he had everywhere manifested for the prosperity of the Pharmaceutical Society and pharmaceutists generally, in every part of the kingdom. He trusted at some time the Society might become equal to the Universities, and be able to return a member of Parliament; that member should be Michael Carteighe, Esq. Mr. Carteighe was an Irishman, and he thought pharmaceutically they should have home rule. He had great pleasure in proposing the following resolution, and he trusted it would be carried unanimously:—

> "That this meeting approves of the Pharmacy Acts Amendment Bill proposed by the Council of the Pharmaceutical Society, and accords the measure its hearty support."

The President said that every one in the room knew pretty well what was in the Bill, and it was more important that he should hear what they said, than that they should hear what he had to say in regard to it. They were living in days when the interests of a large number of people with whom they were associated were more or less against them. He referred to those who distributed various articles to them, who at one time were distinctly associated with them, and who assisted in a kind of moral way, preserving a kind of ethical condition which was perfectly harmonious and which was on the whole beneficial to both the retailer and dispenser of medicines and to the man who was sometimes called the bigger man who supplied the crude material and accessories they used in their work. That relationship from a variety of causes was completely broken, and they were practically left to fight the battle themselves against all comers. Personally he believed in the power and strength of the well-equipped individual pharmacist. He believed he was capable of fighting anybody as long as he was not too heavily handicapped by external conditions. Still, certain changes in the law were eminently desirable, and if he had been one of those who had hesitated from time to take up trade matters it had not been from want of sympathy with his brethren, but from full knowledge of the forces opposed to them in Parliament and elsewhere. Their influence and powers of obstruction were powerful enough to prevent any unjust legislation being forced upon them, but the Society was not strong enough, without the support of the whole craft, to initiate and carry through legislation on its own behalf. Apart from this Bill he appealed to every chemist and druggist of Brighton whether he would remain an outside drop, incapable of doing any good in floating the great ship, or whether he would become one of those drops which would make an ocean, and the grand wave of which might send the ship right through the House of Commons. If the Society were not supported by the trade at large during the next few years all hope of getting legislation on trade questions must be abandoned. The Society had tried to do something for the trade in the Bill it was introducing. It proposed that in future a certain course of study should be required from each candidate before he presented himself for the qualifying examination: he could study where he liked so long as the place had the necessary facilities for giving instruction. This was not mentioned in the Bill, because it was proposed to make bye laws, but it was the intention, for they had found the present system unfair, tact, quickness of speech and sharpness of memory, with second-rate training, accounting for very much more than first-rate long training with incapacity for quick speech and comparatively steady but not sharp memory. The Society proposed to have centres of education, either among pharmacists themselves, or in affiliation with other teaching institutions, being of opinion that it would be better for candidates to attend a course of lectures and prepare for examination during apprenticeship rather than rush up to London at the end of their apprenticeship and cram the preparation into three or six months. Explaining other provisions of the Act, the speaker said one was to provide that those who had passed the Minor examination and were in business on their own account should be admitted to the Society. It was thought they should thus consolidate the Society, and another most important one was intended to make them by statute dispensers of medicine, for at present they were simply so on sufferance. He thought the time had come for them to point out to Parliament that in the interest of public safety they should be the sole dispensers of medicines for which their education and qualification exacted from them eminently fitted them.

Mr. Histed seconded the motion, observing that the Bill did not seem plain to some of them, but after the explanation of the President he thought it would appear highly satisfactory to them.

The motion was carried unanimously, and a hearty vote of thanks was passed to Mr. Savage for occupying the chair.

The party broke up with cheers for the President and Mrs. Carteighe, both of whom attended the ball subsequently held in the course of the evening.

An address was presented to the President by the Brighton Junior Association of Pharmacy.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Lord Justice Fry on Mosses.

Owing to the unavoidable absence of Lord Rayleigh, the first Friday Evening Lecture of the session was delivered at the Royal Institution on the 23rd inst., by the Right Hon. Sir Edward Fry, Lord Justice, the subject of his discourse being "British Mosses." Lord Justice Fry said that he appeared only in the character of a student, who was anxious to introduce a subject in which he found so great delight to the consideration of others. The right hon. speaker proceeded to point out the position occupied by the mosses in the vegetable kingdom as the highest developed form of the cellular cryptogams, and alluded to their tendency to fibrovascular structure, and the chasm existnig between mosses and higher cryptograms. The older classification of the Muscinæ into the groups *Musci*, *Sphagnaceæ* and *Hepaticeæ* and of the group *Musci* into the sub-groups *Pleurocarpeæ*, *Acrocarpeæ* and *Anomoleæ*, was adopted, and of these the *Acrocarpeæ*, which bear an urn (sporogonium) at the end of the axis of growth, and the *Pleurocarpeæ*, in which the capsule is developed laterally, were especially recommended for study. The number of British species amounts, said the lecturer, according to the latest calculations to eight or nine hundred, and the date of the native moss flora has been referred to the tertiary glacial period. Two very ancient collections occur in Scotland; the more important contains eleven species, of which at least ten have been identified with existing forms. It was discovered in the interglacial beds of Renfrewshire, so that accepting Wallace's chronology, these specimens must be from one hundred to one hundred and fifty thousand years old. The second collection, consisting of four species of *Hypnum* still occurring in the valley of the Clyde, was discovered not far from Glasgow and is of equal antiquity. In both collections the predominant genus is *Hypnum*, to which the long, straggly mosses of the woods and fields in the present day belong. In France species of *Polytrichum* have been found in the coal formation, but from the absence of vascular bundles, and consequently the want of tissue capable of offering strong resistance to the action of water, mosses are little adapted for preservation in the state of fossilization. It is noteworthy, however, that, as in the vascular cryptogam, it is the most highly developed forms of the present day that have been found in these prehistoric deposits. Lord Justice Fry then described the life-history of a moss, and illustrated with diagrams the germination of the spore, the development of the protonema, the budding or division into leaves and roots which form the moss plant, and the differentiation of the two classes of cells, archegonia and antheridia, by the fructification of which the sporogonium producing fresh spores, results. These explanations led to a summary delineation of Hofmeister's theory of the alternation of generations and its application throughout the vegetable kingdom, and subsequently the modes of reproduction in the mosses were discussed according to the following scheme:—

A. *Reproduction with Protonema.*

- I. By spores.
- II. By gemmæ.
  - (*a*) On end of leaf (*Orthotrichum phyllanthum*).
  - (*b*) On midrib (*Tortula papillosa*).
  - (*c*) On axis of leaf (*Bryum*).
  - (*d*) On balls (*Aulacomnium*).
  - (*e*) In cups (*Tetraphis*).
- III. By protonema.
  - (*a*) From rhizoids (*Phascum*).
  - (*b*) From aerial rhizoids (*Dicranum undulatum*).
  - (*c*) From terminal leaves (*Oncophorus glaucus*).
  - (*d*) From base of leaf (*Funaria hydrometrica*).
  - (*e*) From midrib (*Orthotrichum*).
  - (*f*) From margin (*Buxbaumia*).
  - (*g*) From stems (*Dicranum*).
  - (*h*) From calyptra (*Conomitrium*).

B. *Reproduction without Protonema.*

- IV. Leaf buds on rhizoids (*Grimmia*).
- V. Leaf buds on aerial rhizoids (*Dicranum*).
- VI. Bulbs on stem (*Bryum*).
- VII. Young plants at ends of branches (*Sphagnum*).
- VIII. Leafy branches becoming detached (*Cinclidotus*).
- IX. Rooting of main axis (*Mnium*).

In view of these numerous methods of reproduction of which the mosses are in possession, the lecturer somewhat severely criticized Dr. Weissman's new theory of division of cell-plasma. The latter investigator distinguishes two kinds of cells, or rather two kinds of plasma in living cells, of which the one, the germ plasma, is endowed with natural immortality, since it is capable of being transmitted from generation to generation, whilst the second is mortal or somatic. Lord Justice Fry remarked that the readiness with which every part of a moss reproduces itself would either suggest that there is no such division of the plasma, or else that the two hypothetical modifications are very intimately mixed throughout the plant, and the tone in which the remark was made betrayed the bias of the right hon. speaker for the first alternative. A few comparisons were then drawn with respect to vegetable and animal embryology, and it was pointed out that in both kingdoms evidence of a process of evolution could be gathered. Thus in the early stages of a moss the protonema indicated descent from an alga, and the change in the mature condition was analogous to that from the gilled tadpole to the batrychial frog. Moreover in the reproductive methods employed by the mosses there is an evident attempt to escape the necessity of "recapitulation" and a tendency to substitute a shorter process for the ancestral method, "a kind of short circuiting," as the lecturer expressed it, which makes itself visible in asexual reproduction. Returning from these theoretical considerations, Lord Justice Fry next showed a magnificent large model of German manufacture of a moss-capsule, the length or height being from two to three feet. The veil or calyptra, the remains of the archegone, was represented by a thin translucent covering which lifted off and brought the sporogonium to view. Upon removal of the cap, the teeth of the peristome were disclosed, and finally by displacement of one side, the arrangement of the spores within the capsule demonstrated. The extraordinary variety and beauty of the
shape and configuration of the peristome in dif
species, the simplest form of four teeth occurri
Tetraphis, was illustrated by the lecturer with th
of numerous diagrams. He also pointed out th
side the function attributed to the peristome
field botanist as an adjunct for the facilitation
finition of species, it enabled, by means of its
bility of assuming a reflexed or recurved po
according to atmospheric conditions, the spores
distributed by the plant under the conditio
dryness or moisture most favourable for their f
development. In conclusion, Lord Justice Fry
attention to the important rôle played by the "
mosses" in the history of the world. The mo
logical habits and anatomical structure of v
species of *Sphagnum* peculiarly adapt them f
absorption and retention of the largest possible
tity of water, so that they may be regarded as
able vegetable sponges. The shape and arrang
of the leaves upon the stem is such as to allo
play to capillary attraction, whilst the large
surrounding the denser tissue of both leave
stems act simply as pitchers for the stora
water. This property of the peat-mosses guar
lower lying land from damage by freshets in
of heavy rain, whilst by the upward grow
the Sphagnaceæ and subsequent decay the m
are gradually converted into solid ground. In
regions of Scotland, the Hebrides, Holland and Ir
however, it has been observed that forests have
replaced by peat mosses. This is due to the g
alteration of the highly absorptive "red" and "
peat into the impervious "black" peat, a thin l
which is sufficient to dam back water, and o
account is employed by the Dutch as the foun
for houses. The resistance offered to drainage
modification of peat destroys the conditions
which the growth of forests is possible.

Rebiew.

NOTES ON THE PRODUCTS OF WESTERN AF
ISTAN AND OF NORTH-EASTERN PERSIA. By J.
AITCHISON, C.I.E., M.D., F.R.S.*

During his sojourn in the regions of We
Afghanistan and North-East Persia, in the positio
naturalist to the Afghan Delimitation Commi
Dr. Aitchison acquired a large amount of val
information concerning the plants of that region
their uses. This information he has now publish
a form which is exceedingly useful for purpo
reference. The whole of the products and their n
botanical and commercial names are arranged i
tionary form. The great advantages (especially to fo
and English merchants) of this method of treat
will be evident from the fact that Afghan pro
frequently come to this country *viâ* Bombay,
their native names. In the preface Dr. Aitchiso
given rules for the pronunciation of the native n
so that it is an easy matter to turn to this dictio
and find out the scientific names and uses of such
ducts. In many cases a classified list of the ar
similar in character or uses is given. Thus unde
word drugs the whole of the drugs in the boo
enumerated, the list occupying five pages. Simil
under dyes all the dye plants are placed toge
and under tanning all the various tanning mate
The merchant therefore who may be intereste
drugs, dyes, fibres, gums, gum resins, oils, resins,
ning materials, wool, timber, etc., can readily asce
what the available resources of Afghanistan are.
the horticulturist and agriculturist will probably
some suggestive remarks under the head of foods
fodders, etc. The pretty yellow flowered delphin

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[*] Edinburgh: Neil and Co. Demy 8vo. Pp. [illegible]

. *Zalil*, whose flowers are employed for a yellow dye Afghanistan, has already been introduced into rdens in this country. *Eremurus aurantiacus* is oken of as a well flavoured vegetable, worthy the tention of the market gardener in England, while allied species, *E. aucherianus*, yields a quantity of ucilage available for many technical purposes. The ork may in fact be regarded as a complete storehouse interesting information concerning the vegetable ant and animal products of Afghanistan.

In an ordinary book of travels such details as the ove would have been scattered here and there and ould have to be laboriously searched for in the dy of the work, or perchance in the index. Dr. itchison's work by no means forms a bare dic- onary, but contains a number of useful and very adable notes extending often to half or a whole page der a single article. It is in fact a model of what such book should be both as regards matter, arrangement, yle and topography. If all travellers had only given e commercial and scientific worlds the results of their bours in such a portable, convenient and exceedingly eful form, many valuable natural products of other untries that are at present unknown would have en introduced into this country, and have added rgely to our imports and exports. It is a book that ould be in the library of every one interested in reign products, especially those on the look-out for velties. A traveller who can make such good use of s eyes as Dr. Aitchison should not be lost sight of hen new regions are explored. We understand that hopes to visit some of the regions of Persia that ve hitherto not been investigated botanically, and clear up the botanical sources of some of the pro- ucts that have for hundreds of years been involved mystery, such as opopanax, sagapenum, the different rieties of galbanum, etc., etc. No one could be more mpetent to undertake such work, for which, from his owledge of the people and of the Persian and abic languages, and of the botany of the neigh- uring countries, he is peculiarly fitted. If he is able visit Persia another valuable contribution to tanical and economical science may be looked for on s return.

Obituary.

EDWARD JOHN WARING, M.D.

The death is announced of Dr. E. J. Waring, the thor of a well-known manual of therapeutics. When, ortly after the appearance of the British Pharmaco- eia, in 1865, the Indian Government appointed a mmittee to draw up a Pharmacopœia of India, which, while affording all the information contained that work of practical use in India, would embody d combine with it such supplementary matter of ecial value in that country, as should adapt it to et the requirements of the Indian Medical Depart- ent," Dr. Waring was appointed a member. In the rk of that committee, on which he had the late niel Hanbury as a colleague, he took a very promin- t part, and when the Pharmacopœia of India was blished in 1868, it bore the name of Dr. Waring on title-page as Editor.

We regret also to have to record the death, on the th inst., of Mr. E. Richards, F.I.C., an active mem- r of the Chemists' Assistants' Association, and at the ne of his death its Financial Secretary. Mr. chards succumbed to an attack of pneumonia, after very short illness.

Notice has also been received of the death of the llowing:—

On the 12th of January, Mr. Thomas Pugh Jones, Chemist and Druggist, Broad Street, Welchpool. Aged 59 years.

On the 13th of January, at Rothbury, Mr. James Dores, formerly of Newcastle. Aged 71 years.

On the 14th of January, Mr. Andrew Chambers, Chemist and Druggist, Amble, Northumberland. Aged 74 years.

On the 17th of January, Mr. Thomas White Serjeant, Chemist and Druggist, West Derby Road, Liverpool. Aged 52 years.

On the 17th of January, Mr. John Napoleon Horsfield, Chemist and Druggist, Sweet Street, Holbeck, Leeds. Aged 66 years. Mr. Horsfield had been a Member of the Pharmaceutical Society since 1872.

On the 23rd of January, Mr. William Frederick Manley, Chemist and Druggist, Talfourd Road, Peckham, London. Aged 54 years. Mr. Manley had been a Member of the Pharmaceutical Society since 1873.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

MR. CARTEIGHE'S VISIT TO SCOTLAND.

Sir,—It is an omen of much significance, that at Mr. Carteighe's meeting in Edinburgh on the 23rd inst., a motion approving of the new Pharmacy Act Amendment Bill was unanimously adopted. The meeting was the largest ever assembled in the Society's house. It consisted of registered chemists, most of them, presumably, either Members or Associates of the Society.

In view of these facts, one feels eager to know what position Scottish chemists generally mean to take up. Do they still purpose holding aloof from the Society as in time past, or, like sensible men, do they now intend at once to become connected with it.

The growl that the Society has done nothing to improve the trade interests of chemists can no longer be indulged in. It was always mean, and is now obsolete. It is as certain as anything mundane may be, that a Bill, with the shutting up of stores as its object (by which is meant the protection of trade interests), has not the slightest chance of getting through Parliament. It is equally certain, however, that a better Bill than that under review would have been framed, had the Society been representative of even a majority of registered chemists.

This is where the gall and wormwood must be tasted; our position and prospects would have been much higher and fairer had we only been united and loyal to ourselves.

Now, however, that Edinburgh has shown the example, surely chemists everywhere through Scotland will rally in support of the cause. Surely local secretaries in their districts will call personally upon each individual chemist not connected with the Society and prevail upon him to join. Surely another chemist, with the zeal and enthusiasm of the idol of Scottish chemists, the late John Mackay, will arise to give us all a further lift forward and upward. So surely as all do so, the brightest and best days of pharmacy are yet to come. JOHN H. FISHER.

Dunfermline, N.B.

Sir,—It is with interest I read of the aspirations and progress of our hermaphroditic calling with hopes of seeing financial as well as educational progress on a more substantial basis when I return permanently to the so-called "tight little isle." In our present critical position great caution and combined non-flagging energy are our only resources; we cannot choose a better time than the present for action, with such an energetic, self-sacrificing, and able President at our head. In your issue of the 17th inst., under the title of "Company Trading and its Repression," you speak of the illegality, except through a qualified man, of poison selling and dispensing by the stores, and the benefit which may be achieved if we could induce registered persons not to act for them; this is, as you state, perhaps too much to expect. I, however, think something towards that end may be done, if all the first class pharmacies throughout the country would refuse to take for assistants those who have been employed by the stores. I know that this, to a certain extent, is already done, few good class houses approving of the slap bang manner of the majority of these gentlemen. I, however, think it should be made more universally known and realized, which in all probability it would be if those houses, when advertising for assistants, would state to the effect "that those who have been in stores need not apply." This has appeared once or twice, and from conversation with fellow assistants I think if more frequently adopted it would have somewhat substantial effect. The stores will, of course, be able to obtain qualified men, but not doing so with the same ease as at present, may be induced to give higher remuneration, thus making it, from a pharmaceutical point of view, better all round, and tending towards a higher respectability of our not superfluously remunerated craft. With combined individual energy and sounder education the at present irritating word stores should not, in the near future, sound so discordantly to the world behind the carboys.

A. Westley Gedge.

Sir,—In view of the apathy, if not active opposition, with which the Pharmacy Bill will be treated, unless it contains a clause prohibiting any future formed company trading as a chemist and druggist, would it not be possible to reverse Mr. Carteighe's proposal and, instead of adding a clause in committee or as an amendment, to put it into the original Bill, and if it is found impossible to introduce or pass it with this clause, it could then be dropped in the same way as it is now proposed to be introduced, and we should then have to be contented with what we could get. It would at least have been tried, and if it failed the Society would have gained the support (for their Bill as it stands now) of many who, like myself, would prefer to try for a whole apple rather than half, but who would nevertheless be willing to accept half if the whole was proved (not stated) to be unobtainable. A Parliamentary election cannot be far off, and with that clause in many of us would be prepared to sink our political views, and vote only for those candidates who would pledge themselves to support the Pharmacy Bill, and work also among our friends and relations, to bring pressure to bear on candidates for the same purpose. It is a maxim in business to ask for at least as much as you hope to receive, and it is a very difficult matter to add to it. Let the Society but meet us outsiders in this manner, halfway, and I feel sure it will not lack support, either for the Bill or membership. I, for one, should be as pleased to rejoin as I felt sorrow in leaving when I felt it was hopeless to expect to get value for my annual guinea.

C. F. Wyatt.

Sir,—I see an account in the Journal of a meeting held at Exeter on the 14th inst., at which it was resolved to waive the "widow's clause" in the Pharmacy Act Amendment Bill, as it was considered every business of a chemist and druggist should be conducted by the proprietor, he being qualified under the Act. I wish to justify their consideration, but to disapprove of their resolution, as it is iniquitous that the widow of a chemist should be debarred from doing so, when she might get a qualified manager and conduct her business with as much or more regard to the safety of the public than the chemists themselves have hitherto done. She should only be allowed to continue the business of her deceased husband and not to have more than the one business, and in the event of remarrying to be compelled to give that up. No widow whose husband at the time of decease was not in business for himself should be allowed to open a business even with a qualified manager, but only those who should be granted permission by the Pharmaceutical Society, whose knowledge of the fact of deceased being on the Register in business on his own account should be a sufficient guarantee, provided, too, that the name of the manager is made known, so that the Society may be satisfied that each manager is also duly qualified, and that no new manager should be appointed without such permission from the Society.

To throw over this clause in order to seek the repression of company trading is manifestly unjust. Where was such an idea as that of which the chemists complain, when they, taking advantage of the wording of the Pharmacy Act, opened up branch shops and businesses remote from their own with the aid of unqualified assistants? Company trading in the direction of pharmacy was not carried on then to the extent it is now, and I question if it were even thought of. To hold up to execration the doings of a body of capitalists who employ unqualified labour whilst they themselves do so on a smaller scale is to my mind the old story of Satan rebuking sin. The chemists led the van and pointed the way to the capitalists, who saw that if the chemist could open branch shops with unqualified men they might open stores with only one qualified man on the establishment. If we can get the Act amended so that everyone who keeps open shop, or in any way derives benefit from the keeping open of a chemist's business where poisons are dispensed, shall be qualified as well as those who sell the poisons on their behalf, then we might do away with company trading, or, as your editorial article well remarks, if those who are qualified will not act for the company then we might hope for the extinction of the great bogie that frightens us and deprives us of rest. I only trust that in justice to our brethren, who may not be able to leave their widows independent of the business, and who leave a family as well to be reared, that a clause on their behalf will be inserted to make provision for them on lines laid down similar to those I have proposed, and I also hope that our men, as they qualify, will be able to find better paid employment in the establishments of their pharmaceutical *confrères* than in that of the trading company, so that they may not be induced to work for the latter, and thus aid in their extinction.

A Registered Chemist and Druggist.

Apprentices' Grievances.

Sir,—I have perused with interest the two letters in the Journal from apprentices. It appears to me that, however much we dislike it, the knowledge gained by practising what we may term as "inelegant" pharmacy, as regards washing greasy bottles, etc., is of the utmost importance to us in our future career. Under the circumstances, then, the master is not to be blamed for instructing his pupil in this branch of the trade. The evil is that in the majority of cases, the apprentice learns nothing more, comparatively speaking, or if he does, it is entirely due to his own effort and strength of purpose, by persisting in learning everything thoroughly. Again, it often occurs, that if an apprentice is not over sharp, he has to submit to a great deal of grumbling and reprimanding, which tend to discourage him; and a young fellow who with a good master that would have given him some little encouragement in his work and explanations in reference to it, would have turned out a credit to himself and his master, frequently becomes just the contrary, and feels disgusted with the whole business long before he is out of his apprenticeship.

The system of instructing an apprentice as it is now in vogue is radically wrong. It appears to be due in a great measure to narrow-mindedness. For instance, the master says to himself, "I have been obliged to go through all this, and even worse, when I was an apprentice, and I do not see why they (the present apprentices) should not do so now." They do not see that "two wrongs" do not make "right." If the system was wrong in former years, as it undoubtedly was, then it should be rectified now. It is far from my intention to decry all masters as those who act in this manner. It is of the system in general I am speaking.

Lea.

Errata:—In Mr. Forret's paper on p. 640, col. ii., line 33 from bottom, *for* "sulphuric" *read* "sulphurous;" p. 641, col. i., line 11 from top, *for* "Fl" *read* "Fe."

We have been requested to correct the inaccuracy of our Aberdeen reporter in informing us that Mr. Carteighe was entertained at dinner by the members of the Aberdeen Society of Chemists and Druggists. The dinner was a private one given by Mr. Johnston, who invited members of the Society to meet the President. We are also requested to state that the subsequent meeting of the Aberdeen Chemists' Assistants' Association was not a conversazione.

Communications, Letters, etc., have been received from Messrs. Davis, Tubby, Wansborough, Humphrey, Wright, Grierson.

THIRD REPORT OF THE RESEARCH COMMITTEE.

Presented to the Council of the Pharmaceutical Society, February, 1891.

The Research Committee were entrusted by the Council with the management of the Research Laboratory for a period of three years from January, 1888. This being the conclusion of the third year the Committee now beg to submit to the Council a detailed account of their work during the whole of this period.

The instructions given by the Council to the Committee in January, 1888, respecting the mode in which the Laboratory shall be managed and its work carried on, are contained in the two following resolutions:—

1. "That the sum of £300 a year be granted for the next three years to a Committee to be appointed annually by the Council, and to consist of the President, Vice-President, and two other members of Council, with instructions to make such arrangements with the Professor of Chemistry as will enable advanced students and others to undertake pharmaceutical research under his direction, and that of the Committee. The Committee, which shall be called the Research Committee, shall meet monthly, except during the vacation, or oftener if required, and shall report from time to time to the Council. The Committee shall have the power to add to their number three persons, not necessarily members of the Society, as additional members of the Committee."
2. "That the Research Committee be authorized to fit up the two laboratories on the top floor of the new building, the other two rooms on the same floor to be fitted, one as a balance-room and store, and the other as an ordinary writing-room for the use of the Professor and members of the Committee, at a cost not exceeding £300."

The Committee have already presented to the Council two Annual Reports, for 1888 and 1889; that for 1890 is included in their present statement. In the first of these reports a full account was given of the arrangements the Committee had made in accordance with the above resolutions; this need not be recapitulated here.

The Committee have met regularly once a month to confer with the Professor of Chemistry as to the work which is being done, and on each occasion they have received from him a report on the progress of the different investigations sanctioned by the Committee, and also on the individual progress made by each worker. At these meetings all questions connected with the expenditure on account of the Laboratory have been considered and the necessary payments authorized. The time and mode of publication of researches, as well as other kindred questions appertaining to the conduct of the Laboratory, have also been discussed.

The following are the titles of the various researches conducted in the Laboratory during each of the three years, which have been already published. Several of these researches have given rise to therapeutical inquiries, and the Committee have been fortunate in securing the co-operation of several eminent physicians to make the necessary therapeutical observations. The titles of the additional papers which have thus been contributed are also given below.

1888. "The Chemistry and Pharmacology of the Nitrites of the Paraffin Series":—1. "The Preparation of Ethyl Nitrite," by Professor Dunstan and Mr. T. S. Dymond; 2. "The Comparative Effects of Spirit of Nitrous Ether and Solutions of Ethyl Nitrite," by D. J. Leech, M.D., F.R.C.P., Professor of Materia Medica and Therapeutics in the Victoria University, Owens College, Manchester; 3. "The Constituents of the Amyl Nitrite used in Medicine," by Professor Dunstan and Mr. E. J. Woolley; 4. "On Isobutyl Nitrite," by Professor Dunstan and Mr. E. J. Woolley; 5. "On the Metameric Amyl Nitrites," by Professor Dunstan and Mr. W. Lloyd Williams; 6. "The Effect of Amyl Nitrite," by Dr. Lauder Brunton, F.R.S., and Mr. Jessop Bokenham; "Chemical Observations on Tartar Emetic," by Professor Dunstan and Miss Boole.

1889. "The Chemistry and Pharmacology of the Nitrites of the Paraffin Series":—7. "On an Apparatus for the Estimation of Nitrites," by Professor Dunstan and Mr. T. S. Dymond; "On the So-called Mussænda Coffee of Réunion," by Professor Dunstan; "On the Occurrence of Skatole in the Vegetable Kingdom," by Professor Dunstan; "On the Chemistry, Botany, Pharmacy and Therapeutics of *Scopola carniolica*":—1. "The Chemical Constituents of *S. carniolica*," by Professor Dunstan and Mr. A. E. Chaston; 2. "Observations on the Therapeutic Action of *S. carniolica*," by Sir Dyce Duckworth, M.D., F.R.C.P., Physician to St. Bartholomew's Hospital; 3. "On the Pharmacy of *S. carniolica*," by Mr. Francis Ransom; 4. "The Natural History of *S. carniolica*," by Mr. E. M. Holmes; 5. "The Histological Characters of the Rhizome of *S. carniolica* compared with those of the Root of *Atropa Belladonna*," by Mr. Thomas Greenish.

1890. "The So-called Double Cyanide of Zinc and Mercury. A Chemical Study of the New Antiseptic," by Professor Dunstan; "An Apparatus for the Distillation of Mercury," by Professor Dunstan and Mr. T. S. Dymond; "The Conditions of Formation of Hydrogen Peroxide from Ether," by Professor Dunstan and Mr. T. S. Dymond; "The Constituents of the Artificial Salicylic Acid of Commerce," by Professor Dunstan and Mr. O. F. C. Bloch; "The Physiological Action of the Constituents of the Artificial Salicylic Acid of Commerce," by Dr. M. Charteris, Professor of Materia Medica and Therapeutics in the University of Glasgow.

As regards the chief of these researches, the Committee think it may be useful to refer to the circumstances that have led to their execution, and to draw attention to their practical value to pharmacy and pharmacology.

The first investigation which occupied the attention of the Laboratory, and which has been continued without intermission during the three years, is one of great medical and pharmaceutical importance. The therapeutic value of certain organic nitrites has been widely recognized, but few, if any of them, have been employed in the pure state, and little is known about the relative power of the different nitrites belonging to the paraffin series. The first step towards the elucidation of this problem was taken by the investigation which has been conducted in the Laboratory, in the course of which the constituents of the medicinal nitrites were ascertained. A number of these compounds have been prepared in a pure state, and their physiological action minutely examined by Professor Cash, F.R.S., of Aberdeen. Part of the work has already been published in the form of seven papers communicated to the Society in 1888–9. It is expected that the remainder will shortly be ready for publication.

In the beginning of 1889, a plant was brought under the notice of the Committee which was being sold under a fancy name as a substitute for belladonna, which it somewhat closely resembled. The chemical constituents of the rhizome of the plant were fully investigated in the Laboratory, and among other substances it was found to contain the alkaloid hyoscyamine in an almost pure state. Sir Dyce Duckworth undertook to examine the therapeutic action of the drug, and he reported in a paper communicated to the Society that its action was similar to, but possessed certain advantages over, that of belladonna. The plant was identified as *Scopola carniolica* by Mr. E. M. Holmes, who described the botanical characters whilst the histological peculiarities of the rhizome were compared, by Mr. Greenish, with those of the root of *Atropa Belladonna.* The pharmacy of the drug was fully worked out by Mr. Francis Ransom. This inquiry, consisting in a complete chemical and pharmaceutical examination of a new drug, may be regarded as typical of an investigation which should always hold a prominent place in the work of the Laboratory.

In the same year Sir Joseph Lister, F.R.S., invited the Committee to undertake the examination of a substance which he had lately discovered to be a valuable antiseptic material for surgical purposes. He had employed the substance under the impression that it was a compound in equi-molecular proportions of the cyanides of zinc and mercury, but facts observed in its preparation on the large scale seemed to be inconsistent with this supposition. Sir Joseph Lister wished to ascertain what was the composition of the substance and also the best method of producing it. The material was examined in the Laboratory, and found to be not the double cyanide of zinc and mercury, as was originally supposed, but zinc cyanide containing about 13 per cent. of mercuric cyanide associated with it in such a manner that this salt is no longer soluble in cold water. A method was discovered by means of which a material could be prepared containing nearly three times this quantity of mercuric salt, the whole of it being retained by the zinc cyanide in an insoluble form. Experiments were also made to determine in what condition the mercuric cyanide exists in this remarkable substance. An account of further experiments on this subject will shortly be published. Sir Joseph Lister has publicly expressed his thanks to the Society for the assistance it has been able to render to surgery in this matter.

An examination by the Director of a specimen of the wood of *Celtis reticulosa*, which belonged to the late Daniel Hanbury, F.R.S., and had been for some years in the Hanbury Herbarium, led to the discovery that its obnoxious smell was due to the presence of skatole, one of the constituents of human excrement, a compound which had not before been found in a plant.

In the same year, at the request of the Director of Kew Gardens, an examination was made of a new substitute for coffee. These seeds (of *Gærtnera vaginata*) were proved to contain no caffeine, or indeed any alkaloid which might entitle them to be regarded as a substitute for coffee.

The Director and Demonstrator have devised an automatically acting apparatus for the distillation of mercury, which renders it possible to readily purify this metal. This apparatus was described at a meeting of the Physical Society, and was shown at work on the occasion of the Pharmaceutical Society's Conversazione last May.

At the last meeting of the Society an account was given of an investigation of the constituents of artificial salicylic acid. It has long been known that artificial salicylic acid often contains foreign substances, but the exact nature of these substances has not been ascertained, although it has been suspected that their presence may be the cause of the disastrous effects which have sometimes followed the administration of large doses of salicylic acid to the human subject. Two foreign acids separated in 1878 by Mr. John Williams from salicylic acid, but not then identified, were proved to be ortho-cresotic and meta-cresotic acids. An examination of a specimen of artificial salicylic acid at present in commerce showed that it contained neither of these acids, but an isomeride, para-cresotic acid. The properties of pure salicylic acid were fully described, as well as a satisfactory method of separating the pure acid from the impure acid of commerce. The physiological action of these acids was investigated by Professor Charteris, of Glasgow, who had for some time previously been working at the subject on its therapeutical side. The ortho-cresotic acid was shown to be highly poisonous, and the meta-cresotic acid innocuous. The first experiments with the para-cresotic acid seemed to show that it was poisonous when administered to animals by injection, but its properties are still under investigation by Professor Charteris.

Another research, which is mentioned last because the first part of it will not have been published before the presentation of this Report, is by no means the least important. The Committee have recognized the importance of undertaking at the earliest opportunity an investigation of the aconite alkaloids, an inquiry which, chiefly on account of its unusual complexity, has virtually been in abeyance since the time it was commenced, nearly twenty years ago, by a distinguished chemist with the aid of grants from the British Pharmaceutical Conference.

It is the desire of the Committee that this investigation, which has been so well begun in the Laboratory, may be completed on its pharmaceutical as well as on its physiological and chemical sides. The whole inquiry has been carefully mapped out, and the services of a distinguished physiologist have been secured, so that the action of the various alkaloids may be determined, and in this way the therapeutic employment of aconite put upon a rational basis.

Among the researches which are in progress, but are not ready for publication, there is besides those which have been incidentally alluded to above, an important investigation of the active principle of croton oil, a long outstanding problem in pharmacology. The physiological action of some new organic compounds which have recently been discovered in the Laboratory is also being examined.

The Committee are of opinion that no one who is concerned for the best interests of pharmacy and the Pharmaceutical Society can fail to be gratified at these results, the value of which has been publicly recognized by some of the leading medical and scientific workers in this country.

Turning now to the educational aspect of the work of the Laboratory. It has been the object of the Committee to encourage in each year a few of the most promising students of the Society's School to spend at least one session in the Research Laboratory, so that in the future pharmacy may have the advantage of the services of men who have been trained in the methods of exact inquiry. The Committee have also been glad to accept the help of other persons not directly connected with pharmacy who are willing and competent to assist in carrying on the work with which the Laboratory may be engaged. No one has been allowed to commence an investigation until he can show that he is proficient in the methods of research; and even in the case of advanced students it has been found desirable that they should devote the early part of their first session to completing and making more accurate their knowledge of the most important quantitative methods. The Committee regard this preliminary training as of the highest importance to the pharmaceutical student, since without it he can never be expected to cope successfully with any pharmaceutical research, whether it be conducted for scientific or business purposes. When a worker can only afford to spend a limited time in the Laboratory, the Committee have considered it more advantageous that he should become properly trained in these special methods than that he should publish the results of an incomplete or superficial inquiry. The Committee give, for the information of the Council, the record of the number of workers for the three years, noting in each year how many of these were duly qualified pharmaceutical chemists. In 1888 there were nine workers, of whom seven were pharmaceutical chemists; in 1889, nine workers, of whom six were pharmaceutical chemists, and in 1890, ten workers, of whom six were pharmaceutical chemists. As at present arranged, the Laboratory will not conveniently accommodate more than eight workers at one time. The following are the details for each year of the expenditure of the annual grant of £300.

	1888.	1889.	1890.
	£	£	£
Director	150	150	150
Demonstrator	60	60	70
Porter	26	26	26
Apparatus, Materials, etc.	56 6	67 14	73

As regards the future conduct of the Laboratory the Committee wish to make the following suggestions to the Council. That the direction of the Laboratory should constitute (as it virtually has during the past three years) a part of the regular duty of the Professor of Chemistry, and that he should take his authority and receive his instructions from the Council and not as hitherto from the Committee. It appears desirable that the general control of the Laboratory should be vested by the Council as at present in a Research Committee. With reference to the future work of the Laboratory the Committee are convinced that the Society will best advance the interests of pharmacy and pharmacology by conducting it on lines similar to those followed by the principal pharmacological research laboratories abroad, which have rendered such brilliant service to the advancement of our knowledge of drugs during recent years, *e.g.*, the Laboratories of Dorpat, Strassburg, and Marburg.

In the department of chemical pharmacology the wealth of material for research is so great that it is necessary to carefully select those subjects which on account of their importance call for immediate investigation. The Committee trust that in the future work of the Laboratory the investigation of the aconite alkaloids make take a prominent place. In this subject alone there is sufficient of the highest importance to occupy the energy of the Laboratory for some time to come. Aconite is only one example of a number of powerful drugs whose constituents have been but very imperfectly investigated, in respect either of their chemical properties or their physiological action. The Committee hope that it will be possible to arrange a coalition of the Research Laboratory of the Pharmaceutical Society with other Research Laboratories, so that conjoint chemical, physiological and therapeutical researches may be systematically conducted.

With reference to the expenditure of the Laboratory it will be seen that even with the exercise of the utmost economy, the annual grant of £300 is insufficient to cover all expenses when there is a full number of workers, and it is probable that in the future it will be found to be still more inadequate. The Committee feel sure that as soon as it is known that the Society intends to make the promotion of pharmacological research a definite part of its educational work that other bodies interested in the same object will be ready to assist in its promotion. The results of inquiries which have been recently made by the Committee fully justify this expectation. The Committee therefore recommend that the Council should make an annual grant of at least £150 for materials and assistance, and that the Research Committee, when reappointed, should at once take steps to obtain pecuniary aid from other bodies.

Finally, the Committee wish to refer to a few additions which it is desirable to make to the Laboratory. A distillation table is urgently required in the east room corresponding to that which exists in the west room, and a few shelves are needed in the Balance Room to hold books of reference. There is also need for some place in which certain physical determinations and gas analysis can be conducted.

The Committee would also express to the Council their opinion that a wider publicity would be given to the work the Society is doing in promoting the extension of pharmaceutical knowledge, if the researches of the Laboratory were some time during the present year to be collected and issued together in one volume.

The Committee cannot conclude their report without acknowledging in the highest terms the zeal, industry, ability and devotion which has been shown throughout the entire period by the Director of the Research Laboratory, Professor Dunstan.

The thanks of the Committee are also due to the Demonstrator, Mr. Dymond, for the efficient assistance he has rendered the Director.

January 30, 1891.

MICHAEL CARTEIGHE, *President.*
ALEXANDER BOTTLE, *Vice-President.*
THOMAS GREENISH.
G. F. SCHACHT.
T. LAUDER BRUNTON. }
CHARLES EKIN. } *Additional*
MICHAEL FOSTER. } *Members of the*
EDWARD FRANKLAND. } *Committee.*

HENRY BOWMAN BRADY.

The following paragraphs, from the pen of Professor Michael Foster, appear in the number of *Nature* for January 29 :—

Henry Bowman Brady was born on February 23, 1835, at Gateshead. His father, an esteemed medical practitioner of that place, belonged to the Society of Friends, and retained to the end the dress and manner of conversation of that body. The father's house, for many years the home of the son, was one of those charming Quaker abodes where strength and quietude sit side by side, and where homely plenty and orderly preciseness hide for a moment from the stranger the intellectual activity which is filling the place. Though the son, when I knew him, had abandoned the characteristic dress and speech of the Society, without, however, withdrawing from the body, the influences of his surroundings moulded his character, making him singularly straightforward and free from manner of guile.

After an ordinary school career spent in Yorkshire and Lancashire, and an apprenticeship under the late Mr. T. Harvey, of Leeds, and some further study at Newcastle in the laboratory of Dr. T. Richardson, which may be considered as the forerunner of the present Newcastle College of Science, he started at business in that city as a pharmaceutical chemist in 1855, while yet a minor. That business he conducted with such ability that in 1876 he felt able to resign it to Mr. N. H. Martin, and to devote the whole of his time to scientific work.

He contributed to science in two ways—one direct, the other indirect. Of the many scientific movements of the last thirty years or so, one not of the least remarkable has been the scientific development of the pharmaceutical chemist. Into that movement Brady threw himself with great vigour, especially in his earlier years. He was for many years on the Council of the Pharmaceutical Society, and the progress of that body was greatly helped by his wide knowledge of science and of scientific men and things, as well as by his calm and unprejudiced judgment.

His more direct contributions to science were in the form of researches in natural history, more especially on the Foraminifera. His first publication seems to have been a contribution in 1863 to the British Association as a report on the dredging of the Northumberland coast and Dogger Bank; his last was a paper which appeared only a short time ago. Between these two he published a large number of researches, including a monograph on Carboniferous and Permian Foraminifera, an exhaustive report on the Foraminifera of the *Challenger* Expedition, as well as monographs on Parkeria and Loftusia, and on Polymorphina, in which he was joint author.

By these works he not only established a position, both in this country and abroad, as one of the highest authorities on the subject, but, what is of more importance, largely advanced our knowledge. Every one of his papers is characterized by the most conscientious accuracy and justice; and though his attention was largely directed to classification and to the morphological points therein involved, his mind, as several of his papers indicate, was also occupied with the wider problems of morphological and biological interest which the study of these lowly forms suggests. I have myself often profited by his wide knowledge and power of accurate observation in discussing with him questions of this kind arising out of his studies, and learning from him views and opinions which, to his critical mind, were not as yet ripe enough for publication.

The leisure of the last fifteen years gave him opportunity for travel, and he visited various parts of the world, utilizing many of his journeys—notably one to the Pacific Ocean—in the collection and study of Foraminirera. Some of these travels were undertaken on the score of health, to avoid the evils of an English winter, for he was during many years subject to chronic pulmonary mischief.

During his last journey for this purpose—one to the Nile in the winter of 1889-90—he met with difficulties, and failed to receive the benefit from the change which he had secured on former occasions. During the last two or three years, and especially during the last year, his condition gave increasing anxiety to his friends; the malady against which he had so long struggled seemed to be beating him at last; and we heard with sorrow rather than with surprise that the fierceness of the recent cold had conquered him. Settled for the winter at Bournemouth, and full of cheerful hopes for the coming summer, he succumbed to a sudden attack of inflammation of the lungs, and died on January 10, 1891.

Science has lost a steady and fruitful worker, and many men of science have lost a friend and a helpmate whose place they feel no one else can fill. His wide knowledge of many branches of scientific inquiry, and his large acquaintance with scientific men, made the hours spent with him always profitable; his sympathy with art and literature, and that special knowledge of men and things which belongs only to the travelled man, made him welcome also where science was unknown; while the brave patience with which he bore the many troubles of enfeebled health, his unselfish thoughtfulness for interests other than his own, and a sense of humour which, when needed, led him to desert his usual staid demeanour for the merriment of the moment, endeared him to all his friends.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 7, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

The Council meeting last Wednesday was attended by nineteen members, and after the minutes of the previous meeting had been passed, the President called attention to tho loss which the Society has sustained by the death of Mr. Brady, recalling the services he had rendered in various capacities as an officer of the Society in promoting the advancement of pharmacy. He also referred to an article appearing in last week's *Nature* as showing the kind of influence exercised to the advantage of the pharmaceutical body by the cultivation of scientific subjects such as those in connection with which Brady had earned distinction. This article, written by the Secretary of the Royal Society, cannot fail to have a special interest for our readers, and we have therefore reproduced it in our issue of this week.

The election of a member of Council to fill the place left vacant by the resignation of Mr. Martin was the next business on the agenda, and it was introduced by Mr. Atkins with a reference to the need for a larger proportion of London members in order to deal with the administrative work of the Council. For that reason, and on account of general qualifications, he proposed Mr. William Warren should be elected. This motion, seconded by Mr. Newsholme and supported by the Vice-President and Mr. Cross, was carried unanimously. It may be mentioned that the election of a London member was the desire of the country members especially, and the fact shows how very unfounded are the views sometimes put forward to the effect that the Council is incapable of appreciating the conditions and requirements of country business by reason of the preponderance of London members.

On taking the lot to determine which members of Council should retire next May, the names drawn were those of Messrs. Abraham, Atkins, Gostling, Greenish, Harrison, Leigh, and Schacht. Those who will retire by rotation are Messrs. Allen, Bottle, Cross, Martindale, Newsholme, Southall and Watt.

Six persons were elected pharmaceutical chemist members of the Society, forty-six persons were elected associates, and sixty-six persons were elected apprentices or students of the Society. The Registrar's report on the present numerical strength of the Society, the statistics of the examinations and the registers was presented to the Council, and will be found at page 702.

In referring to the report of the Finance Committee the President pointed out that there were a certain number of new members of the Society. The accounts of the North British Branch of the Society had been examined and approved. There has been some increase in the expenditure connected with the examinations, and some money had been laid out upon the Library and premises, but the Council is indebted to Mr. Gilmour and the Assistant Secretary for the care with which they administer the financial and other affairs in Scotland. In connection with the Benevolent Fund the receipt of a legacy last month had furnished means of purchasing another £100 consols, making the total amount invested £3000, and leaving £40 as a nucleus towards a further investment. The President expressed a hope that the amount invested might be raised to £5000, so as to admit of the annuities being increased. On the recommendation of the Benevolent Fund Committee three grants of ten pounds each were made, and the Vice-President, in testifying to the benefits conferred by the annuities, said he should be glad to see them raised to fifty pounds, which he should look upon as a more suitable annuity to be given by the Society to members of the trade who have been unfortunate.

The report of the Library, etc., Committee mentioned that the celebration of the Society's fiftieth anniversary had been discussed, and its further consideration adjourned until the next meeting, and called attention to the purchase of a collection of very fine specimens of gums, resins, and other drugs for the Society's Museum.

The report of the Law and Parliamentary Committee stated that the draft Pharmacy Bill had been considered, and its adoption in the form in which it was now presented to the Council was recommended, subject to any verbal alterations found necessary by the President in consultation with the Solicitor. It was also recommended that the Committee should be authorized to take steps for introducing the Bill into Parliament. The President, in moving the adoption of the report, remarked that he had been struck by the curious fact that many of those most strongly opposed to the Bill had not even read it, and hoped that he might have dissipated some ignorance of that sort during the last few months. In the final consideration of the Bill and of the various suggestions in regard to it, the Committee had been unable to make any material alteration. In the clause relating to dispensing the words "for sale" had been introduced in order to make quite clear the intention that the clause should not interfere with compounding in hospitals, etc. The word "immediate" was omitted, so as to leave the amount of supervision to be determined first by the Council as the body having power to prosecute and afterwards by a judge. The President expressed the opinion that the effect of this clause had been misapprehended, and that it would not be so serious as some supposed. He also reminded all interested in pharmacy, as well as those who assumed to represent the trade as being a different body from the Society, that legislation for a class carrying on business in so many various ways must of necessity appear to press harshly on some, and suggested that if they were not prepared individually to sacrifice something for the common good all hopes of legislation must be abandoned. Mr. Hampson, in seconding the motion, said he should have been glad if other things could have been included in the Bill, but after serious consideration he was persuaded that it contained as much as could possibly be obtained, and that if passed it would be of great benefit to the trade and to the public. He hoped the trade would rally round the Society and sink all minor differences, so that there might be some chance of getting the Bill passed. If there were a response to the very substantial effort made to bring into the Society every one engaged in the business of a chemist and druggist, something more might be done in the future, but everything depended upon their unanimity. Several other members concurred in expressing regret that other provisions could not be included in the Bill, but they agreed that it was impracticable; and Mr. Harrison, referring to his former suggestions, admitted that he must be content for the present to remain with the minority in the hope that his views would eventually be accepted. The demand for amendment from outside had not been sufficient to lead him to do otherwise or to take up the time of the Council with further discussion. He confessed that though the Bill falls short of what is desired, it goes as far as they are absolutely agreed, and that by going a step further contentious matter would be opened up. He therefore loyally accepted the Bill as an instalment, and would urge his friends throughout the country to give it their hearty support as an honest attempt to deal with difficulties. Mr. Storrar acquiesced in these views. The motion for the adoption of the Bill was then carried unanimously, and it was resolved that the Law and Parliamentary Committee should take the necessary steps for its introduction into Parliament. All the speakers concurred in expressing their high sense of the obligations the whole body is under to the President for the labour he has devoted to the explanation of the Bill during the last few months.

In reference to a letter received from the Privy Council Office, calling the attention of the Council to a rider to a verdict given in a case of poisoning the **President** suggested that a reply should be sent to the effect that the Council is of opinion that other things should be included in the poison schedule, and had already expressed that opinion. This was unanimously agreed to.

A proposition to make some alteration in the details of the Preliminary examination was agreed to, and the Report of the Research Committee, which is printed at page 693, was presented and referred to a Committee for consideration.

THE REGISTRAR'S REPORT.

The presentation to the Council, on Wednesday last, of the Registrar's report on the state of the Registers of Pharmaceutical Chemists and Chemists and Druggists and on the Numerical Strength of the Society, furnishes authentic data for comparison with the figures of previous years. The exact number of persons whose names were on the Register of Chemists and Druggists at the close of last year was 14,163, or an increase of 83 as compared with the end of 1889. During last year no less than 529 names were added to the Register of persons who had passed the qualifying examinations, besides 20 restored on payment of a fine, and 7 of persons who were in business before 1868. Altogether these new entries numbered 556. In the previous year the entries were 470, the difference, namely 86, almost corresponding with the beforementioned increase in the number of names on the Register. But this does not show the real increase during the year 1890 in the number of registered persons. In order to determine this approximately, account must be taken of the fact that the Register has recently been reduced by the erasure of 253 names of persons who failed to reply to two registered letters. As this number represents an accumulation of incorrect entries during two years, it may be assumed that one-half accrued during 1889, and that therefore the true increase in 1890 was greater than the apparent one by a corresponding number. Now if 126, as the half of 253, be added to 83, the reported increase, the sum is 209, which curiously enough is exactly the number of deaths of registered persons reported to the Registrar from all sources during the twelvemonths. It follows, therefore, that the additions to the Register of Chemists and Druggists during the year were, as nearly as possible, twice as many as the erasures consequent upon authenticated deaths.

Notwithstanding this considerable increase on the general Register of Chemists and Druggists the separate Register of Pharmaceutical Chemists shows a decrease of 10, the number of names being 2176 against 2186. This is no doubt partly due to only 66 persons having passed the Major examination during 1890, but it is also probably partly accounted for by a high ratio of deaths among the older pharmaceutical chemists, who acquired the title without examination by joining the Pharmaceutical Society before 1854. As to the "Analysis of Examinations," the figures given are practically the same as have already been commented upon in our summary of the year's history, the principal difference consisting in the setting out of the returns from the two Boards of Examiners separately.

The Report of the Registrar on the numerical strength of the Pharmaceutical Society, though not so satisfactory as might be wished, is less unfavourable than that of the previous year. So far as the voting strength is concerned it remains exactly the same, a decrease of 14 pharmaceutical chemist members, and 26 chemist and druggist members being compensated by an increase of 40 associates in business. Of course, as has often been pointed out before, the decline in chemist and druggist members is inevitable, while the fact that 12 of the decrease in the pharmaceutical chemists fall among the life members, tends to substantiate a remark in the previous paragraph; it is therefore satisfactory that once more the increase in the associates in business equals the decrease in both classes. But on the other hand there is a decrease reported of 51 associates not in business and 23 apprentices. Altogether, at the end of the year, there were 4370 registered persons connected with the Society, or about 31 per cent. of the whole. Whether the recently aroused interest in the Society's work will result in any large addition to its numbers time will show.

On Wednesday next, the 11th inst., an Evening Meeting of the Pharmaceutical Society will be held at 17, Bloomsbury Square, W.C., when a paper will be read on "The Carbohydrates of Manna from *Eucalyptus Gunnii*, L.," by Dr. F. W. Passmore, and a "Note on Chaulmoogra Oil and Gynocardic Acid," by Mr. J. Moss. The chair will be taken at 8 o'clock, but the theatre will be open an hour previously to give an opportunity for the examination of specimens and apparatus exhibited, among which will be a large collection recently acquired by the Society, illustrating the grades of gums and gum resins occurring in commerce.

* * *

Among the imports into China of special interest to British merchants, Mr. Consul Alabaster considers soap to have a future before it. Although only just coming into demand it is now constantly to be seen exposed for sale at the stalls in the streets, and there is no native soap worthy of the name as a competitor. At present an article like Pears' soap is considered to have little chance, as a cake would represent so large an investment of capital that it would be eaten by rats or cockroaches before it was legitimately consumed. But for yellow soap there is a constant demand and for small cakes of fancy soap there is also a market. Among other articles for which there is a need are feeding bottles, but the difficulty is that these small things are not at present worth the attention of merchants, and it is thought that there is an opening for tradesmen ready to act as agents for such articles.

* * *

The next meeting of the Chemists' Assistants' Association will take place on Thursday, Feb. 12, when a paper will be read on "Bacteria and their Relation to Life," by Mr. H. W. K. Pears. The Annual Dinner will be held on Thursday, March 5th, at the Holborn Restaurant, when Mr. T. Tyrer, F.I.C., F.C.S., will preside.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 4, 1891.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Evans, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martindale, Newsholme, Richardson, Schacht, Southall, Storrar and Watt.

The minutes of the previous meeting were read and confirmed.

THE LATE MR. BRADY.

The PRESIDENT said: Before we proceed to the business of the day, I must claim your indulgence for a moment while I refer to a loss which the Society has sustained since our last meeting, in the person of a most distinguished pharmacist, a most distinguished man of science, and, moreover, a man who had been a member of this Council for some years, a member of the Board of Examiners and a colleague of most of us in various ways; a man further who assisted at the birth, if he was not the godfather, of the British Pharmaceutical Conference, who served it for many years as treasurer, and became one of its most respected and gifted Presidents. You will gather naturally from what I have said that I refer to Mr. Henry Bowman Brady. The observations that I have thought it my duty to make are intended to be those of the President of the Pharmaceutical Society, not of a personal friend, because I take it that the Society has lost a man who has done grand work for the advancement of pharmacy, and whose loyalty to this Society was quite unbounded. Possessing, as you all know, somewhat weak physical health, he had a mental force which was simply extraordinary to those who like myself have the gift of good health. I have many a time known him, after a long day's work here, travel down to Newcastle at night, and then return here next day to attend to his duties, at a time when he could not afford to take a longer interval from his business cares. What I wish particularly to impress on the Council is this, that although it has often been said that the Pharmaceutical Society develops men who occasionally go out of the business early in life into other professions or occupations—although I am not one of those who think that when that is the case there is any great disadvantage to the Society, because there is reflected lustre and renown shed upon it—still, in this case, it is somewhat peculiar that a man beginning business almost when a minor, earning a sufficient competence by his own efforts, should during the time he was earning that competence, achieve a position in the scientific world which soon brought him the blue ribbon of science, the fellowship of the Royal Society, and the esteem of all scientific men. As to his work on the Council and the Board of Examiners, that is so well known that I need not refer to it. He was simply gluttonous for work. He was one of those who from 1866 to 1868, when the Council was trying to arrange terms with the United Society of Chemists and Druggists with regard to a Pharmacy Bill, when in fact we did come to terms which ended in the passing of the Act of 1868, threw his heart and soul into the work. He was as capable of bringing his mind to bear on the smallest detail of an ordinary retail business as he was of dealing with the pharmaceutical work in this house, and whether looked at from the point of view of an all-round man, a travelled man, a pharmacist, or a man of science, there are very few who can come up to his standard. I would refer lastly to a notice of him which appeared in last week's *Nature*, which some of you may not have read, which shows what is thought of this kind of work outside our own Society. It says, "He contributed to science in two ways, one direct the other indirect. Of the many scientific movements of the last thirty years or so, one, not the least remarkable, has been the scientific development of the pharmaceutical chemist. Into that movement Brady threw himself with great vigour, especially in his earlier years. He was for many years on the Council of the Pharmaceutical Society, and the progress of that body was greatly helped by his wide knowledge of science and of scientific men and things, as well as by his calm and unprejudiced judgment." Then, after enumerating his special scientific work, which was, as you know, chiefly biological—outside the work which he contributed to the Pharmaceutical Society and the Conference,—it concludes with a testimony to the man which those who knew him will regard as lifelike. It would be difficult for me to say anything better about him personally, but this part is worth recording: "Science has lost a steady and fruitful worker and many men of science have lost a friend and a helpmate whose place they feel no one else can fill. His wide knowledge of many branches of scientific inquiry, and his large acquaintance with scientific men, made the hours spent with him always profitable; his sympathy with art and literature and that special knowledge of men and things which belongs only to the travelled man, made him welcome also where science was unknown; while the brave patience with which he bore the many troubles of enfeebled health, his unselfish thoughtfulness for interests other than his own, and a sense of humour, which when needed led him to desert his usual staid demeanour for the merriment of the moment, endeared him to all his friends." That article is signed by Professor Michael Foster.

ELECTION OF A MEMBER OF COUNCIL IN PLACE OF MR. MARTIN.

Mr. ATKINS, after alluding to the association of Mr. Martin with the late Mr. Brady, said the Council had now to fill up the place left vacant by Mr. Martin's resignation, and it was perhaps well that the resolution he was about to move should come from a country member. Some, no doubt, would think that as a country member had retired his place should be filled by the election of another country member, but on looking at the list it would be found that there was reason in the suggestion he was about to make. There were only six London members and fifteen provincial, which was a smaller proportion than had existed for many years, and it seemed to him too small a number for the large amount of administrative work which had to be transacted in London. He did not go in for territorial representation, although there was a great deal to be said for testing the feeling of different parts of the country. It was not uninteresting to look at the map of Great Britain and see how the members were located; and it was a remarkable fact that the area round London, the home counties, was practically unrepresented, except by the London members themselves, who of course represented the whole district in the same way as they all represented the whole country. There were many men whom it would be pleasant to see at the Council board, and some of whom in the course of time he hoped would appear there, and from amongst them he would move that—

Mr. WILLIAM WARREN, of 24, Russell St., Covent Garden

be elected. He knew Mr. Warren very well and esteemed him very highly; he was a good pharmacist, a good all-round man, a man of business, a man of culture and of common sense, and he believed he would, if elected, prove an admirable member of the Council. Mr. Warren was so well known to all that it was needless to urge his claims further, and he felt that in electing him a valuable member would be added to the Council.

Mr. NEWSHOLME seconded the motion, saying he had known Mr. Warren for some years, and he knew no one who would be a more worthy representative of provincial as well as of London chemists. Mr. Warren was conversant with the business of a chemist, as well as with the business of the Society, of which he had always been a loyal member.

The VICE-PRESIDENT, in supporting the nomination, said he had known Mr. Warren from his boyhood and had watched his progress in life since. In early days Mr. Warren had proposed to come to him as an apprentice, and though that was not arranged, he afterwards came to him as an assistant for some few years, and he could speak of his business capacity and general culture in the highest terms. The question of appointing London or country members was one upon which he felt rather strongly. There was a little disposition to undervalue the provincial knowledge of men who happened to be resident in London, and there was an immense advantage in having at hand men who could be called upon at short notice to confer with the President on special occasions.

Mr. CROSS, as a country member, supported the motion. The Society wanted the best men who could be found to fill the seats at the Council. A distinguished member of the Council had recently been attending meetings in the provinces, and although he had been hitherto, to some extent, tabooed by many country chemists simply because he was a metropolitan member, when they came to see him and know him he was sure the general feeling was that they were proud of him, not because he lived in London but because he was capable and a good man. He believed they were coming to a time when these narrow prejudices were being overcome, and if they wanted the greatest good for the greatest number they would all agree in the election of the best man.

The motion was then put and carried unanimously.

It was resolved that Mr Warren's name be added to the Finance, the Library, Museum and Laboratory, and the Law and Parliamentary Committees.

MEMBERS OF THE COUNCIL WHO RETIRE.

The lot having been taken in the usual manner to determine the seven members of the Council who should retire in May next, the following names were drawn:—

Abraham.
Atkins.
Gostling.
Greenish.
Harrison.
Leigh.
Schacht.

The following, who remained in by lot last year, now retire by rotation:—

Allen.
Bottle.
Cross.
Martindale.
Newsholme.
Southall.
Watt.

The following seven remain in office another year:—

Carteighe.
Evans.
Hampson.
Hills.
Richardson.
Storrar.
*Warren.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Dalziel, Charles Michie.
Durno, Alexander Emslie.
Liversidge, Joe Sykes.
Mackenzie, William Graham.
Phillips, Sidney.

ELECTIONS.

MEMBERS.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Dalziel, Charles Michie	Leith.
Jack, James	Arbroath.
Lovibond, James Joseph	Plymouth.
Shepheard, Wm. Fredk. John	Chester.
Shrubsole, Alfred	Chester.
Wrench, Frederick William	Silverdale.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Duplock, Walter	St. Albans.
Fielding, Clement	Halifax.
Hope, Ingham	West Butterwick.
Horsfield, Edmund	Leeds.
Jarvis, Clarence Frank	Birmingham.
Perkins, Samuel Augustus	Torpoint.
Richardson, Wm. Jenkinson	Edinburgh.
Smith, John	Liverpool.
Troughton, Reginald	Wakefield.
Walker, Henry James	London.
Watt, John Charles	Ealing.

Modified.

Nicol, William	Elgin.

ASSOCIATES.

The following, having passed their respective examinations, and tendered or paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Arrandale, John Samuel	Denton.
Bonner, Clifford Goodwin	Berechurch.
Cameron, Lewis	Aberdeen.
Clark, George Alexander	Portsoy.
Cowan, Hugh	Ayr.
Dupont, John Munro	Grantham.
Evans, Josiah	Pencader.
Ford, James	Montrose.
Geddes, James	Leith.
Greatorex, Edward John	Stapleton.
Hendry, David	Tillicoultry.
Jefferson, John Mitchell	Southport.
Johnson, Martin Kemble	Stoke.
Kirk, James	Edinburgh.
Knight, William	Chichester.
Knott, Herbert	Bolton.
Latham, Walter	Crewe.
Lawton, Charles Edward	Lockwood.
Leask, John	Leith.
Linstead, Edward Flatman	London.
Little, George	Falkirk.
McKellar, Arthur	Pollokshields.
O'Dell, John Dennis	Hull.
Page, William Irwin	Kennington.
Pain, Charles Frederick	Dover.
Rosewarne, Richard	Falmouth.
Scott, Henry	Middlesborough.
Smiles, Robert Smith	Edinburgh.
Strachan, John	Edinburgh.
Wallis, William	York.
Wright, Cecil	New Somerby.
Wynne, William Arthur	Mold.

Modified.

Eaton, John	Lichfield.
Gowen, Albert	Stratford-on-Avon.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

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* In place of Mr. Martin.

Anderson, William	Ashton-under-Lyne.
Andrews, Walter	Winchester.
Anning, James John	Leeds.
Ashmore, Arthur	Brighton.
Bamford, Thomas	Aberavon.
Barker, George	Bedale.
Blackman, Percy	Southampton.
Blankley, Frank Ferniough	Arnold.
Bowker, James Skinner	Radcliffe.
Bray, Edwin John Rogers	Saltash.
Breeze, John Albert Edmund	Pontesbury.
Breeze, Joseph Ernest	Brierley Hill.
Brown, Sidney	South Molton.
Browne, William	Northampton.
Caldwell, Alexander Smith	Shotts.
Cameron, John	Montrose.
Casewell, Richard Hazeldine	Ludlow.
Clayton, George Francis	Leyton.
Cox, Harry Bertrand	Shepton Mallet.
Dalkin, Thomas	Sheffield.
Davidson, Robert	Montrose.
Davis, George Ernest	London.
Davis, John Butler	London.
Dickenson, Edmund Ernest	Nottingham.
Eaton, Robert	Sutton, Surrey.
Edwards, Henry	Pontardulais.
Eglington, Malkin de Kindistone	Yarmouth.
Felce, Albert	Norwich.
Fidelia, Paul Louis	London.
Fisher, John William	Hugglescote.
Francis, Arthur Llewelyn	Wrexham.
Freeman, John	London.
Hanson, Thomas Arthur	Huddersfield.
Hinde, Ernest Lionel	Stoke Ferry.
Hornby, Frederick William	Luton.
Hughes, John	Penmaenmawr.
Jackson, Henry	Witney.
Jeeves, Arthur Thomas	Brighton.
Jones, William Castledine	Reigate.
King, William Bealby	Gainsborough.
Lee, John Edward	Hull.
Lisle, Francis Rouget de	Cambridge.
Maskew, William	Easingwold.
Matthewson, David	Arbroath.
Mumford, Sydney Herbert	Cambridge.
Neville, Egbert	Banbury.
Osborne, Albert	Hounslow.
Owen, Alfred Herbert	Atherstone.
Penman, David	Lochgelly.
Ringer, Frank Arthur	Norwich.
Roberts, Frederic Lancelot	London.
Rockliff, John Thomas	Crewe.
Roe, Alfred	Wolverhampton.
Samuel, Harry Thomas	London.
Shaw, John Thomas	Nottingham.
Shepherd, James Henry	Leicester.
Shields, William Thomas	Alsager.
Stone, Ernest Sidney	Hastings.
Swann, Albert Ernest	Bath.
Taylor, Herbert William	London.
Thomas, John Aubrey	Redditch.
Udale, George William	Cheadle.
Watson, John Robert	Newport (Mon.).
Warren, George	London.
Whitworth, John Handley	Southport.
Williams, Cuthbert Ford	Leicester.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and fine.

THE REGISTRAR'S REPORT.

The **Registrar** laid upon the table his report on the numerical strength of the Society, and statistics of the Examinations and the Registers. The report is printed at pp. 702–703.

APPOINTMENT OF LOCAL SECRETARIES.

In accordance with the nomination papers which had been received in each case the following appointments of local secretaries were made:—

Leamington, Mr. J. F. Barrett in place of Mr. Pullin, resigned.

Middlesborough, Mr. J. C. Robson in place of Mr. Thos. Buck, resigned.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee was of the usual character, recommending certain accounts for payment.

The **President**, as Chairman of the Committee, moved the adoption of the report and recommendations. He said the receipts consisted of subscriptions and examination fees, and he was glad to see there were a certain number of new members, but there was nothing special in the revenue. With regard to the Benevolent Fund, the dividends and some ground rents had been received, and a few subscriptions, but the major amount would come in in the next two months. Nothing had been received during the month on the donation account, but in consequence of the legacy received last month, another £100 two and three quarters Consols had been purchased, leaving £40 as a nucleus towards another £100. There was now over £3000 vested in Consols, and the Committee was on the look out for an investment in ground rents. He should be very glad if the amount to be invested could be raised to £5000. He would remind the Council that the amount of the annuities was very small, and he hoped the time would come when they might be increased by £5 or £10 a year. This was quite worth working for, quite apart from the question of electing more annuitants. It was really distressing that an educated pharmacist, when he fell into misfortune, should only have £35 a year allowed him by a large Society like that. The payments were of the usual character. The Committee also had had before it the accounts of the North British Branch, which were examined and approved, and he might say briefly that though the expenditure had been larger than last year, the increase was chiefly with regard to examinations, all the ordinary items being practically the same. Some money had also been expended on the Library and the premises at the back, which were let as a stable. The Council was very much indebted to Mr. Gilmour and the Assistant Secretary for the care with which they administered the financial as well as the other affairs in Scotland.

Mr. **Atkins** having also borne testimony to the care and strict economy which was exercised by the officials in Edinburgh, as was evident to him when he visited the branch in August last,

The motion was unanimously agreed to.

A letter was read from Mr. J. R. Hill, thanking the Council for the addition recently made to his salary.

REPORT OF THE BENEVOLENT FUND COMMITTEE.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow (age 61) of a member, 1852-71. This case had been deferred from December, 1889. (London).

£10 to a registered chemist and druggist (age 77), having no means of support. This case was deferred from last month. (Cheshire).

£10 to a registered chemist and druggist (age 62) in bad health, and able to do very little. Applicant had a similar grant in January, 1890. (Birmingham).

One other application the Committee had declined to entertain.

The **Vice-President**, in moving the adoption of the report, said he should like to supplement what had been said by the President with reference to increasing the amount of the annuities. It was within his know-

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1890.

	Life Members.		Subscribing Members.		Associates in Business.	Associates not in Business.	Apprentices.
	Pharmaceutical Chemists.	Chemists & Druggists.	Pharmaceutical Chemists.	Chemists & Druggists.			
Number in 1889	206	2	1459	608	1226	...	...
" restored, 1890 ...	...	...	11	3	7	...	...
" elected, 1890 ...	...	...	67	13	123	...	...
	206	2	1537	624	1356	...	...
Deaths, Secessions, etc. ...	12	...	80	42	90	...	...
Total Strength of the Society	**194**	**2**	**1457**	**582**	**1266**	**869**	**885**
Summary:—							
1889	206	2	1459	608	1226	920	908
1890	194	2	1457	582	1266	869	885
Increase	...	...	...	...	40	...	...
Decrease	12	...	2	26	...	51	23

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1886-90.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1886	1887	1888	1889	1890
Restored to Membership ...	2	4	2	5	11
Elected " ...	44	57	55	73	67
(Total additions) ...	46	61	57	78	78
Deaths, Secessions, etc. ...	88	88	99	92	80
Decrease ...	42	27	42	14	2
Total Number of Subscribing Members	**1542**	**1515**	**1473**	**1459**	**1457**

ASSOCIATES-IN BUSINESS.

	1886	1887	1888	1889	1890
Restored	5	3	8	3	7
Elected	121	100	130	94	123
(Total additions) ...	126	103	138	97	130
Deaths, Secessions, etc. ...	106	114	127	152	90
Increase ...	20	...	11	...	40
Decrease ...	...	11	...	55	...
Total Number of Associates in Business	**1281**	**1270**	**1281**	**1226**	**1266**

ASSOCIATES NOT IN BUSINESS.

	1886	1887	1888	1889	1890
Increase ...	12	7	35	...	...
Decrease ...	...	...	...	21	51
Total Number of Associates not in Business	**899**	**906**	**941**	**920**	**869**

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1886	1887	1888	1889	1890
Restored to Membership ...	2	1	3	...	3
Elected " ...	6	9	8	9	13
(Total additions) ...	8	10	11	9	16
Deaths, Secessions, etc. ...	40	40	32	42	42
Decrease ...	32	30	21	33	26
Total Number of Subscribing Members	**692**	**662**	**641**	**608**	**582**

APPRENTICES OR STUDENTS.

	1886	1887	1888	1889	1890
Increase ...	...	...	...	...	...
Decrease ...	26	69	102	115	23
Total Number of Apprentices or Students	**1194**	**1125**	**1023**	**908**	**885**

LIFE MEMBERS.

	1886.	1887.	1888.	1889.	1890.
Pharmaceutical Chemists	**216**	**211**	**209**	**206**	**194**
Decrease	9	5	2	3	12
Chemists and Druggists	**2**	**2**	**2**	**2**	**2**

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1890.

FIRST OR PRELIMINARY EXAMINATION.

Number of Candidates during the Year.	Number of successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average number of Candidates at each Examination.	Average number of Rejections at each Examination.	Percentage of Rejections.
1392	617	775	4	348·00	193·75	55·67

Number of Certificates received in lieu of the Preliminary Examination ... 84

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations 31
Average attendance of the Members of the Board of Examiners at each meeting ... . 15·74

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of rejections at each Meeting.	Percentage of Rejections.
Major	92	56	36	6	15·33	6·00	39·13
Minor	864	359	505	6	144·00	84·16	58·44
Modified	7	4	3	3	2·33	1·00	42·85

SCOTLAND.

Number of days on which the Board met for conducting the Major, Minor and Modified Examinations 22
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 8·31

Examinations.	Number of Candidates during the Year.	Number of successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of rejections at each Meeting.	Percentage of Rejections.
Major............	13	8	5	4	3·25	1·25	38·46
Minor......... ...	293	165	128	4	73·25	32·00	43·68
Modified	1	1	None.	1	1·00	—	—

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1890.

Additions during the year:—

Number of persons who have passed the—		
Modified Examination		5
Minor „		524
Major „	64*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868		7
Number of persons restored to the Register on payment of a fine		20
		556

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Erasures during the year:—

Deaths:—	
Notices from Registrars	148
Other sources	61
Erased at the request of registered persons themselves	11
Erased by the Registrar in pursuance of the provision set forth in Section 10 of the Pharmacy Act, 1868, after sending two registered letters, to which no answer has been given..	253
Increase of numbers on the Register	83
	556

Number of Pharmaceutical Chemists on the Register, December 31st, 1890	2,176	
„ Chemists and Druggists	11,987	
		14,163

ledge that even the £30 or £35 now granted had worked an immense amount of good in the homes of those who had seen better days, but he should be very glad if a way could be seen to raise it by £5 or £10 a year, or even bring it up to £50, which he should look upon as a fair and proper annuity to be given by such a body, to members of the trade who had been unsuccessful in the battle of life. He did not anticipate living to see that done, but it would be a great satisfaction to him if he could see some addition made. He did not want to diminish the number of annuitants, but would like to add to the comfort of the recipients.

REPORT OF THE LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
December	Day . .	411	32	5	18
	Evening .	142	13	3	9
Year 1890	Day . .	6157	40	1	21
	Evening .	1875	34	1	9

Circulation of books.	Total.	Town.	Country.	Carriage paid.
December . .	184	94	90	£1 5 1½
Year 1890 . .	2603	1364	1239	£15 14 0

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

U. S. Surgeon-General's Office, Index-Catalogue of Library, vol. 11. From the SURGEON-GENERAL.

Year-Book of Pharmacy, 1890. 2 *copies*.
From the BRITISH PHARMACEUTICAL CONFERENCE.

Medico-Chirurgical Transactions, vol. 73.
From the ROYAL MEDICAL AND CHIRURGICAL SOCIETY.

Mason Science College Calendar, 1890.
From the COLLEGE.

Additions to the British Pharmacopœia, 1890.
From Professor ATTFIELD (Editor).

Hooker, Flora of British India, part 17.
From H.M. SECRETARY OF STATE FOR INDIA.

The late James Backhouse, by F. J. Hanbury.
From the AUTHOR.

Dorveaux (P.), Catalogue des thèses soutenues devant l'Ecole de pharmacie de Paris, 1815-1889.
From the AUTHOR.

Daniel (M. E.), Recherches sur le strongle paradoxal, 1890.

Feuilloux (C. J.), Contribution à l'étude anatomique des polygalacées, 1890.
From the ÉCOLE SUPÉRIEURE DE PHARMACIE DE PARIS.

Macoun (J.), Catalogue of Canadian Plants, part 5.

Pearson (W. H.), List of Canadian Hepaticæ, 1890. From the GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.

The Committee recommended that the undermentioned books be purchased:—

For the Library in London—

Ganot, Physics, 13th ed.
— Natural Philosophy, 7th ed.
Bernthsen, Organic Chemistry.
Additions to British Pharmacopœia. 2 *copies*.

For the Library in Edinburgh—

Additions to British Pharmacopœia. 2 *copies*.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
December	Morning	431	27	6	18
	Evening	74	12	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of the fruit of *Carapa Moluccensis*.
From the DIRECTOR, Kew Gardens.

Specimen of Sandal Wood and of the ortho-, meta- and para-cresotic acids of commerce.
From Mr. H. HELBING.

Specimen of the Potassium Salt of Benzoyl sulphonic imide in fine crystals.
From Messrs. BURGOYNE, BURBIDGES, CYRIAX and FARRIES.

Nine Photographs of crystals of Salicylic Acid.
From Mr. F. DAVIS.

To the Herbarium—

Specimens of *Carex tomentosa*, *Barbarea arcuata*, and *Agrostis canina*, var. *Scotica*.
From Mr. G. C. DRUCE.

A large collection of very fine samples of gums, resins, and other drugs, illustrating the different grades met with at the drug sales, had been purchased for the Museum.

The motion was put and carried unanimously.

The Society's Jubilee.

The question of the mode of celebrating the fiftieth anniversary of the foundation of the Society had been discussed and the further consideration adjourned.

The Staff of the Society's School had attended and reported on their respective classes.

The PRESIDENT, in moving the adoption of the report, referred to the collection of gums and drugs mentioned in the report as having been purchased, which, he said, had been collected by a specialist mainly from a commercial point of view. The question of celebrating the Jubilee awaited further consideration.

The VICE-PRESIDENT asked if a special meeting would be held to consider this subject, because if a Conversazione were to be held outside the Society's premises or a dinner, it would be necessary to commence the arrangements almost immediately.

The PRESIDENT said the next meeting of the Committee would probably be devoted to this matter, and if there were other business to be done a special meeting could be called subsequently.

Mr. HILLS said the Committee would be glad to receive suggestions from any one not on the Com-mittee.

The report and recommendations were then unanimously adopted.

REPORT OF THE LAW AND PARLIAMENTARY COMMITTEE.

The Draft Pharmacy Bill.

This Committee had considered the draft Pharmacy Acts Amendment Bill and recommended its adoption in the form now presented, subject to any necessary verbal alterations being made by the President in consultation with the Solicitor. It is also recommended that the Committee be authorized to take steps to introduce the Bill into Parliament.

The PRESIDENT, in moving the adoption of the report, said the details had already been discussed almost *ad nauseam*; but it was necessary, in order to get the opinion of members and the trade, that many explanations should be made. He might mention, as a curious fact which had much struck him during the last three or four months, that many of those who were most strongly convinced of the injustice of the Bill, and of the weak-kneed character of the Council, had not even read it, and if he had managed to dissipate some ignorance of that sort, probably some good had been done. The Committee had had a long sitting on the previous day, and considered carefully the various suggestions which had been made, either at meetings or by letter, but he could not say that any material change had been made, though the arrangement of the clauses had been altered. In the 6th clause (formerly the 7th) the words "for sale" had been introduced, as there was an impression in some quarters that as it stood the clause would interfere with the compounding of prescriptions in hospitals and various public institutions. That was not so, as the Bill only affected what took place in an "open shop;" but it was as well to make it quite clear. It would be a good thing if only registered men were employed in all these public institutions, but that would be brought about by the pressure of public opinion and by the action of members of the Society whenever elections to such offices took place. The Government had decided that in future dispensers in prisons should be qualified men, and he thought what was necessary for prisoners would be good for others, and probably before long public opinion would operate in that direction. In the same clause it was proposed to omit the word "immediate" before "supervision," so as to leave the question of the amount of supervision to be determined in the first instance by the Council as the prosecuting body, and afterwards by the judge before whom the case was tried. This portion of the clause would therefore run as follows:—"It shall be unlawful for any person to compound medical prescriptions for sale unless he be a person holding one or other of the qualifications set forth in the foregoing portion of this section, or be acting under the supervision of such qualified person." The effect of this clause had been, he thought, misapprehended, and it was not likely to be so serious in its effects as some supposed, but he would remind them that in the Irish Act passed last year it was provided that no sale of poison even by a registered druggist should take place, except by the hand of a qualified man. In one sense they were going for the provisions of the Irish Act, inasmuch as they were asking for the privilege of compounding prescriptions, and they could only do that on the ground of public interest. The clause with regard to the election of the Council would require the addition of a few words, and it was intended to redraft it, with the aid of the solicitor. He would remark that up to now even pharmaceutical chemists in Scotland were not exempted from jury service, and to that extent therefore their Scotch brethren were specially interested in the Bill being passed. In conclusion, he hoped that all those interested in pharmacy and those who assumed to represent the trade, which was sometimes regarded as a different body from the Society, would remember that no form of legislation could be devised for a body carrying on business in so many diversified ways which would not appear to press a little hardly on someone, and if they were not prepared as individuals to sacrifice something for the common good all hopes of legislation must be abandoned.

Mr. HAMPSON seconded the motion. He should have been glad if certain other things could have been included in the Bill, but after giving it the most serious and prolonged attention, he was persuaded that it contained as much as it was possible to obtain —perhaps more. He hoped all in the craft would rally round the Society, sinking all minor differences, so that there would be some chance of getting the Bill passed. Even if they were perfectly unanimous, such was the state of political affairs that it would require very considerable skill to carry the Bill through. Notwithstanding the criticisms which had been passed, he felt sure that if this Bill passed very considerable benefit would accrue, not only to the public, but also to the trade. He referred especially to the dispensing clause, which would be a very important step gained if it were passed. Beyond that, there was a very substantial effort made to bring into the Society everyone interested in the calling of a chemist and druggist; and if that were accomplished something more might be done in the future. It all depended on unanimity amongst themselves and the education of the public.

Mr. HILLS said the Bill was practically the same as when it was discussed before, and it went as far as was practicable at present. He thought the whole trade, as well as the Council, owed a deep debt of gratitude to the President for his efforts in connection with it during the last few months. They little knew the time, energy, money, and brain power he had expended in those efforts; and if he had not always succeeded in convincing his audiences of the wisdom of this Bill in every particular, he had, at any rate, left a pleasanter feeling behind him wherever he had been.

Mr. EVANS was glad to find that one or two clauses had been improved, and in particular that the jury clause had been added. People had had time to consider it, and he believed there was a much better feeling towards the Bill than there was some months ago. One of the provisions was that for regulating and subdividing the examinations, and he ventured to suggest the possibility of having a qualification for apprentices in the *bonâ fide* employment of registered chemists, who had passed the first portion of the Minor, under which they would be entitled to act in their employer's business. This would be a very great convenience to a large section of the trade.

The PRESIDENT said this point had been considered.

Mr. EVANS said the examinations would naturally become stiffer under the provision of this Bill, and a man who had passed the first portion would practically be equal to one who passed the Minor some years ago. At the same time he would not press it if it had been considered. He endorsed what Mr. Hills had said, for the President had convinced him to this extent, that he was quite sure he was perfectly sincere in his efforts to benefit the trade; he had worked very hard and deserved the thanks of the Council and the trade.

Mr. SCHACHT said though it was hardly necessary to add anything, he should like to take the opportunity of drawing attention to the altered circumstances in which those who practised pharmacy were placed by recent decisions. It had been declared that the public safety was secured by the qualification of the person who manipulated and sold the poison, and the Society was now going one step further in declaring its opinion that it should be also necessary that the person who manipulated and sold the ordinary remedies, such as were used in dispensing, but which were not designated poisons, should have themselves received the credentials of the examining body as being fit to conduct these duties. These two decisions, one from an outside authority and the other by those who studied these questions from within, went to show that those who were to be entrusted with these duties should certainly not be vouched for until the examiners were completely satisfied of their competence. This led up to the point that it was more and more necessary that the training of young pharmacists should be absolutely efficient, and thoroughly justified those who had been for some time urging the importance of what was known as the curriculum. Formerly it was supposed that a young pharmacist might be completing his education after his apprenticeship, whilst acting as an assistant, before he became a responsible and qualified man; but it was now laid down that he must be thoroughly qualified before he could dispense or sell poisons, and therefore it was clear that his Preliminary training ought to be better than it was in days gone by. His time therefore ought to be more systematically utilized, as was desired by the promoters of the curriculum scheme.

Mr. ATKINS said he thoroughly agreed with the remarks made by Mr. Hill and Mr. Evans, with regard to the services which the President had rendered; and if a definite resolution had been proposed on that subject he should have been delighted to support it. The President had told them that some gentlemen who had criticized the Bill had not read it, and that was not an unusual fact. It was a knowledge of details which always rendered a thoughtful man profoundly anxious, and made him cautious in his criticisms. But whatever criticisms might have been passed there seemed, at any rate, to be a very fair consensus of opinion in favour of the Bill as a whole; and besides that the President had made many friends, and in doing so in his representative capacity he had made friends for the Society. He was glad that the words "for sale" had been inserted in clause 6, because it was as well to have that point made clear; and the question had been brought before him in his own neighbourhood whether they were going to interfere with dispensaries. He knew one case where there was a very good man who was unqualified; but in another instance, when a vacancy had occurred he had managed to secure the appointment of a registered man. It was for the members of the Council to exercise their influence on Committees, or in other ways to secure that such appointments should only be filled by qualified men. Some two years ago he pointed out to his friends connected with a large hospital, that it was extremely desirable to have a registered man as dispenser, and they at once fell in with that view. He was also glad to see the word "immediate" was deleted, because while they meant the Bill to be a real and not a sham Bill; at the same time it was well to allay unnecessary anxiety. Their friends in the country were very anxious about that clause, but he was sure, having a full knowledge of the difficulties attending the conduct of a pharmacy with limited aid, the Council would consider each case upon its merits before sending it to a higher tribunal. If it had been possible to defend titles it would have been wise to do so; but having heard the difficulties which existed in dealing with such a clause it was felt prudent not to attempt it. He much regretted this because he had heard it said over and over again that if they could not touch the burning question, which had been so much agitated in the past, namely, what was considered illegal trading, something might have been done to protect the title. But the Council, having most carefully considered the matter from every point of view, thought it was best not to introduce any such clause into this Bill. Still this must not be regarded as the last word to be utttered by the Council on the difficulties which pharmacy had to encounter. It was an instalment, a large instalment, and an honest instalment, and was a considerable amendment of the Act of 1868. It was worth while even for those who thought there was important things omitted to consider whether it did not contain enough of importance to induce them to join in one supreme effort to pass it into law.

Mr. **Hampson** thought Mr. Atkins's remarks with regard to their inability to defend titles were rather misleading, because the Society did defend titles.

Mr. **Atkins** said the point he had in his mind was this: he was informed that in London there was a case, which might probably be multiplied by many, in which a company, not consisting of chemists and druggists, used the title of "chemists and druggists." He did not wish to press the matter at present.

Mr. **Harrison** said he felt, as everyone must feel, who took an interest in pharmacy, that the whole body was deeply indebted to the President for the labour which he had undertaken, and the masterly manner in which he had piloted this measure through the country, with a view to his constituents becoming better acquainted with its provisions. He regretted that the Bill was not a more complete measure, and on a recent occasion he indicated the direction in which he thought it might be made more useful to the trade and to the public. On that occasion he was left in a hopeless minority, but he ventured to believe that the weight of argument was on his side and of votes on the other; but still, like most men of principle, he had to be content with being in the glorious minority, and with being convinced that sooner or later the majority would come round to his way of thinking. He said this because he very much feared that the loophole left for unqualified persons to carry on business would be very largely made use of. With regard to legitimate pharmacy, the gate was very strait and the way narrow; but there was a very wide gate and a very broad road, through which certain persons could walk and practice what he considered illegitimate pharmacy. He feared that that broad road would be largely used, and that they would be perfectly powerless to stop it. At the same time the way in which his views were received on the last occasion did not warrant him in taking up the time of the Council in further discussion; nor had there been that demand from outside for amendments which would lead him to do so. The President had been through the country, from north to south, and though there had been some murmuring and dissatisfaction expressed, they were justified in assuming that this discontent had not justified itself by showing any practical way of getting out of the present difficulties; nor had there been memorials asking the Council to deal with this matter. He did not place too great value on the apparent acquiescence in the President's views, because he fully recognized that a masterly hand like his might easily paralyse those whose knowledge of the facts were smaller, and whose skill in using argument was much less than his own. In fact, he noticed that at several places where the opposition had been very slight, after the President had left, and people had had time to think the matter over, it was evident from the correspondence which was published that they were still unconvinced. He knew how skilful and at the same time fair an antagonist the President was, and he fully sympathized with those who were not accustomed to be sat upon to the same extent as they were at that Council table. When in Edinburgh the President said that he was there in the capacity of a schoolmaster enlightening his pupils: but he thought it was the duty rather of the President at a public meeting to discuss the matter with his constituents; it certainly was not the duty of pupils to discuss matters with their schoolmaster. If the position at all the meetings was that of a schoolmaster and his pupils he could understand the somewhat meagre character of the discussions which had taken place. Still he thought it might probably be taken that after the explanations which had been given the constituents began to see that it was better to aim at what was practicable than at what they desired, and he took it that this Bill, which fell very far short of what was desired, went as far as they were absolutely agreed upon. If they went a step beyond they would begin to open up contentious matter and get on ground upon which they were not agreed as to the course of proceeding. He quite recognized that if they were to go to Parliament with any prospect of success they must go as a united body, and therefore he loyally accepted the Bill, though only as an instalment, and should urge as strongly as he could all his friends throughout the length and breadth of the country to give it their hearty support, in the fervent hope that something more would be added at some future time. He should have been delighted to go further at present, but he did not see his way, and the country did not seem ripe for it, and until they were ready to demand it with one voice it was useless to proceed. In that spirit he should urge the measure forward. He believed it had very much good in it, and very much which would be to the advantage of members and to the public. It was an honest attempt to deal with difficulties, and possibly at some future time, when they found that they commanded to a greater extent the sympathies and good wishes of the trade, they might be able to go forward and apply for a measure of a much larger character.

Mr. **Storrar** said he had no intention of saying anything which would disturb the unanimity of the Council. The Bill had been before the members a long time and had received careful and lengthy consideration, and the large majority were of opinion that this was all that could be reasonably asked for at present. That view had been endorsed by almost every meeting that had been held throughout the country, and for that reason it would be worse than a crime to attempt to oppose it—it would be a mistake. Mr. Hampson, however, and the President had put forward as an argument in favour of this Bill that it would unite the trade and strengthen the Society, but he was very strongly of opinion that this Bill would not add to the numbers of the Society in any way, for two reasons. It was good for members of the Society who might be said broadly to represent what was called "the professional part of the trade," but as it stood it went a little too far or not far enough to satisfy the general trade. It went perhaps a little too far in that it narrowed the door to the individual to enter, but it widened the gate which admitted the illegitimate trader. For that reason, and also because it left the 1868 Act in the lop-sided condition in which recent decisions had left it, without any attempt at amendment, he feared that it would not increase the numbers of the Society in any way. He was very anxious that the status and qualification of the members of the Society should be increased, but still more anxious that the Society should, if possible, represent the whole body of the trade, and he was very glad to hear Mr. Atkins say that it was not for the want of will that the Council did not go forward to introduce a companies clause or protect titles, but simply because it was believed it would be impossible. For these reasons he acquiesced in Mr. Harrison's remarks and hoped that it would be the forerunner of a much larger measure to be introduced at some future time, which would give them what they all wanted, although very few liked to mention it, namely, a little protection.

The **President** said he agreed heartily with what Mr. Storrar had said. Their powers for obtaining fresh legislative measures were crippled by the fact of their representing only a small part of the trade. They must be able to show the Legislature and the Government that they were acting solely for the public good, and they were not powerful enough to attack certain general principles of company trading, which bore hardly upon them, without representing the whole trade. It was unfair and illogical for the trade to stand outside when they wanted some great good and say, "We will come to you when you have done it." If they wanted the good done let them join the Society and assist. As he had said before on many occasions the members of Council would work heartily and honestly, night and day, if the trade would give them their confidence, but it was useless to attempt to do what the Government had said was unnecessary and which members of Parliament would not take up. It was not a question of passing a measure, it was a question of getting a Bill introduced—of getting some one to listen to their proposals. They were a long way off passing even the smallest measure in Parliament, for at the present day it was necessary to persuade half a dozen members to back a Bill, and a great many more that it was right in the interest of the public, and not in the interest of a great corporation. The powers of corporations were regarded in the House of Commons with very great jealousy, and rightly so. Some corporations had not done their duty, and secondly, even those who were doing their duty to the public were looked upon with suspicion. He should like to remind Mr. Harrison and Mr. Storrar that in 1883 and 1884 the Council was in communication with the Government—this was a bit of history which was often forgotten—with the hope of introducing a Bill, and the Government told the Council very definitely on more than one occasion that it had no business to touch what were called "trade matters;" that it was the business of the Government to deal with that form of legislation, which not only affected chemists and druggists connected with the Society, but those outside it, as well as medical men and veterinary surgeons. A Bill was submitted, and the then President had interviews with various members of the Government department with regard to it, and the result was not only that they would not listen to the proposal of touching company trading, but that their idea was to regulate it, and let one individual be considered the manager of the business of the poison department, leaving everything else just where it was. In going to Parliament the Council had to be guided very largely by the opinion of the Government department, and the first practical question put to any one who went and asked members to support a Bill, or to father it was, "Does the Government approve of it?" It was just the same thing in 1868. Those who had influence went round to a number of members, and the first question always was, Did the Government approve? It was a matter of special detail which ordinary members could not be expected to know much about, and the question was, Was the public safeguarded in the measure to a sufficient extent to satisfy the Government department which had charge of pharmaceutical affairs? If the Government was satisfied that the Bill was for the good of the public, even if it were indirectly good for the trade, then members would support it, but not otherwise. If those who promoted the Bill declined to commit themselves to that extent the members sought the opinion of their constituents, and in so doing of course they had the opinions of grocers as well as chemists, and of all those connected with the great mixed druggists' trades, who all had votes. In going to Parliament to ask for something which would affect three-fourths of the trade not in the Society and many others as well, it must be recognized that the Government of the day, whichever side was in office, would not in its official capacity allow company trading to be interfered with. If the whole 14,000 men on the Register were all associated with the Society, they might be able to defy the Government by bringing influence to bear on members, but as the Society stood at present it was simply a small department of the Government, and worked very timidly and cautiously. He wished he could convince the members of the trade of his personal desire to benefit them. He never grudged any amount of hard work, and if he had had to express views which were not always palatable, it was only to try and make clear the difficulties, not that he was unwilling, or that his colleagues were unwilling to take the responsibility of trying to get this particular form of trading stopped. As he had often said before, this matter of company trading would be dealt with, if it were possible to deal with it at all, by the united efforts of a large number besides those who were affected by it, and he was not sure what the development would be during the next two or three years. The Council might draw clauses which would meet the case of present or future company trading; but in the present state of opinion in the House and outside, and in the Government—he said nothing about their interests—the Council would not be listened to until it was able to command, if that time ever came, the support of the whole trade throughout the country.

Mr. Atkins: Not even then.

The President said perhaps not; but so long as the Society only represented one-fourth of the trade that was a sufficient answer to those outside who asked the Council to do what was impossible before they would give it their support. That was not the way in which victories could be won; soldiers must fall in and obey the officers who led them.

The motion was then put and carried unanimously.

It was also resolved, on the motion of Mr. Schacht,

> "That the Law and Parliamentary Committee be instructed to take the necessary steps for the introduction into Parliament of the draft Bill now agreed to."

PRELIMINARY EXAMINATIONS.

The President said he had to ask the assent of the Council to a slight change with regard to the details of the Preliminary examination. These examinations were carried on by the College of Preceptors, but under the direction of the Council, and some discussion had occurred from time to time with regard to copying. The Examiners had found it a great inconvenience that candidates were supplied with loose sheets for writing upon, and after due consideration and consultation it had been decided that the best way of dealing with the difficulty would be to send out small books, such as are used by the University of London, instead of separate sheets.

Mr. Evans suggested that as there were now three universities in Wales, namely, at Bangor, Aberystwith, and Cardiff, the conduct of these Preliminary examinations might be entrusted to those bodies, who he felt quite sure would be willing to undertake them, and possibly the same thing might apply to other parts of the country.

Mr. Harrison said the great desideratum was to have uniformity in results, and therefore it would be better to continue these examinations as at present, in the hands of the College of Preceptors, with the additional safeguard now proposed.

The resolution authorising the alteration suggested was carried unanimously.

REPORT OF THE RESEARCH COMMITTEE.

The President said this report was somewhat long. It marked the end of an epoch in the history of the Research Committee, and not only referred to matters which were past, but contained recommendations for the future, and particularly the association with the work of certain other bodies. It was a report from a committee all the members of which were not members of the Council, and therefore was somewhat different from the report of an ordinary committee, and the question which occurred to him was whether it should be discussed now in Council or should be referred in the first place to a committee for consideration and report. He would simply move at present that it be formally received and entered on the minutes.

The report is printed at page 693.

Mr. Hampson thought it would be desirable that the report should be referred to a committee as the first step, though, of course, it was highly desirable that the matter should be thoroughly discussed by the whole Council.

Mr. Harrison suggested that as members had only just received copies and had not had time to examin- the report it should be referred to the General Pure poses Committee, which consisted of the whole Council, as it was of sufficient importance to warrant the most careful consideration. It might then be considered and brought before the Council at the next meeting.

Mr. Hills supported this view, if the continuity of the work would not be interrupted by the postponement.

The President said there were some little inconveniences in that method, but he thought they were not insuperable.

Mr. Hills said that it was very important that the subject should be fully discussed in Committee before it came forward in public.

Mr. Hampson also supported Mr. Harrison's suggestion, which was then unanimously agreed to.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the solicitor reporting on cases placed in his hands. It stated that two penalties had been received, and that several cases stand for hearing. In one case the summons had not been served, the defendant having left the neighbourhood.

Several cases of infringement of the Act had been reported, and proceedings were recommended.

This report, as usual, was read and considered in Committee.

On resuming, the report and recommendations were unanimously adopted.

THE POISON SCHEDULE.

The President said the following letter had been received from Sir C. L. Peel, of the Privy Council Office, calling the attention of the Council to certain suggestions which had been made recently at an inquest held in Somersetshire.

"Council Office, January 29, 1891.

"Sir,—I am directed by the Lord President of the Council to transmit to you a copy of a letter from the Coroner of South Somersetshire with reference to an inquest recently held on a woman who died from the effects of poison by taking bichromate of potash.

"I am also to transmit a 'rider' to the verdict of the Jury 'that the Pharmacy Acts, 1868, should be amended by the inclusion of other poisons than those within the meaning of the Act,' and I am to request that the Pharmaceutical Society will be pleased to favour his Lordship with their remarks in regard to the opinion of the Jury.

"I am, Sir, "Your obedient servant,
(Signed) "C. L. Peel.
"The President, Pharmaceutical Society,
"17, Bloomsbury Square."

[Copy].

"Bruton, Somerset, January 20, 1891.

"Sir,—I recently held an inquest at Crewkerne on a married woman, who died from the effects of a dose of bichromate of potash, taken by her for a dose of bicarbonate of potash. The bichromate of potash was obtained from a chemist, and not being one of the scheduled poisons within the meaning of the Pharmacy Act of 1868, was not marked poison.

"The medical man who gave evidence at the inquiry stated that the case in question was the second that has occurred within his knowledge during the last few months. In the other case, however, the result was not fatal. Bicarbonate of potash appears to be a remedy for neuralgia.

"It is not a poison. There is no antidote to bichromate of potash.

"The Jury requested me to bring to your notice the rider attached to the verdict, a copy of which I enclose you.

"I am, Sir,
"Your obedient servant,
(Signed) "W. Muller,"
"Coroner for South-east Somerset."
"The Secretary of State,
"Whitehall, S.W.

"Copy rider referred to—

"And we are of opinion that the Pharmacy Acts, 1868, should be amended by the inclusion of other poisons than those within the meaning of the Act."

The PRESIDENT said that in order to avoid delaying the reply to that communication, he brought this matter before the General Purposes Committee on the previous evening, and suggested that he should be instructed to write a letter saying that the Council was of opinion that other things should be included in the Poison Schedule, and it had already expressed its opinion to that effect in certain resolutions (the dates of which would be inserted) previously sent, but that as to bichromate of potash, having regard to its use in manufacture and arts, it was not considered expedient to place it in the Schedule. If the Council approve of such a reply being sent it should be done.

This was agreed to unanimously.

REPORT OF EXAMINATIONS.—*January*, 1891.

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (21st)	3	3	0
„ (28th)	3	2	1
	— 6	— 5	— 1
Minor (21st)	11	7	4
„ (22nd)	13	9	4
„ (23rd)	13	8	5
„ (28th)	11	9	2
„ (29th)	13	8	5
„ (30th)	14	11	3
	—75	—52	—23
	81	57	24

Preliminary Examination.

13*th*.—Candidates examined, 307. Passed, 154. Failed, 153.

28*th*.—Sixteen certificates by approved examining bodies were received in lieu of the Society's examination.

EXAMINATIONS IN EDINBURGH.

January 21, 22, 23, 28, 29 *and* 30, 1891.

Present on the 21st, 22nd, and 23rd—Mr. Carteighe, President; Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Present on the 28th, 29th and 30th—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 23rd, 28th, and 30th, on behalf of the Privy Council.

MAJOR EXAMINATION.

21*st*—*Three* candidates were examined, and were declared qualified to be registered as Pharmaceutical Chemists:—

Dalziel, Charles Michie.........Aberdeen.
Durno, Alexander Emslie......Aberdeen.
Liversidge, Joe Sykes ....Dumfries.

28*th*.—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Mackenzie, William Graham...Edinburgh.
Phillips, Sidney ....Wolverhampton.

MINOR EXAMINATION.

21*st*.—*Eleven* candidates were examined. *Four* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Antcliffe, Herbert ....Sheffield.
Armstrong, Frederick William.Chester-le-Street.
Baxter, Alexander Kidd ......Leith.
Black, Charles Jeffrey ....Anstruther.
Blayney, William Herbert .....Haslingden.
Cameron, Lewis ....Aberdeen.
Clarke, John James ....Liverpool.

22*nd*.—*Thirteen* candidates were examined. *Four* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cocker, Horace Edward.........Ripponden.
Connan, Campbell Allan ......Crieff.
Cowan, Hugh ....Ayr.
Dick, James........................Lochgelly.
Dupont, John Munro ....Grantham.
Evans, Rees ....Llanybyther.
Gates, Colvin ....Moffat.
Greatorex, Edward John ......Stapleton.
Greenhill, James Donaldson...Glasgow.

23*rd*.—*Thirteen* candidates were examined. *Five* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Henderson, John..................Keith.
Hendry, David.....................Tillicoultry.
Kirkness, George David ......Kirkwall.
Leask, John ....Leith.
Lyle, William Kennedy.........Glasgow.
McDougall, Daniel ....Edinburgh.
McKellar, Arthur ....Pollokshields.
McWilliam, John ....Aberdeen.

28*th*.—*Eleven* candidates were examined. *Two* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Mingay, Adolphus Alfred......Burton-on-Trent.
Mitchell, Patrick ....Kingussie.
Moore, Thomas ....Stirling.
Morrison, David Russell ......Alloa.
Murray, Lewis.....................Forres.
O'Dell, John Denis...............Hull.
Patton, James ....Aberdeen.
Reekie, Balfour ....Glasgow.
Rhodes, Herbert Walter ......Wrawby.

29*th*.—*Thirteen* candidates were examined. *Five* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Furness, Thomas Edwin ......Oldham.
Riley, Joseph Arthur............Seaforth.
Rosie, George ....Edinburgh.
Ross, William Neil..............Partick.
Scott, Henry ....Middlesborough.
Strachan, John ....Edinburgh.
Stephen, Charles.................Arbroath.
Thacker, Charles Baildon ......Edinburgh.

30*th*.—*Fourteen* candidates were examined. *Three* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Geddes, James.....................Leith.
Jones, Edward David............Llanrhaiadr.
Latham, Walter ....Crewe.
Vernon, Thomas ....Tarporley.
Walker, Walter ....Leicester.
Watson, James ....Glasgow.
Whitelaw, Alexander............Kelso.
Whyte, Peter ....Fraserburgh
Wilson, William Elliot ....Edinburgh.
Wolstenholme, William.........Sheffield.
Young, Robert ....Dunfermline.

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LIVERPOOL CHEMISTS' ASSOCIATION.

The annual meeting of the forty-second session was held at the Royal Institution, on Thursday evening, January 29, the President, Mr. C. Symes, Ph.D., in the chair.

The minutes of the previous meeting were read and confirmed, the donations announced, and Mr. Hanson, of Aigburth, unanimously elected a member of the Association.

The President now called upon the Hon. Secretary to read the annual report of the Council, which was followed by the Hon. Treasurer's statement for the year, presented by Mr. Richard Parkinson, and showed a balance in hand of £25 16*s.* 5*d.*

Moved from the chair, seconded by Mr. M. Conroy, supported by Mr. A. H. Samuel, and unanimously resolved:—"That the report as read be adopted, and together with a list of the members be printed and circulated among the members."

The election of seven members of Council now took place, and the retiring members, Messrs. E. Davies, J. Bain, M. Conroy, A. S. Buck, J. S. Ward, J. Woodcock, and H. Wyatt were re-elected.

Proposed by Mr. A. S. Buck, seconded by Mr. Hocken, and unanimously resolved:—"That the best thanks of the meeting be given to the donors to the Library and Museum, and to the authors of papers during the past session."

Proposed by Mr. J. Smith, seconded by Mr. Wokes, and resolved:—"That a vote of thanks be accorded to the officers and Council for their services during the past session."

The President, in accordance with the notice printed on the circulars calling the meeting, now moved:—"That the ordinary meeting be held at seven o'clock instead of eight o'clock as heretofore."

The President, in moving the resolution, said the question was freely discussed at the last meeting and the feeling decidedly in favour of it. He should be glad, however, to have the matter fully discussed before any decision was arrived at.

Mr. Conroy seconded the motion, and after a few remarks it was carried unanimously.

In reply to an invitation from the chair for any suggestions from members of any way in which the Society might be better able to accomplish its purposes than at present,

Mr. Ward suggested the desirability of re-instituting the "question" box.

Mr. Hocken thought the Association might be brought into closer touch with the trade generally if the city were divided into districts, and one of these allotted to each member of the Council, who would undertake to visit the chemists in his district and generally work the ground.

Mr. A. H. Samuel, having regard to the healthy state of the finances, thought it would be wise if the Council could see their way to re-establish the teas on the evenings of meeting.

The President said he was indebted to those gentlemen who had made these suggestions, which should have the consideration of the Council.

Dr. Symes now delivered his inaugural address.

INAUGURAL SESSIONAL ADDRESS.

BY C. SYMES, PH.D.

When, for the sixth time, one begins to consider what shall form the subject of an annual address, the natural tendency is to avoid subjects already dealt with, and to get on new lines of thought, to seek for fields and pastures new. In direct proportion to the comprehensiveness of previous efforts will be the difficulty of accomplishing this object, and it will not be surprising therefore if I merely ask you to look with me from a somewhat uncommon point of view at a well worn topic. Fortunately for me at the present time, British pharmacy is being agitated by political questions of considerable importance, both educational and practical. To those present the practical side will doubtless have the sterner realities, and it may therefore not be so difficult to find matter of interest as would otherwise be the case. It will be remembered that when Mr. Carteighe was good enough to pay us a visit in the middle of November, when in his speech he referred to clause 6 of the draft Pharmacy Bill, he said, "We call this the consolidation clause, its object being to consolidate the Pharmaceutical Society." It occurred to me at the moment that this was a big word to represent a somewhat feeble effort; but that effort being in my opinion quite in the right direction, I was led to reflect further on the idea of consolidation, and asked myself "What if the whole trade could become consolidated?" In these days of the iodine ring, salt union, alkali combination, rubber trust, attempted bottle syndicate, and a host of other associations for the protection of various trades and combined interests, could not some means be found for bringing nearer together and in greater harmony the scattered members of our craft? What those means should be it is of course difficult to define, for it scarcely seems probable that any amount of engineering would bring about a combination of chemists of the character of the concerns which I have mentioned; or that all the tact and energy that could be thrown into the work would result in unity of the whole trade. That "unity is strength," however, no one doubts, and it has become a hackneyed and undisputed proverb; but I am quite sure that in practice we all underrate its value. The Pharmaceutical Society has entered on the fiftieth year of its existence; and its own journal has practically told us within the past few weeks (*Pharm. Journ.*, Dec. 17, p. 520) that in everything but benevolence it has almost been a failure. I should have had some hesitation in saying this on my own authority, and as a pharmaceutical chemist of nearly thirty years standing and who has served ten years on its Council, I must enter a mild sort of protest against this pessimist view of things. At the same time I feel bound to admit that except in this one particular it has not accomplished all that its founders expected, or that we have fondly hoped for. It has not consolidated the trade, it has not consolidated itself, and is only now making a feeble effort to do so. The Trade Association was a well organized body, capable of accomplishing much good, and at first it made excellent progress, but after ten or twelve years of a precarious existence it passed away, notwithstanding that vigorous efforts on the part of its executive were made to keep it going and to resuscitate it when it had grown feeble and weak. You all know it was starved out for want of sufficient support at the very small subscription of 5*s.* per annum. Our own Association has existed over forty years, and yet the roll does not contain the names of much more than one-third of the local trade, and of these not more than one-third take an active interest in the proceedings or attend our meetings. This is by no means encouraging, and were it not that hope is strong within me I should scarcely see it possible that anything would be capable of bringing about a state of greater unity and solidity, more coherence between those who constitute the members of our fraternity. At the present moment we appear to be influenced by a centrifugal rather than a centripetal force, and the chances of coalescence seem very remote. But just as "the darkest part of the night is that nearest the dawn," so I believe that when things have got to about the worst with us (if that be not so already) signs of a better state of things will present themselves, and I trust we shall be fully prepared to embrace them. It is this preparedness which chiefly merits our attention at present, for, as is well known, the realization of an object is often brought about by the preliminary preparations concerning it. The only organization of a national character which at present exists in this country capable of facilitating progress and ameliorating the hardships and difficulties connected with the exercise of our calling is the Pharmaceutical Society, which statement is no sooner made than we are met by the well-worn cry, "What does the Society do for us?" To which comes the inevitable response of the President, "What do you expect the Society to do for you unless you join its ranks and contribute to its exchequer?" Here we have a dead lock; and where, may I ask, are we to look for a solution of the difficulty? Well, gentlemen, no society, be it ever so powerful, can provide business capability, tact and energy for a man, and these are essentials for a successful career. They are qualities, be it noted, which differ materially from those known as shrewdness and smartness, and which are closely related to selfishness and even dishonesty. But the Society can do much in the way of furthering the general interests of all connected with the trade, and it is here that I cannot endorse its action. I have been told again and again that the "outsiders," as they are designated, have no part or lot with the members who are within; that as they do not contribute to the Society they have no right to expect consideration or to derive advantages from it. This, I say, is a narrow policy and dwarfs the general progress. We have already seen that the Benevolent Fund is the special branch of the Society which has been eminently successful. A noble institution, administered on the broad and large-hearted principle that the widows or orphans of those outside receive the same consideration as those within, so long as there is equal need and sufficient means. There is therefore no excuse for any practitioner of pharmacy not contributing a small or large amount, as his means may allow, to this comprehensive and excellent fund. Now let the Society attempt the administration of its general affairs on similarly broad lines, and with the same generous hand, and I cannot but believe it would soon command the sympathy of a large portion of those who now stand aloof from it. The President's campaign would no doubt assist materially in this way, were it not for the fact that its chief object appears to be to show that the Society is right and everybody else wrong. Even so it has done some little good, which goes to prove that those outside the Society are disposed to listen to any reasonable proposals. I believe if they would to a larger extent join the Society, and take an active interest in its constitution and proceedings, we should find real progress made in the direction of the consummation so much to be desired. We should then have a Society which would identify itself not only with education and benevolence (which are both exceedingly good in their way), but with the important business interests of the majority of the trade. An organization not spending its energy and its thousands of pounds in endeavouring to gain prestige and a position as a learned Society (which are also good if they are not gained at too great a cost and with the neglect of important duties), but in protecting our legal titles, and as far as possible curtailing the power of the enemies and parasites which are sapping the foundation of the legitimate trade. A research laboratory, not merely devoted to experimental work, which may be good as mental exercise or convenient to bring before the members of a purely scientific society, but almost useless to the average pharmacist who has to find the means to support it. We should soon have a real improvement in our business status, and should not merely be invited as an act of courtesy to offer suggestions for and occupy an insignificant position in the production of the Pharmacopœia, but we should (as in all other civilized countries) have our recognized position as members of the Pharmacopœia Committee, a totally different position from that concerning which so many complimentary remarks have been made of late. What I claim, what every true friend of pharmacy must claim, is the principle that we share with the medical profession equal authority, responsibility and credit or discredit in the production of the book which is to be our mutual guide. For many years the Society creditably maintained this position, and on one occasion petitions were sent to the local secretaries for signatures of both medical men and chemists in support of it. On all occasions when opportunity presented itself efforts were put forward in the same direction, and I am at a loss to know what has since occurred to cause the abandonment of so reasonable a claim, or to justify the Council in bartering this "our birthright for a mess of pottage," as has recently been the case. Add to this the abandonment of our claim to business title already referred to, and it will be seen that if anything worth having is to be saved those who are concerned should rally round the Society and use their influence in staying further retrograde steps. I am afraid that it will appear as though this short address had been given with the intention of having a grumble all round; but such has not been my object. Everyone seems dissatisfied with our position and progress, few, if any, suggest a remedy. As a pharmacist and friend of the Society, having at the same time sympathy with the whole trade, I have ventured to suggest that we should leave the circuitous methods of diplomacy and the narrow system of administration that have hitherto been adopted, that we should fairly and openly face the position, and put our shoulders to the work of broader and better organization.

At the close a very hearty vote of thanks, proposed by Mr. A. H. Samuel, seconded by Mr. J. Bain, and put to the meeting by Mr. Parkinson, was accorded to Dr. Symes for his address.

Dr. Symes briefly replied and the meeting terminated.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS ASSOCIATION.

The eighth meeting of the second session of this Association was held in Lockhart's Café, St. Nicholas Square, on Wednesday evening, February 4, at a quarter-past eight o'clock, Mr. F. Park, President, in the chair. There was a good attendance.

The minutes of previous meeting having been read and adopted, the President called for a paper on—

Effervescent Preparations.

BY HEDLEY PATTINSON.

There exist in pharmacy a large number of preparations of a granular form which effervesce when mixed with water, owing to the presence of a free carbonate and one or more free acids. Officially we have four liquid (B.P.) effervescing preparations—liq. potassæ, liq. sodæ, liq. lithiæ, and liq. magnes. citratis, which are dispensed ready charged with CO_2 for consumption. Of these the liq. sodæ and liq. potassæ are by far the most popular. They are prepared by forcing into water, in which the bicarbonates of the salts have been dissolved, as much pure washed carbonic acid gas—obtained by the action of sulphuric acid upon chalk—as can be introduced at a pressure of four atmospheres.

The official strength—30 grs. to the pint—is rarely found in the market, enormous quantities daily sent out from numbers of aerated water works being simply water charged with CO_2—simply aerated or carbonated water—and sold as potash or soda to the numerous supporters of these popular cooling preparations.

I may say I have prepared liq. potassæ effervesc. to contain 1 drachm of bicarbonate in each pint for medicinal uses, so that a person while enjoying a pleasant cooling drink may be at the same time taking the official maximum dose of a drug which plays an important part in medicine.

Impurities in aerated waters exist very largely, and until recently manufacturers laboured under great difficulties; but thanks to analytical skill these have vanished, and to-day makers of these preparations with a knowledge of chemistry, combined with a good plant and good supply of pure water, can prepare these popular beverages perfectly pure. Until within the last few years a difficulty was experienced, owing to a milky opalescence or turbidity in ginger ale appearing a day or two after it had been aerated and bottled, the same essence of ginger, syrups, colouring matter, etc., having been always used; the only ingredient which was different was the vitriol used in generating the CO_2. Attention was drawn to the difficulty, and suspicion thrown on the sulphuric acid as the cause of the change, which occurred periodically, depending altogether on the purity of the vitriol used. To prove that nitrous compounds carried over, with the generated CO_2 is the cause of this change pass a stream of CO_2, generated from marble and pure oil of vitriol, which will be free from nitrous compounds, through a solution containing ginger essence, syrup, etc., and a perfectly bright ginger ale is produced. Through another portion of the same ginger essence, etc., pass a current of carbonic acid gas, generated from marble and impure sulphuric acid, and in a short time the objectionable opalescence is noticed. To further prove the point, add a little nitrite of potash to the sulphuric acid before generating the gas, and the nitrous fumes which will be carried over will cause the beverage to become quite milky in the course of twenty-four hours. It is thus conclusively shown that the objectionable "cloudiness" is caused by the nitrous compounds in the vitriol. Further experiments show that the action is upon the ginger essence and not upon the syrup and other ingredients.

A "batch" of aerated ginger ale kept for a few weeks would thus lose the whole of the colour of the ginger essence.

It is reasonable to assume that a large percentage of aerated waters made with common cheap vitriol by unskilled manufacturers contain as impurities nitrous compounds, which would not produce any objectionable appearance in carbonated waters free from colouring essences.

Fortunately there is no difficulty in obtaining H_2SO_4 free from these impurities, so that, by care, these objectionable results may be avoided. The defect in the pungency of ginger ale thus produced having been seen, the question naturally arises as to whether nitrous compounds affect other flavouring essences to the same extent as ginger? It is the custom for manufacturers of high-class waters to pass the generated CO_2 through a scrubber containing an alkaline solution of permanganate of potass. The small traces of nitrates and nitrites may be disregarded if this precaution is adopted. It will be well to note that H_2SO_4 made from pure sulphur may be just as likely to contain nitrous compounds as that made from iron pyrites, but will be free from arsenic. This danger may also be avoided by heating the H_2SO_4 with a little sulphate of ammonia. To prove that nitrous compounds are absent, add to 20 c.c. of H_2SO_4 a few drops of solution of potassium of permanganate, and the pink colour will be retained, whereas, if impure, the colour will in a short time be destroyed. (Mr. Pattinson here gave an illustration of the test.)

Passing from the liquid effervescing preparations to those in the granular form, it will be well to look at the theory of granulation first. It is the citric acid in the mixed powder which is the chief factor in the process of granulation, assisted to a small extent by the moisture in the sugar. A glance at the formula $(H_3C_6H_5O_7 \cdot H_2O)$ will show that water is present. This is given off in heating, and the moisture thus obtained partially forms a syrup with the sugar, which acts as an adhesive agent during the melting process. The object aimed at is to apply only sufficient heat to cause adhesion and at the same to lose as little CO_2 as possible during the process. Care must also be taken not to raise the temperature too high, as the preparation would then be rendered much less freely soluble. Before looking on the different methods of granulation I would say that effervescent preparations in this form are gaining popularity year by year. In a pleasant draught an unpalatable drug may be taken, its nauseousness being corrected by that pleasant, sharp taste due to the presence and escape of carbonic acid gas. The popularity of such preparations as gran. effervescent antipyrin, citrate of caffeine, lithia, sulphate of soda, etc., is in itself sufficient proof that they are preferred to the ancient manner of a pill, powder or bitter draught. Again, when taking a dose of caffeine for example, the effervescing draught in itself acts, and independent of the presence of the active ingredient, produces a soothing and good effect upon the patient.

Three methods of granulation have been advocated. (1) To make the mass into a tough paste with S.V.R., press the mass through a large meshed sieve and dry quickly. (2) To heat the dried ingredients together until a temperature between 200° and 220° F. is reached, stirring well all the while to form granules; then by means of suitable sieves separating the granules and preserving in well-closed bottles. The foregoing, as will be perceived, is the pharmacopœial method. To both of these processes experience shows there are objections. The objections to the first may be readily seen, inasmuch as it is an expensive and comparatively poor method. In the official process I have found a large amount of waste, as it is impossible to get all the base and active ingredients into granular form, the large proportion of powdery product mixed with the granules giving the preparation an inelegant and "saline" appearance. To follow the directions of the B.P., the granules of perfect form are to be separated from the powdery product. But is it not possible that the active ingredient—or a large percentage of it—may be contained in this part of the preparation?

The process, I venture to say, which beats the two foregoing, is that of heating quickly, with manipulation, the ingredients till the mass becomes pasty. This pasty portion in lifted up, at intervals of a few seconds, to the top so as to allow all the powder to come into contact with the bottom of the granulating tin used. It is then pressed through a wire sieve of convenient sized mesh. The granules are received on white paper and dried in a warm room on suitable trays. By this method we have no S.V.R. used, neither have we a superabundance of powder mixed with our granules. Care of course must be taken to apply a certain amount of heat to prevent too great a loss of CO_2, otherwise our product would be deficient in effervescence. A little experience in manipulation is soon obtained, and as much as 50 per cent. of active ingredients can readily be incorporated. The B.P. sodii tart. effervesc. may be taken as a typical example of the medicaments. I need not go over the details of manufacture again, but will compare it with that popular article which seems to be sold cheaper and of more inferior quality year by year. I refer to what is known as citrate of magnesia.

Magnesia in this preparation is frequently entirely absent, and such phrases as "so called" or "known to the public as," sometimes omitted altogether from the labels. The same may be bought of grocers, etc., outside of pharmacy, nicely flavoured with lemon, vanilla, etc., in divers colours. As an example of what pleases the public, the following is the composition of a preparation boldly styled citrate of magnesia—

Acid. tartaric.	37 parts.
Sodii bicarb.	41½ parts.
Sugar	21 parts.
Magnes. sulph. exsic.	½ part.

The above compound, sold under the name of citrate of magnesia, was not even in granular form, but retailed under that name and sold in the simple form of a saline. In the words of one of our weekly journals, "Never use good stuff and remain careless of details in the struggle for existence."

Two prosecutions occurred about a year ago in reference to granular effervescent citrate of magnesia, the special adulteration being lead to the extent of ·37 grain per lb. Scientific evidence having been given to the effect that commercial citric acid invariably contained a minute quantity of lead; the stipendiary on consideration dismissed the case, but without allowing costs.

In the same year a chemist in Greenock was prosecuted under the '72 Adulteration Act for selling as magnes. cit. an article alleged to be adulterated with sodæ carb., ac. tart., sugar, and sodæ sulph. Again evidence was given for the defence to the effect that the substance sold was what is known and sold in commerce as magnes. citrate. Medical evidence was also given to the effect that when a medical man prescribed magnes. cit. he meant the article as sold by defendant, simply an effervescing salt, chiefly for the tartrate of soda found during effervescence. The authorities in this case also dismissed the case. Since then the advance made in the manufacture of effervescent preparations has been indeed rapid, and the past year has the distinction of adding to the official list four new effervescent salts, three of them granular. I refer to the B.P. Addenda.

The popular household seidlitz powder now takes up its position with the valuable sodæ sulph. in the "book of authority" with mag. sulph., and sodæ phosph., making up the four. The rendering of seidlitz powder official will, I should hope, be the means of running out of the market enormous quantities of cheap guessed powders, sold outside of pharmacy at such prices as are consistent only with inferior drugs, and frequently underweighed proportions.

Whether it will be now necessary that every package labelled and sold as "seidlitz powders" should be the weight ordered in the B. P. is a question I would respectfully invite discussion upon. It is not mentioned in the Addendum as a synonym. There is, however, a footnote to the effect that effervescent tartrate of soda powder is commonly known as seidlitz powders, and the question arises, In the event of a prosecution for retailing something else as seidlitz powders, or retailing less than the quantity ordered in the B. P., would the footnote have as much force as a synonym?

Doubtless careful pharmacists will prepare and weigh their seidlitz according to the B.P. on a point of principle rather than on a question of fear of prosecution.

But there remains that large class of traders who supply such as is supplied to them by wholesale drysalters, at prices as before stated consistent only with inferior drugs, wrapped and boxed by incompetent and cheap labour. The question seems to be of importance to chemists, and I hope that the footnote may be looked upon with the force of a synonym. Regarding the mag. sulph. eff., I would suggest that the percentage of mag. sulph. should be 25 per cent. instead of 50 per cent. It could then be taken with very little taste of the active ingredient—when containing 50 per cent. it is extremely bitter. The sodæ sulph. and sodæ phosph. are such as have been made and become so popular in recent years. Since acid citric plays such an important part in the practice of granulation, I would like to have looked a little further into its characters, the percentages obtained from lemon juice at different seasons of the year, but time will not allow of this at present. I will therefore finish my modest paper with the hope that an interesting discussion may result, and with no light amount of confidence that in the future of pharmacy, granular eff. preparations will make even greater strides, not merely in the process and manipulation of manufacture, but in the confidence and popularity of the profession and the public, who are ever ready to appreciate sound and elegant pharmaceutical preparations.

Mr. Pattinson showed several very good samples of gran. eff. combinations.

The President, in his remarks, proposed a hearty vote of thanks to the author, which

Mr. Merson seconded and an interesting discussion on the various points followed, taken part in by Messrs. M. Bell, Chapman, Herd, Penman, and Pescod.

Before the meeting closed the Association decided that officially it should take no active part in the half-holiday movement.

Parliamentary and Law Proceedings.

MILK OF SULPHUR PROSECUTION.

At the Marlborough Street Police Court on Wednesday last, Mr. Frederick Hall was prosecuted before Mr. Hannay at the instance of the St. James's Vestry, Westminster, for an alleged contravention of the Sale of Food and Drugs Act, 1875, section 6.

Mr. Hitchens, who appeared for the Vestry, said the whole question would turn upon what was meant by milk of sulphur, and then as to what was meant by the ordinary purchaser by that term. Altogether thirteen samples of sulphur were taken during the month of December by the inspector, eleven of which proved to be free from any admixture, and two were found to contain a certain quantity of gypsum. With regard to what constituted milk of sulphur, he would ask his worship's attention to one or two authorities on the point; first of all there was Dunglison's 'Medical Dictionary,' which said "Sulphur precipitatum, lac sulphuris. Milk of sulphur is prepared by boiling," etc. The date of that was 1851. Then taking the B.P. for 1885 there was a very similar direction: "Sublimed sulphur, slaked lime, hydrochloric acid and distilled water." The process appeared to be exactly the same: "Let the united filtrates cool, dilute with 2 pints of the water, and in an open place or under a chimney, add in successive quantities the hydrochloric acid previously diluted with a pint of the water until effervescence ceases, and the mixture acquires a slight acid reaction. Then allow the precipitate to settle, decant the supernatant liquid, pour on fresh distilled water, and continue the purification by affusion of distilled water and subsidence until the fluid ceases to have an acid reaction and to precipitate with oxalate of ammonium. Collect the precipitated sulphur on a calico filter, wash it once with distilled water, and dry it at a temperature not exceeding 120° F." He proposed to call Dr. Edmonds to show that sulphur prepared in that way would not contain sulphate of lime. Then Pereira's 'Materia Medica' gave milk of sulphur as a synonym with precipitate of sulphur. That authority followed exactly the same course as the other two, so that all he need put before the court now was that milk of sulphur and precipitated sulphur were identical, and should not contain sulphate of lime, and that the sample in the present case contained gypsum, which was not recognized by either of the three authorities he had referred to.

Mr. W. H. Watson, inspector appointed by the vestry under the Sale of Food and Drugs' Act, was then called, and deposed that on December 12 last he purchased from Mr. Hall 2 ounces of milk of sulphur, for which he paid 3*d*. His attention was not called to the fact that the article he purchased contained gypsum or sulphate of lime. He produced the certificate of the public analyst, which certified that the sample submitted to him contained 10¾ parts per cent. of gypsum.

Cross-examined by Mr. Pattinson on behalf of the respondent: He asked for 2 ounces of milk of sulphur. Nothing was said to him by Mr. Hall until after he purchased it.

Why did you ask particularly for milk of sulphur?—I was instructed to do so.

Are you prepared to say that the gentleman who served you with it did not say that the milk of sulphur contained impurities?—He said nothing of the sort.

Dr. Edmonds, who stated that he was the public analyst for St. James, Westminster, and Medical Officer of Health, was then called and examined by Mr. Hitchins. He had been a public analyst for many years, and had great experience in the use of drugs.

Do you consider that obtaining a standard quality of drugs is important?—Very important.

Whether milk of sulphur or any other drug?—Yes.

In ordering milk of sulphur what would you consider that you were ordering?—Pure sulphur.

According to the British Pharmacopœia?—Certainly.

The Magistrate: Does that contain any gypsum?—Certainly not. It contains nothing but sulphur. It is whiter and very much finer than the ordinary flower of sulphur. It is prepared by precipitation instead of sublimation, which gives you a gritty, coarse material, which is really a number of small crystals.

Mr. Hitchens: You have had several samples of milk of sulphur to analyse, I think?—Thirteen samples were submitted on that occasion. Eleven were absolutely pure, as they ought to have been.

Do you draw any conclusion from that as to the practice of druggists in general?

Mr. Pattinson objected to the question.

The Magistrate said it was very satisfactory to hear that eleven were absolutely pure.

Mr. Hitchens said the question was only meant to elicit the fact that the general practice of druggists was to sell pure sulphur.

The Magistrate ruled that the question could not be put.

Mr. Hitchens: Can you give any reason from the authorities why you consider that milk of sulphur should be pure sulphur?—We are governed in the use of drugs by the order of the Pharmacopœia as to their method of preparation and as to their tests. That is the standard of all drugs.

Are you acquainted at all with the general practice of public analysts in this matter?—It would be difficult to say quite what it is. I am not prepared to give an opinion on that.

Supposing you were a purchaser of milk of sulphur, what would you expect to get?—Pure sulphur.

The Magistrate: He says in his certificate: "I am of opinion that the said sample contains foreign ingredients as under, viz., 10¾ per cent. of gypsum." I think you might leave your opponent to see if he can get rid of that.

Cross-examined by Mr. Pattinson: Have you ever been behind a chemist's counter and sold either milk of sulphur or precipitate of sulphur?—No; I have been educated rather to order these things in my prescriptions than to sell them.

What was the old formula for making milk of sulphur—in 1846?—It was that the sulphur should be boiled with lime, and that it should then be precipitated with hydrochloric acid so that the lime should be maintained in perfect solution and the sulphur thrown down.

Do you not know that in the London Pharmacopœia the process employed is by precipitation with sulphuric acid?—No; it is prepared in that way by fraudulent druggists for the purpose of increasing the volume.

Have you ever known in the ordinary course of business or in the ordinary course of the preparation of drugs, that it was the usual practice to make milk of sulphur with sulphuric acid?—Only by fraudulent druggists.

You deny that it was ever the universal practice to make it in that way?—The Pharmacopœia has directed it to be made with hydrochloric acid.

Do you admit that Dr. Redwood is a great authority on this point?—Yes.

I believe as a matter of fact he is the editor of the British Pharmacopœia?—No; the British Pharmacopœia is edited by the College of Physicians. I dare say his assistance with other eminent chemists has been called in.

What is your authority for saying that milk of sulphur and sulphur præcipitatum are one and the same thing?—Pereira is one, and I will give you Dunglison's 'Dictionary,' which is a well known authority. That was published in 1851, and it says sulphur præcipitatum; and it gives as a synonym, "lac sulphuris;" as another, "milk of sulphur;" as another, "præcipitated sulphur," and states that it is prepared by boiling lime and sulphur together and adding muriatic acid to precipitate the sulphur,

As a matter of fact that is your authority for this prosecution?—Not at all, I say all the authorities say that.

You say the ordinary standard for drugs is the British Pharmacopœia?—Yes.

At page 389 there is sulphur præcipitatum, that is given as precipitated sulphur?—Quite so.

That is made by hydrochloric acid and lime?—Yes.

Your contention is that that sulphur præcipitatum supersedes the substance known as milk of sulphur?—No, I say that it is milk of sulphur.

The Magistrate: Here I have got Pereira's 'Materia Medica,' where it says "Precipitated sulphur, lac sulphuris"?—Yes, they are merely synonyms.

Mr. Pattinson: Is it not a fact that where a substance given in the British Pharmacopœia is to be the recognized thing in the trade to be used, if it supersedes another article, that the synonym is put underneath?—No, that practice has been discontinued.

What is paregoric?—Compound tincture of camphor.

That was not always a uniform compound?—That is a very difficult question to answer.

Mr. Hitchins: This is a compound, not like milk of sulphur.

The Witness: There you simply have not the synonyms, but the Latin and the vernacular name.

The Magistrate: I should like to know precisely what is gypsum?—Gypsum is plaster of paris.

Mr. Pattinson: I do not admit that the substance in this particular sample is gypsum. My point is that where there is a synonym, and where one substance supersedes another, then the Pharmacopœia puts the second name as a synonym, and I cite paregoric as an instance. The analyst says that milk of sulphur ought to be precipitated sulphur.

The Witness: I say it ought to be pure sulphur. The sulphur is boiled with lime in order to make it soluble, and that takes up the sulphur in solution in combination with the lime. Then you add muriatic acid to that. The muriatic acid combines with the lime in a perfectly soluble form, and throws out the sulphur in an insoluble cloud, which is then allowed to subside, washed and dried, and that is pure precipitated or pure milk of sulphur, and the result is sulphur in a very finely divided form and very white. In the adulterated form sulphuric acid is used to precipitate it. The sulphuric acid also combines with the lime and throws out the sulphur, but the sulphate of lime which is formed, instead of being soluble and remaining in solution and washed away, is an insoluble substance that is thrown down.

The Magistrate: That is how you account for it being found in these samples?—Yes.

Mr. Pattinson: I will now read to you what Professor Redwood said in evidence in a case at the Runcorn Petty Sessions in 1877: "You have heard the evidence of Dr. Bell; do you agree with him?—No, I do not. On what grounds do you differ from him as to the terms milk of sulphur and precipitated sulphur?—I consider that the term milk of sulphur has been, and still is sometimes used as synonymous with the term precipitated sulphur, but I do not consider that it is so necessarily used, and in the great majority of cases when the terms are used by the non-medical public two distinct articles are referred to by those two names. I may further state that milk of sulphur is principally employed by the non-medical public, and by that term they refer to sulphur containing sulphate of lime."—I should object to that altogether.

It goes on: "What is the mode of taking it?—The usual mode of taking milk of sulphur, that is the preparation containing sulphate of lime, is by mixing it with water, and the great advantage which milk of ulphur presents when it contains sulphate of lime is hat it readily mixes with water; whereas that which contains no sulphate of lime will not mix in the same way."—No; I do not agree with that; the usual way is aking it in milk.

Is it not the fact that the precipitated sulphur is much lighter than the lac sulphuris?—Really, I do not know what distinction you are drawing—which is which? I have just said they are both precipitated ulphur; it cannot be denied.

Do you admit that precipitated sulphur with plaster of paris would mix better?—I daresay in water an addition of plaster of paris would make it mix quicker.

Is it not a fact that when you try to mix precipitate of sulphur in water it sticks on the top of the glass?—Yes; but the practice is to give it in milk when it mixes perfectly.

I will read on a little further: "You have heard it mentioned once or twice in the course of Dr. Bell's xamination that this milk of sulphur is not menioned in the last edition of the British Pharmaopœia; can you give any explanation of that?—Milk of sulphur has not been mentioned in any of our Pharmacopœias under that name for more than 100 ears."—That is what I have just told you.

"Can you give examples of other drugs which are ot mentioned in the last Pharmacopœia, but which re still well known?—I can. (The Clerk): 'That oes not bear on the point at all.' Is the precipitated ulphur you refer to an impure article; is it so or ot?—Precipitated sulphur is not pure sulphur."—I quite agree with that.

"Does it contain sulphate of lime?—No. Under the ame precipitated sulphur an article which contains ulphate of lime ought not to be sold, certainly."—That is what I say.

"And you say some parties of eminence, if milk of ulphur is asked for would expect to receive precipitated sulphur?—There are some, but that I conceive is a mistake." Do you agree with that?—Really the tatement is so mixed up that I do not quite know what Professor Redwood means.

The Magistrate: What is the particular bearing of hat case? Was it an adulteration case?

Mr. Pattinson: It was on all fours with the present ase.

The Magistrate: Do you mean to say that there is o such thing as milk of sulphur?

Mr. Pattinson: That is my friend's contention.

The Magistrate: There is no such name in the test Pharmacopœia that I have here; it is sulphur ecipitatum, and they do not give those other ames.

Mr. Pattinson: My case is simply this: that there are two separate and distinct commodities, one known as milk of sulphur, and the other known as sulphur præcipitatum. One is a commercial article sold in shops, and the other used in prescriptions.

The Magistrate: Do you say that milk of sulphur contains gypsum?

Mr. Pattinson: No; I say it contains sulphate of lime.

The Magistrate: If this case is to go on like this it had better be submitted to Somerset House. How can I tell? it is a question of fact.

Mr. Pattinson: I should like to ask one or two further questions. Is not gypsum what is known as plaster of paris?—Yes; it is the natural form of plaster of paris before it has been baked and pulverized, and, therefore, plaster of paris is gypsum minus a small quantity of water.

Sulphate of lime, according to your contention, is the same as gypsum?—Yes, exactly; with the exception of a minute quantity of water more or less combined with it.

Why do you call it gypsum in your certificate?—Simply because that is the vernacular name.

The Magistrate: [reading the case heard at Runcorn Petty Sessions in 1877, the conviction in which was afterwards quashed, *Pharm. Journ.*, [3], viii., 579]. They have contended successfully in this case. "Upon this point I shall argue and produce evidence which I consider almost incontestable that sulphur præcipitatum is a drug prepared according to one formula, and milk of sulphur is another drug prepared according to a distinct formula."

The Witness: I deny that.

The Magistrate: They seem to have succeeded upon that.

Mr. Hitchens: May I call your worship's attention to the fact that that was in 1877, and that since then there has been a fresh edition of the Pharmacopœia.

The Magistrate: In which milk of sulphur was left out altogether.

Mr. Hitchins: I think my learned friend will admit that the first edition of the Pharmacopœia was generally recognized to be very incomplete indeed, and was very speedily followed by a revised edition.

Mr. Pattinson: That case was appealed against, and went to the Quarter Sessions.

The Magistrate: Was it finally quashed or was a case stated?

Mr. Pattinson: No; it was finally quashed.

The Magistrate: Surely no ordinary member of the public would be expected to ask for sulphur præcipitatum.

The Witness: No; they always say milk of sulphur.

The Magistrate: The bench seemed to say, according to the leading article in the *Pharmaceutical Journal*, that "they thought that although the absence of the term milk of sulphur from the Pharmacopœia might be considered to justify the county analyst in the course he had adopted, yet the bench could not for one moment doubt, after the evidence of Mr. Pemberton and others, that in the trade and in the medical profession there were two distinct substances known as lac sulphuris and sulphur præcipitatum, and that they were supplied to the trade and the public by those names as two distinct things. They therefore thought that the case had not been made out, and that the appellant had not committed the offence within the Act. The conviction would therefore be quashed."

The Witness: It is very much a question of whether the case was properly put.

The Magistrate: You may perhaps be able to find whether the case has been reported in the 'Justice of the Peace' or anywhere else.

Mr. Hitchens: We shall repudiate a lot of the evi dence given in that case altogether. We say it is not correct.

The Magistrate: A decision of quarter sessions not appealed against, with a legal chairman, is a thing I should be inclined to treat with great respect. I do not know much about dictionaries, but here in the latest dictionary you have got there is nothing about milk of sulphur at all.

Mr. Hitchens: I should like to call your attention to this fact, that Pereira's 'Materia Medica' gives that as a synonym, and there is no occasion to give a synonym in the British Pharmacopœia.

The Magistrate: It seems to be an exceedingly fine question, and the great difficulty is created by the medical publications.

Witness: I think Pereira gives it very clearly.

The Magistrate: But that is a very much older publication than the Pharmacopœia.

The Witness: Yes, that is the reason why I brought it.

The Magistrate: You say that sulphur præcipitatum is prepared in a different way from milk of sulphur?—No; I say they are both sulphur præcipitatum.

The Clerk: He says they are one and the same thing.

The Witness: Yes; but one is prepared by sulphuric acid and the other by hydrochloric acid.

The Magistrate: Which is right?—The one precipitated with hydrochloric acid.

And the other is wrong?—Yes.

The Magistrate: I must adjourn this case until I can get more information on the part of the prosecution,—until I know what they mean. Here is an authority cited to me where the very same point was raised; in that case the Justices convicted, and their conviction was quashed by the Court of Quarter Sessions. If you can get the whole history of that case I shall be in a better position to consider it. But I may tell you that I should be very slow to run counter to a decision of that kind unappealed against.

Mr. Hitchens: With every respect to the gentlemen who constituted that Court of Appeal I do not think they quite understood the question.

The Magistrate: That may be so. I dare say you understand it a great deal better, but still it was a public body presided over by a legal gentleman. You say that sulphur præcipitatum ought to have been asked for.

Mr. Hitchens: That is the learned name; it is generally called milk of sulphur.

The Witness: We still use the term milk of sulphur.

The Clerk: But it is not in the Pharmacopœia?—There are none of those synonyms in the Pharmacopœia.

Mr. Hitchens: The Pharmacopœia is not a dictionary.

The Witness: The question for the public is whether when we ask for milk of sulphur we are to have 40 or 50 per cent. of plaster of paris to swallow.

The Magistrate: If you ask for the other, sulphur præcipitatum, then there is no such thing?—Then I say it is the same thing as milk of sulphur.

Mr. Hitchens: There are two kinds of precipitated sulphur, one containing sulphur only, and the other containing sulphate of lime precipitated with it.

The Magistrate: Then you do not agree with Dr. Edmonds; he says there is only one. I should like to read this case through very carefully and see what it was that they really decided.

The Witness: That is a trade journal, and it naturally takes the part of the chemist and druggist.

The Magistrate: I shall read this through for information to see what I can learn.

Mr. Hitchens: Of course that case was in 1876. We do not know what Professor Redwood's present opinion is.

Mr. Pattinson: There has been no prosecution since.

The Magistrate (to the witness): Just listen to this evidence given by Dr. Matthew Bell. I cannot reconcile it with what you have been saying: "On the trade sheet what do you find under the head of sulphur?—Sulph. sod., sulph. lotum, sulph. lac, sulph. præcip. pur., and sulph. sublim. Do you sell those articles as distinct preparations?—We do. Has that always been done?—Always. You mention the article on your trade sheet lac sulphuris; would that article contain sulphate of lime?—It would. Is that inevitable from its preparation?—Yes. You mention sulph. precipitatum; how is that prepared?—It is prepared by using hydrochloric acid instead of sulphuric acid.

What would the product be from such a preparation?—By the use of hydrochloric acid it would be sulph. præcip. pur.; by the use of sulphuric acid it would be milk of sulphur."

The Witness: No; I do not agree with that.

Mr. Pattinson [Handing a trade list to the witness]: Are there two different substances put down there, one as sulph. lac. and the other as sulph. præcip.?—It is put down here as commercial milk of sulphur and precipitated milk of sulphur.

In the face of that do you say they are the same substance?—No; I say that they ought to be the same substance; I say that that is an abuse of the synonyms for the purpose of selling an adulterated article.

Mr. Pattinson: That is all I have to ask this witness.

The Magistrate: I think there ought to be time for us all to consider the matter; therefore I propose to adjourn it for two or three weeks, in order that you may find out what became of that case, because it is rather important. I think there ought to be some authoritative decision given about it.

Mr. Pattinson: Yes, that is what we desire, as chemists have been in a very great difficulty over it.

It was ultimately arranged that the case should stand adjourned until the 25th inst.

ANNOYANCE TO A CHEMIST BY AN OFFENSIVE TRADE.

The case of Alexander *v.* Wolsey, heard in the Chancery Division of the High Court of Justice, before Mr. Justice Romer, on Tuesday last, turned on the question whether the carrying on of the business of a fishmonger came within the prohibition of "any other noisy, noisome, or offensive trade or business whatever." The motion was on the part of the freeholder of two shops in Gloucester Road, Kensington, for an injunction against the tenant in one of them carrying on the business of a fishmonger, but the real plaintiff was Mr. Albert Cooper, pharmaceutical chemist, the tenant of the adjoining shop, who complained that the carrying on of the business of a fishmonger next door was detrimental to his business as a chemist. Evidence for the plaintiff was given by Professor Attfield, Mr. Michael Carteighe, Dr. Dudfield, Medical Officer of Health for Kensington; Dr. Seaton, Medical Officer for Chelsea; Dr. Heath, Dr. Barton, Mr. Hawkins, and Mr. Albert Cooper, and for the defendant by Dr. Stevenson, Professor Corfield and others. Mr. Justice Romer said the words of the covenant were very stringent, and that it had been established to his satisfaction that what the defendant had been doing in carrying on his business was to the annoyance and damage of the plaintiff's tenants, including Mr. Cooper. He therefore granted an injunction restraining the defendant from using the premises, No. [illegible] Gloucester Road, as a fishmonger's shop, or otherwise to the annoyance or disturbance of the lessor or any of the tenants on the estate.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Reynolds, Ferrall, Critchett, Leigh, Cripps, Smith, Senier, Stark, Bennett, Bullen, Devonian.

ON THE CARBOHYDRATES OF MANNA FROM EUCALYPTUS GUNNII, HOOK., AND OF EUCALYPTUS HONEY.[*]

BY F. W. PASSMORE, PH.D.

From the Research Laboratory of the Pharmaceutical Society.

A specimen of manna from *Eucalyptus Gunnii*, Hook., having been forwarded to the Research Laboratory by Mr. J. H. Maiden, Curator of the Technological Museum, N.S.W., Professor Dunstan suggested that I should investigate its principal constituents. The manna was collected on the 27th and 28th March, 1890, near Woollandibby, Jindabyne, N.S.W., from trees of 2–4 feet diameter and from 40–60 feet high, known in that locality as "white gum" trees. In v. Mueller's 'Eucalyptographia' the *E. Gunnii*, Hook., is referred to, under the synonyms of "Swamp Gum Tree" and "Cider Eucalypt," as yielding a sap not unpleasant in taste and converted occasionally by the bush people into a kind of cider; but it is further stated that although the percentage of saccharine substance in the sap is large, "it does not seem to become at any time concreted and exsiccated into firm masses." The present specimen, however, consisted of a dirty white semi-crystalline substance, in the form of small nodules, mixed with a small quantity of matter of evidently extraneous origin, and possessed a sweet aromatic taste and odour suggestive of eucalyptus oil. The saccharine constituent or constituents dissolved readily in water and to an appreciable extent in absolute alcohol. The filtered aqueous solution reduced Fehling's reagent strongly upon warming and also gave a precipitate, though of unpromising character, when heated for ten minutes upon a water bath with acetate of phenylhydrazine, thus suggesting the presence of a sugar contaminated with substances of a gummy or resinous nature. The principal constituent, when isolated in a perfectly pure condition, exercised, however, no reducing action upon Fehling's solution and did not react with phenylhydrazine, thus resembling the mannite of the ash-manna. But after boiling a few minutes with a dilute mineral acid, the neutralized solution caused a copious precipitate of cuprous oxide, and yielded almost immediately, upon addition of acetate of phenylhydrazine and warming, a yellow precipitate of an osazone melting at a temperature considerably below the melting-point of phenylglucosazone (205°). The latter observation proved that the body under examination did not belong to the series of polyatomic alcohols of which mannitol is the type, but that it was probably either a glucoside or else possessed a constitution analogous to that of cane-sugar, resulting from the condensation of two or more molecules of a glucose with elimination of water.

The first reference to an eucalyptus manna was made by Virey[†] in 1832, and this product, derived from *E. viminalis*, the so-called manna gum-tree, was examined chemically in 1843 by Johnston,[‡] who extracted from it a crystalline sugar to which he assigned the formula $C_{24}H_{21}O_{21}+7HO$. In 1856 Berthelot[§] isolated apparently the same body from a sample of manna obtained from Van Diemen's Land and said to be the exudation from various species of eucalyptus. He examined the sugar, which he termed melitose, ascribed to it the formula $C_{24}H_{24}O_{24}+4HO$ and determined its rotatary power to be $[\alpha]j = +88{\cdot}0^\circ$, a value that was considerably diminished upon boiling the solution with mineral acids. Berthelot further found that by fermentation with yeast melitose split up into carbonic acid, ethyl alcohol and a second saccharine amorphous body, eucalyn, according to the equation $C_{24}H_{24}O_{24}=4CO_2+2C_4H_6O_2+C_{12}H_{12}O_{12}$. Finally he observed the occurrence of mucic as well as oxalic acid as an oxidation product of melitose. In 1885 Rischbieth and Tollens[*] established the identity of the sugar contained in the manna from *E. viminalis* with the raffinose or "plus-sugar" of molasses and the gossypose of cotton-seeds, and further these investigators determined that melitose could be completely fermented with yeast into carbonic acid and ethyl alcohol, though two distinct stages were observable. The further history of melitose is that of raffinose, concerning the occurrence and constitution of which much has been published in the last decade, as a thorough knowledge of the subject is of great importance to the sugar refiner. The presence of the so-called "plus-sugar," which possesses a greater specific dextrorotation than glucose, introduces an error into the estimation of glucose in molasses by means of the saccharimeter. v. Lippman has detected melitose in the sap of the sugar-cane and O'Sullivan has found it in barley-grains, whilst its occurrence has also been alleged in the soy-bean (*Glycine Soja*) and in the embryo of the wheat-plant.

The extended occurrence of melitose in the vegetable kingdom, more especially its occurrence in the manna of *E. viminalis*, as well as the results of the preliminary experiments mentioned at the commencement of this paper, led me to believe that the sugar of *E. Gunnii* is identical with melitose, and further investigation has shown this assumption to be correct.

100 grams of manna was dissolved in 500 c.c. of boiling 50 per cent. alcohol, a little pure animal charcoal added, filtered and allowed to cool. A thick compact deposit of crystals separated on the bottom and sides of the vessel, and these required to be recrystallized five or six times from 80 per cent. alcohol before they were completely freed from adherent saccharine matter that reduced Fehling's solution. The mother liquors upon evaporation yielded a dark brown uncrystallizable syrup that reduced Fehling's solution strongly and probably contained inversion products of melitose, together with a small quantity of resinous matter soluble in ether. Its further investigation was not attempted. The crystalline sugar, of which about 60 grams was obtained, separated from absolute alcohol in tufts of long white needles, that like melitose commenced to melt at 87° C.

The recent researches of Rischbieth and Tollens and of Scheibler and Mittelmeier have established the formula of $C_{18}H_{32}O_{16}+5H_2O$ for melitose, which Scheibler proposes to rename "melitriose," in harmony with the systematic nomenclature now adopted in the sugar group, the terminations "biose" and "triose" designating sugars resulting from the condensation of two and three molecules of a glucose, or sugar with the formula $C_6H_{12}O_6$.[*] The formula $C_{18}H_{32}O_{16}+5H_2O$ requires that a loss of 15·15 per cent. should result from the drying of the sugar, but the determination of the water of crystallization in this instance is accompanied with difficulties that have given rise to a considerable amount of dispute as to the true formula. If the sugar be heated rapidly it begins at about 87° C. to melt or dissolve in its water of crystallization, a syrup resulting from which it is almost impossible to drive off all the water at a temperature below that causing decomposition. If exposed in a vacuum over sulphuric acid or in an air-bath of medium temperature melitriose is only obtained in an anhydrous condition after a period of several weeks. As the sugar of *E. Gunnii* presents the same difficulty I endeavoured to avoid the tediousness of the water determination by a combination of both the above methods, and succeeded in devising a plan, suggested by a recent communication of W. Hempel[†] to the German Chemical Society, by which the water of crystallization could even in this case be determined in a few hours.

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[*] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, February 11.

[†] *Journ. de Pharm.*, [2], xviii., 705.

[‡] *Phil. Mag.*, 1843, 14.

[§] *Ann. Chim. et Phys.*, [3], xlvi., 66.

[*] *Berichte d. deutsch. chem. Ges.*, xviii., 2611.

0·9712 gram sugar, crystallized from alcohol and dried by exposure to the air, was placed on a watch-glass at the bottom of a desiccator, and a dish containing pumice stone saturated with sulphuric acid upon a tripod above it. The desiccator was then made vacuous and placed upon a hollow iron cylinder above a sand bath, by which means the lower part of the desiccator was heated to a temperature of about 50° C., whilst the bell remained comparatively cool. Under these conditions the warm aqueous vapour streams upwards into the vicinity of the sulphuric acid, whilst corresponding downward currents of a denser cold and dry atmosphere are formed. After three hours the weight of the sugar remained constant at 0·8224 gram, indicating a loss of 0·1488 gram of water, equivalent to 15·32 per cent. as against 15·15 per cent. calculated for the formula $C_{18}H_{32}O_{16}+5\,H_2O$. This high value may be accounted for by assuming that the last trace of alcohol had not been removed by drying in air, or that a small quantity of a higher hydrate, $C_{18}H_{32}O_{16}+6\,H_2O$, which Berthelot[‡] has occasionally observed, was present. The error, however, is a scarcely appreciable one, as the following analysis of the hydrated substance shows :—

0·2531 gram sugar gave 0·1625 gr H_2O and 0·3372 gr. CO_2.

	Found	Calculated for $C_{18}H_{22}O_{16}+5H_2O$.
C	36·33	36·36 per cent.
H	7·13	7·07 „ „

These analytical results, and the correspondence of the melting-points of the hydrated and anhydrous substances, 87° and 136° C. respectively, with those given by other investigators for melitriose, suffice to establish the identity of both sugars. For further confirmation I tested the rotatory power.

2·5248 grams of light sugar dissolved in 25 c.c. solution at 20° C. sodium showed a rotation of + 20·9° in a 200 m.m. tube, and as—

$$[\alpha]_{20}^{D} = \frac{100a}{d} = \frac{100\times 20{\cdot}9}{2{\cdot}5248\times 4\times 2} = +103{\cdot}47^\circ$$

the sugar turns the plane of polarized light to the right about one and a half times as strongly as cane sugar. Scheibler[*] found the specific rotation of melitriose in 10 per cent. solutions to be $[\alpha]_D = +103{\cdot}74^\circ$.

Having thus conclusive proof that the sugar of *E. Gunnii* is melitriose, I determined to employ the remaining material in my possession for the identification of one of its inversion products, concerning which some little doubt appears to exist. The molecule of sugars of the "triose" group is decomposed by the action of ferments or dilute mineral acids into three molecules of sugars of the formula $C_6H_{12}O_6$. The recognition of mucic acid by Berthelot[†] and of saccharic acid by Gans and Tollens[‡] among the oxidation products of melitriose, rendered the presence of galactose and dextroglucose in the syrup resulting from inversion extremely probable. The isolation of galactose in a crystalline state by Rischbieth and Tollens, and the investigations of Scheibler and Mittelmeier[§] have since then established this point beyond dispute, but the identity of the third $C_6H_{12}O_6$ sugar has not yet been conclusively proved. It is true that Rischbieth and Tollens obtained from the inversion-syrup of melitriose, by extracting with boiling alcohol and precipitating with ether, an amorphous sugar that rotated the plane of polarization to the left with an intensity similar to that of lævulose (now termed fruit sugar or fructose); but even Scheibler and Mittelmeier deemed this evidence insufficient, since they endeavoured to characterize the third constituent by means of its compound with phenylhydrazine. They obtained from the lævorotatory syrup an insoluble osazone of the normal constitution—

$$CH(:N{\cdot}NH{\cdot}C_6H_5){\cdot}C(:N{\cdot}NH{\cdot}C_6H_5){\cdot}(CHOH)_3{\cdot}CH_2OH$$

and possessing the same crystalline character and melting point as that obtained by E. Fischer from both glucose and fruit-sugar. Scheibler and Mittelmeier therefore, in 1889, said,[||] "Since no lævorotatory sugar but lævulose is known that yields this osazone, the conclusion of Rischbieth, Hädicke and Tollens that lævulose is an inversion-product of melitriose, may be accepted with a fair degree of security." In 1890 E. Fischer, however, during his brilliant researches among the carbohydrates, discovered two new lævorotatory sugars, l-mannose and l-glucose, both of which yield osazones identical in the above characters of solubility, melting point and crystalline form with that obtained from the so-called "lævulose." It appeared therefore of interest to determine more definitely which of these three lævo-rotatory sugars resulted from the inversion of melitriose, and since it is almost impossible to obtain mannose, fruit-sugar or even glucose in a crystalline state from a small quantity of impure syrup, and the quantity of material at disposal was insufficient for an exhaustive examination of the oxidation and reduction derivatives of the sugar in question, I resolved to further study the behaviour of the products of inversion towards phenylhydrazine.

Ten grams of melitriose was inverted by boiling with 200 c.c. of a 4 per cent. solution of sulphuric acid for three hours, and the solution subsequently neutralized with barium carbonate and filtered, whereby the sulphuric acid and a small quantity of humin substance produced by the continued action of the acid upon the sugar, were removed. The cold solution, which reduced Fehling's reagent strongly, was now treated with 20 grams of phenylhydrazine dissolved in an equal weight of 50 per cent. acetic acid and allowed to stand. Since mannose is distinguished from other sugars by the formation of a white insoluble phenylhydrazone,$CH(:N{\cdot}NH{\cdot}C_6H_5)(CHOH)_4{\cdot}CH_2OH$, under these conditions, the absence of any precipitate after twenty-four hours proved that mannose is not one of the inversion products of melitriose. The task now remained of deciding between fructose, or fruit sugar, and l-glucose as the lævo-rotatory constituent. To this end the saccharine solution was heated upon a water bath, and in a few minutes a copious separation of osazone was observable. The temperature was maintained for three hours, and the product filtered whilst hot. The precipitate was extracted several times with large quantities of boiling water, and these filtrates added to the mother-liquor. By this means, the galactosazone, which is freely soluble in hot water, was removed and separated from the cooled filtrates, recrystallized first out of water and again out of alcohol, and then identified by its melting point. The product insoluble in hot water was purified by washing with alcohol and ether, and repeated recrystallization out of alcohol. It was then obtained in the crystalline form characteristic of phenylglucosazone, and possessed the melting point of 204–205° C.

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[*] These terms must not be confused with those adopted by Fischer for simple sugars containing different numbers of carbon atoms, as tetrose for $C_4H_8O_4$, pentose for $C_5H_{10}O_5$, hexose for $C_6H_{12}O_6$, etc. The difficulty may be met by a double terminology for compound sugars, as hexabiose for cane sugar, etc.

[†] *Berichte*, 3566.

[‡] *Compt. Rend.*, cix., 549.

[*] *Berichte d. deutsch. chem. Ges.*, xviii., 1781.

[†] *Ann. Chem. et Phys.*, [3], xlvi., 71.

[‡] *Tageblatt der Naturf. Vers.*, 1887, 87.

[§] *Berichte d. deutsch. chem. Ges.*, xxii., 1678, 3118.

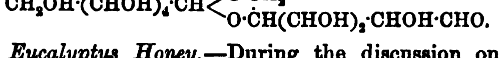
[||] *Berichte d. deutsch. chem. Ges.*, xxii., 1679.

The osazones of the optically active sugars are themselves optically active, but turn the plane of polarized light in the opposite direction to the aldehyde sugar from which they are derived. From d-glucose a lævo-rotatory glucosazone is therefore obtained, and conversely it is a dextro-rotatory modification that is derived from l-glucose. If melitriose is the condensation product of equal molecules of galactose, d-glucose and l-glucose, the glucosazone obtained from its inversion products would be composed of an equal mixture of the dextro- and lævo-modifications, and therefore be inactive towards polarized light. On the other hand E. Fischer has shown that the well-known lævo-rotatory fructose (lævulose) $CH_2OH{\cdot}CO{\cdot}(CHOH)_3{\cdot}CH_2OH$, is the corresponding member of the ketoses or ketone sugars to the dextro-rotatory glucose of the aldoses or aldehyde sugars, $CHO{\cdot}(CHOH)_4{\cdot}CH_2OH$, and that both yield the same optical modification of phenylglucosazone. Further, since all the optically active modifications of the carbohydrates and their derivatives are classified according to the rotatory direction of the aldehyde sugar, ordinary lævulose bears the paradoxical name of dextro-fructose, although it is itself lævo-rotatory.

It will be seen from these considerations that if ordinary fruit-sugar be the lævo-rotatory constituent of melitriose, the resulting phenylglucosazone will be lævo-rotatory, whereas if l-glucose be present the glucosazone will be inactive, since in the latter case the osazone will be composed of equal quantities of the lævo- and dextro- modification. The solution of the question therefore remains in the determination of the behaviour of the glucosazone towards polarized light.

0·17 gram of glucosazone was dissolved in 20 c.c. of hot glacial acetic acid and the solution at once cooled and filtered into a 200 mm. tube. A deviation of 1·8° to the left was observed, a result closely agreeing with that obtained by E. Fischer for d-phenylglucosazon.*

This investigation shows that the characteristic sugar of the manna from *E. Gunnii* is melitriose, which consists of a condensation product of equal molecules of galactose, glucose, and fructose. The nature of the combination is not yet perfectly understood, although Scheibler and Mittelmeier† suggest that the connection between the glucose and galactose residues is probably identical with that in milk sugar, to which Fischer has ascribed the constitutional formula—



$$CH_2OH{\cdot}(CHOH)_4{\cdot}CH\left\langle\begin{matrix}O{\cdot}CH_2\\ O{\cdot}\dot{C}H(CHOH)_2{\cdot}CHOH{\cdot}CHO.\end{matrix}\right.$$

Eucalyptus Honey.—During the discussion on the subject of "Eucalyptus Honey" at the last evening meeting of this Society, a letter was read from Mr. Coleman containing the following reference to the origin of the genuine eucalyptus honey. "The dark honey is gathered from the blossoms and leaves of the manna gum. . . . A sweet juice exudes from the leaves and twigs, and it is gathered by the bees at the same time that they are gathering honey from the flowers of the trees. Both are stored in the same combs, though usually in separate cells, so that I often observe some cells in a comb filled with dark manna juice, whilst others are filled with honey. The comb is all emptied at once, so that the two become mixed in the extractor. The sample contains probably from 25 to 35 per cent. of the manna juice."

In connection with the foregoing investigation on eucalyptus manna it appeared to me of interest to ascertain if it be possible to determine the presence of this manna in eucalyptus honey by chemical methods. The recognition of galactose, one of the compounds of melitriose, among the constituents of the honey would afford strong evidence that the eucalyptus manna entered into its composition, since the honeys accumulated by bees in the ordinary was from the nectaries of flowers contain only glucose and fructose, generally in molecular proportions. On the other hand it is evident that a honey from which galactose is entirely absent cannot have been stored by bees that habitually resort to the manna-like exudations from eucalyptus trees for provender.

The identification of the constituent sugars was therefore made the chief aim in the examination of a sample of the dark honey above referred to, for a supply of which I am indebted to Mr. E. M. Holmes.

The honey consists of a thick syrup with indications of incipient crystallization, possesses a faintly aromatic odour, not however suggestive of eucalyptus oil, and an unpleasant acrid after-taste. It turns the plane of polarized light to the left to nearly the same extent as inverted cane sugar.

10·52 grams of honey dissolved in water, and the solution made up to 100 c.c. at 10° C., rotated the sodium ray in a tube of 200 mm. length 4°·35 to the left. Hence the specific rotation of the honey in 10 per cent. solution is about −21°·2, whereas v. Lippman gives −24·5° for invert-sugar in 17 per cent. solution.

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* *Berichte d. deutsch. chem. Ges.*, xxiii., 385.

† *Ibid*, xxii., 3128.

The rotatory power is not affected by heating the solution in a closed tube with carbonic acid for three hours at 100°, nor does this treatment alter the degree of its reducing power upon Fehling's solution or the quantity and composition of the osazone yielded with phenylhydrazine. This negative behaviour towards hydrolysing agents indicates the absence of cane sugar and other polyglucoses, like melitriose.

But an examination of the osazone showed that a small quantity of galactose is present in the honey. Five grams of honey was dissolved in 100 c.c. water and ten grams of phenylhydrazine with an equivalent quantity of acetic acid added. After a few minutes' heating upon the water-bath, a copious precipitate of osazone was apparent, and after two hours the mixture was cool and filtered. The precipitate weighed 6·8 grams, and about another half gram resulted from further heating of the mother liquors, indicating above 80 per cent. of sugar in the honey. This precipitate was boiled with two litres of water, filtered hot, and the osazone that deposited in the filtrate upon cooling examined. By recrystallization of this deposit from water and subsequently from alcohol, scarcely 0·1 gram of an osazone resembling galactosazone in all its physical characters was obtained, so that about 1 per cent. of galactose apparently occurs in the honey. The insoluble osazone, after recrystallization from alcohol, melted with decomposition at 205° and consisted solely of d-phenylglucosazone. The individual amount of the two principal constituents of the honey, d-glucose and fruit sugar, was not determined, but from the rotatory power of the honey an excess of fructose is apparently present.

The results of this investigation of eucalyptus honey agree with those obtained by Maquenne,[*] with the exception that the latter investigator reported the entire absence of galactose. It is possible, however, that a small quantity of the latter sugar in the honey may have been overlooked by him, as I obtained a mere trace of mucic acid by oxidation with nitric acid, which was the conclusive proof offered by Maquenne.

If it be assumed that the galactose contained in eucalyptus honey is derived from eucalyptus manna stored in the comb by the bees, a process of inversion appears to take place subsequently, and a hydrolysing agent must consequently be sought. Of the two stomachs of the bee it is known that one performs an office in some respects analogous to that of the crop in birds, for it receives and retains for a time the saccharine fluid gathered from the nectaries of flowers. The coats of this reservoir are muscular and the bee is thus furnished with means of regurgitation of the honey into the honey-cells, but Hunter[†] mentions that he never found the contents of the reservoir to have undergone any operation suggestive of partial digestion whatever time they may have been retained. Bensemann[‡] suggests that formic acid is secreted by the bees for the purpose of inversion and traces are certainly found in honey, but it would seem more probable that some ferment, such as the couvain of Brittany honey, determines the decomposition.

[*The discussion on this paper is printed on p.* 725.]

NOTE ON CHAULMOOGRA OIL AND GYNOCARDIC ACID.[*]

BY JOHN MOSS, F.I.C., F.C.S.

I may remind the meeting that in the *Chemist and Druggist* of December 14, 1878, I published a Preliminary Paper on Chaulmoogra Oil, and that in August, 1879, I communicated to the British Pharmaceutical Conference a paper giving the result of an examination of the oil, and announced the discovery and chemical formula of its active principle, which I named gynocardic acid.

The immediate cause of this supplementary note is the appearance in France of an extremely interesting *brochure* by Dr. Louis Roux entitled "Huile de Chaulmoogra et Acide Gynocardique, Etude Chimique et Thérapeutique; leur emploi dans le traitement de la Lèpre.'

In this "Etude" the author does me the honour of referring at considerable length to my papers, and expresses a general agreement with the conclusions arrived at. There are certain statements, however, made with a considerable degree of confidence, which so directly traverse my own observations as to call for notice from me.

Solubility of Chaulmoogra Oil. — In a foot-note on p. 22 Dr. Roux says, "Moss ayant écrit que l'alcool froid en dissolvait une assez grande quantité, tous les auteurs l'ont répété apres lui. Cela est inexact." One must admit that "a considerable quantity" is not an exact expression, and so far we may agree with Dr. Roux. I take him to mean, however, that "a considerable quantity" is not dissolved by alcohol. Indeed, he says in the text "L'action de l'alcool froid est à peu près nulle sur l'huile." The accuracy of such a statement of course depends upon the meaning to be attached to the expressions "a considerable quantity" and "cold alcohol." As to the strength of the alcohol my own statement is sufficiently explicit. Word for word it reads thus: "At the ordinary temperature alcohol (·807) dissolves a considerable proportion." Since Dr. Roux throws doubt upon this statement I am warranted in assuming that he employed alcohol of the strength mentioned in the paper he criticises. To resolve the doubt quantitative experiments have been made with two different specimens of oil, Nos. 1 and 2.

1. (*a*) Three grammes of oil were shaken with 1 fluid ounce of alcohol and allowed to stand for four hours at a temperature of 65° F. The spirituous solution yielded ·855 gramme (28·5 per cent.) of dry oil.

(*b*) The undissolved oil of (*a*) was shaken with another ounce of alcohol. The yield added to the first quantity increased it to 1·485 gramme or 49·5 per cent.

(*c*) Similar treatment of the undissolved oil from (*b*), with a further ounce of alcohol, brought up the total to 1·935 gramme or 64·5 per cent.

2. Treated precisely as No. 1, gave 42·55 per cent., 58·02 per cent., and finally 67·7 per cent.

In a third experiment the oil was at once treated with a larger proportion of alcohol. One gramme of No. 1 specimen was macerated and agitated with 1 fluid ounce of alcohol for two hours; the solution was removed from the undissolved oil and allowed to stand two hours at 55° F. It was then filtered and evaporated to dryness. The yield was ·519 gramme or 51·9 per cent.

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[*] *Ann. Chim. et Phys.*, [6], xvii., 495.

[†] 'Manual of Bee-Keeping,' 1875.

[§] *Archiv der Pharm.*, 1888, p. 319.

[*] Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, February 11.

These results encourage me to claim your support for the statement that "At the ordinary temperature alcohol (·807) dissolves a considerable proportion."

Isolation of Gynocardic Acid.—On page 32 of the "Etude" Dr. Roux makes this statement, "Il est de toute impossibilité par la méthode de Moss d'obtenir de l'acide gynocardique pur." This is preceded by a short accurate sketch of the method referred to, and is followed by the description of a process recommended by the author; a process which by the way differs only from my own in the further use of an excess of acetate of magnesium in alcoholic solution. With reference to the statement itself, I may say that the method mentioned is the one which was devised and used by me in a search which resulted in the discovery and isolation of gynocardic acid, and gave it in a pure condition, as evidenced by Dr. Roux. He expressly states that his own combustion experiments on his own pure acid yield numbers concordant with those obtained by me with my pure acid; yet he says a pure acid cannot be prepared by my method. His melting point is 29° mine 29·5°. I express no opinion on Dr. Roux's modification of my method; it may be an improvement. I claim most distinctly however that in careful hands my method will yield chemically pure gynocardic acid, and I also claim my critic as a favourable witness.

Commercial Gynocardic Acid.—The process has not been put forward as one by which the acid can be prepared commercially, but a good commercial process can be based upon it, taking advantage of such slight modifications as would be suggested by experience or demanded by economy. In this connection it is interesting to note that Dr. Roux mentions (p. 36) England and India as the two countries in which gynocardic acid is prepared. That it is prepared in England we know, but outside Dr. Roux's pamphlet I have been unable to obtain any information relative to its manufacture in India. I take this opportunity of asking for information on the subject, and shall be grateful for any that is furnished, especially if accompanied by specimens. The Indian acid is described as hard, yellowish and with a strong sickening odour; it contains proportions of palmitic, hypogæic and cocinic acids, and the melting point is 35°. The specimen of English acid examined by Dr. Roux was almost pure, and soft enough to smear the fingers, but had the nauseous odour of rancid fat. It fused at 31°.

[*The discussion on this paper is printed on p.* 726.]

DRIMYS AROMATICA, and D. DIPETALA, F.v.M.

BY J. H. MAIDEN.

Both these trees are known in Australia locally as "Pepper-trees." The dried fruits of *D. aromatica* are black, rather shrivelled, sub-globular, with short stalks, and much resembling cubebs in appearance, except for the minute brown scars (varying from one to six or more). They break down readily under the teeth, forming a gritty powder, but in a very short time they burn the tongue and roof of the mouth severely. They are very acrid, with a flavour like allspice, only much more intense. The leaves and bark also have a hot, biting, cinnamon-like taste. The bark, leaves, and fruit are, as is well known, sometimes used by country people as a substitute for pepper. The barks of these two species are being tested for their medicinal properties.

D. aromatica finds its most northern extension on the Sugar Loaf Mountain (Braidwood), and perhaps a trifle more north in the Clyde Mountains—though it has not yet been seen north of the Sugar Loaf Mountain. Near our southern boundary, and especially in the Gippsland ranges, it attains its greatest height and diameter in the jungle, where it is often found as a small handsome tree about 20-25 feet high and from four to six inches in diameter. On the slopes of the Snowy Mountains it sometimes forms dense jungles which are there called "pepper scrub." It ascends to an altitude of more than 6,000 feet, but is then always shrubby.

D. dipetala is a small gully-tree which bears a considerable quantity of fruit of a plum colour up to nearly black when fully ripe. They are in shape like a roly-poly, and I have measured them up to one and a quarter inch full by three quarter inch in diameter. They are succulent, and may be eaten with impunity, tasting like a nearly insipid apple, but the few small black seeds which they contain, which are from pear- to kidney-shaped, are exceedingly pungent, tasting like *D. aromatica* fruits if chewed. I have not heard of the blacks eating them, but it is not possible they could have ignored them.

The present species is not so well known as *D. aromatica*, nor has any use been made of either bark, leaves, or fruit. The ripe fruit, when bruised and steeped in hot water, makes a beautiful dark red to purple liquid, a teaspoonful of which added to a glass of water makes a pleasant refreshing drink. This suggests whether the ripe fruit might not be used in colouring and flavouring wines and other beverages, giving them a beautiful red colour and adding a spicy and aromatic taste.

MICROCHEMICAL TESTS FOR MINERAL ACIDS AND MINERAL BASES IN PLANTS.

Herr A. F. W. Schienper recommends the following as the best tests for this purpose:—

Lime.—The formation of crystals of calcium sulphate by addition of sulphuric acid; also, in certain cases, the production of crystals of calcium oxalate by addition of ammonium oxalate, or of calcium carbonate by ammonium carbonate.

Chlorine.—Precipitation by silver nitrate or thallium sulphate. When present in large quantities, potassium or sodium chloride may be crystallized out of an aqueous solution of the ash.

Potassium.—Production of potassium-platinum chloride, insoluble in water and alcohol.

Magnesium.—The formation of ammonium-magnesium phosphate by addition of sodium phosphate or sodium-ammonium phosphate with the addition of ammonia. The formation of magnesium-sodium uranate by the use of uranacetyl.

Sodium.—The same as the last.

Oxalic acid.—Formation of calcium oxalate.

Phosphoric acid.—The production of ammonium-phospho-molybdate by the addition of ammonium molybdate and nitric acid. Formation of magnesium-ammonium phosphate.

Nitric acid.—Formation of an aniline-blue with diphenylamine; an extraordinarily delicate reaction. Production of calcium nitrate.

Sulphuric acid.—One of the most difficult determinations, as the occurrence of a precipitate with barium chloride by no means proves the presence of sulphuric acid. Crystals of potassium sulphate may be obtained from a solution of the ash.

Tartaric acid.—May be precipitated by potassium acetate or calcium chloride.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 14, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed* "*Pharm. Journ.*"

REPRESENTATION OF THE TRADE BY THE SOCIETY.

APART from the special objects for which the meetings of chemists and druggists have recently been held in Scotland and other parts of the kingdom, there are some other points of view in regard to which the meetings in question have furnished indications that may be worth referring to. One of the most evident things shown by the proceedings at these meetings is the very general absence of any well founded unanimity of opinion among chemists and druggists in regard to the means by which their business interests as a class may be promoted and protected against a variety of disadvantageous influences, the existence of which cannot well be disputed. There is abundance of discontent, and in some form or other a very general though vague expression of the feeling that the conditions under which chemists and druggists carry on their business are not such as they should be. But though individual speakers have occasionally pointed to the want of unity in the class as being one of the chief sources of the evils that are complained of, this fact is very far from being generally appreciated. The average chemist and druggist persists in maintaining an isolation that makes the class to which he belongs an exception to the rule prevailing with almost all other classes of the community. Though an organization has now been established for half a century, having for one of its objects the promotion of the interests of chemists and druggists, the great majority of them not only hold aloof from taking any part in the work requisite for that purpose, but in many instances assume towards the Society a position of hostility which is difficult to understand. While proclaiming their need of protection they refuse to assist in the endeavour to provide it, and take the unreasonable stand that they will not connect themselves with the Society until it has obtained for them protective legislation, which it would be impossible to obtain without the united support of the entire trade, and which might not be obtainable even with that support.

Without referring to the attempts that have hitherto been made on the part of the Pharmaceutical Society to remedy the unfortunate condition of affairs above mentioned, attention may be called to the fact that another opportunity is now being offered for putting an end to or considerably mitigating the disunion under the influence of which chemists and druggists experience disadvantage. The clause of the Pharmacy Act Amendment Bill which provides for the reconstitution of the Society would practically admit of every registered chemist and druggist in future becoming a member of the Society, and enable each one to co-operate with his brethren in the trade for the advancement of their common interests. We take it that such a course of action is the only one by which those interests can be advanced and protected at the present day, when free trade principles are so generally entertained and excessive competition is so prevalent in every calling. If this view were generally accepted and acted upon by chemists and druggists joining the Society and taking an interest in its work, so that there could no longer be any talk of "outsiders," the change would constitute a very appropriate, as well as beneficial, celebration of the jubilee of the Society which is now approaching. The moment at which this opportunity is offered is a favourable one. In the Council as at present constituted all shades of opinion are represented, and there is the additional advantage that it has an able and enterprising President who has not only rendered material services to the entire trade, but is prepared to undertake the task of advocating the claims of those who are willing to rank themselves under his leadership. But if any success is to attend those attempts, members of the trade must manifest more active interest in the work and not remain open to the reproach cast upon a certain section of them at the last Council meeting by Mr. HARRISON, for the want of any adequate support to the endeavour he had made to put their views before the Council and bring about their adoption.

The question still remains how influence is to be brought to bear upon members of the trade. We do not suppose that, as a correspondent in this week's Journal suggests, our editorial articles can be of much avail in this direction, and are more disposed to consider that a better effect would be produced by personal applications made by the Society's Local Secretaries throughout the country. If these officers of the Society would undertake to call upon members of the trade in their several districts, their representations would be likely to carry greater weight than any other form of application, and we trust that Mr. BULLEN's recommendation will be very widely adopted.

"MILK OF SULPHUR."

THOUGH it would be improper to comment upon the merits of the case reported in last week's Journal while it is still undecided, we may nevertheless offer a protest against the imputations cast by one of the witnesses upon chemists who supply the well-known preparation containing sulphate of lime when asked for milk of sulphur. According to the evidence of Dr. EDMUNDS this is only done by "fraudulent druggists," and it is to this statement that we take exception. For the information of our readers we may state that the defendant is not a druggist, but a registered medical man, practising as an apothecary. The point contended for by Dr. EDMUNDS is that according to the British Pharmacopœia the term "milk of sulphur" means pure sulphur. That is a question of fact upon which it will be the province of the magistrate to decide, and until the decision is given we cannot say anything further. But in addition to the protest already made in respect to the charge of fraud against sellers of milk of sulphur that is not pure sulphur, we cannot omit to point out the impropriety of applying incorrect and abusive nomenclature to the substance present in "milk of sulphur" as a necessary consequence of being made by a process that has had the authority of a previous Pharmacopœia. That substance is neither "gypsum" nor "plaster of paris," and the application of these names to it is indicative either of ignorance or of a desire to establish a prejudice.

An Evening Meeting of the Pharmaceutical Society will be held at the Society's House, 36, York Place, Edinburgh, on Wednesday next, February 18. The proceedings will include the adjourned discussion on the B.P. Addendum, and the reading of a paper on "Liquor Bismuthi et Ammonii Citratis," by Mr. Daniel Gorrie. The Assistant Secretary will also call attention to some recent donations to the Museum.

* * *

The Artificial Manures, etc. (Adulteration) Bill, which was introduced into the House of Commons and read a first time in November, but which has just been issued in a revised form, has for its object the better prevention of frauds in the manufacture and sale of artificial manures and other preparations for agricultural purposes. This it proposes to attain by making it compulsory, in all sales in quantities of not less than one hundredweight of artificial manure or feeding stuffs, for the seller to deliver to the purchaser a guaranteed analysis of the article sold, and by making misrepresentation in this certificate punishable by summary process. In order to facilitate the carrying out of the law the Bill provides for the appointment by every county council of "one or more persons possessing competent knowledge, skill and experience as analysts of artificial manures and feeding stuffs within such county," from whom purchasers will be entitled to obtain an analysis on payment of a fee of five shillings. All appointments of these analysts would be subject to the approval of the Board of Agriculture, which may require to be supplied with satisfactory proof of competence, but the only other limitation is that no person shall be appointed as analyst who is engaged directly or indirectly in the trade or manufacture of the substances he may be called upon to examine. The Board of Agriculture would also be empowered to authorize a county council for a specified time to appoint inspectors to obtain and deal with samples of manures and food stuffs offered for sale in a manner corresponding to the provisions of the Sale of Food and Drugs Act.

* * *

The Registration of Firms Bill which has been introduced into the House of Commons appears to be identical with that which has been brought under the notice of Parliament for several sessions past. It is so far of interest to our readers in that it provides for the compulsory registration of the names, residences and other occupations of persons carrying on a business under a firm name, and would therefore in some cases facilitate the carrying out of the provisions of the Pharmacy Acts.

* * *

The Poisoned Flesh Prohibition Act Amendment Bill, which has been introduced into the House of Commons by Mr. F. Stevenson, proposes to extend the provisions of the second section of the 1864 Act so that they shall apply not only to flesh or meat, but to all animal substances which have been mixed with, or steeped in, or impregnated with poison or any poisonous ingredient so as to render such animal substances poisonous and calculated to destroy life.

* * *

Reference was made recently to the fact that in the materia medica of China are included many items hardly in accord with European notions. A recent article in the *China Medical Missionary Journal*, quoted in the *Boston Medical and Surgical Journal*, furnishes opportunely some instances. A mixture of cinnabar, saltpetre, and horse and turtle urine for the removal of a tooth. For a sore eye one half of a chicken placed over the ailing optic and the other half to be eaten. A child who grinds its teeth during sleep should have its face slapped several times with a cooked pig's tail, and then be made to eat the remedy. For cholera, one remedy—which is described as "god-like"—is to take an earthern spoon, anoint it with tea-oil, and then rub with it the spine of the patient until the appearance of black spots, which are to be pierced to the bone with a needle that is then heated with a burning lamp-wick. The additional treatment consists in the administration of salt heated in an iron spoon, mixed with ginger juice, boy's urine and cold water.

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The next meeting of the Chemical Society will be held on Thursday, the 19th inst., when a paper will be read on "αα′ Diacetylpentane: Synthesis of Dimethyldehydroxyheptanethylene," by Professor Perkin and Dr. Kipping.

* * *

A meeting of the Midland Counties Chemists' Association will be held at the Mason College, Birmingham, on Tuesday evening next, when papers will be read on "The Chemistry of the B.P. Addendum," by Mr. Robinson, and on "Tinctura Quininæ Ammoniata," by Mr. Adcock.

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At the next meeting of the Chemists' Assistants' Association, to be held on Thursday, the 19th inst., a paper on "Coal," by Mr. Walmsley, will be read.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, February 11.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An Evening Meeting of the Pharmaceutical Society was held on Wednesday, the 11th inst., at 17, Bloomsbury Square, Mr. Michael Carteighe, President, in the chair.

The **President** first called on the Curator, Mr. Holmes, to describe some donations to the Museum which were exhibited, as it included specimens on which they would hope to hear something from Professor Trail, of Aberdeen University, whom they were all glad to welcome there, but who had to leave early.

Mr. **Holmes** said the actual donations were but few. One consisted of a beak of cuttlefish (probably *Sepia moschata*) found in ambergris. Although ambergris is probably a biliary concretion, consisting as it does chiefly of ambreine, a body closely allied to cholesterine, the beaks of cuttlefish (probably *Sepia moschata*) were occasionally found imbedded in it, this animal forming part of the food of the sperm whale. An interesting account of ambergris, than which none better had, so far as he was aware, been published, might be found in the 'Philosophical Transactions' in 1783. To what body the peculiarly lasting odour of ambergris was due was he believed unknown; but judging from the present high value of ambergris, the subject might repay investigation. There was also a specimen of the plant *Carex tomentosa*, which was thought to be extinct in England. It was found originally at Measton Mearby, in Wiltshire, and was rediscovered about two years since near Fairford, in Gloucestershire, which was not very far off from the original locality. It was probably supposed to be extinct from being looked for in the wrong situation, its locale having been described as damp meadows, whereas it was usually found in comparatively dry soil. There were also some plants presented by Prof. Van Eeden, who had taken a great deal of trouble to clear up the origin of the garu woods met with in eastern commerce. The rest of the specimens exhibited were about one-fourth of a collection recently acquired by purchase. This collection had been made during a period of seven years by a gentleman in the city, who had got together all the different grades he could obtain of many drugs, recording the prices, and commercial names. The specimens exhibited that evening were those which showed in the most marked manner the different commercial qualities. It would be observed that the specimens of beeswax varied not only in colour and quality, but were imported from nearly every country in the world. Nutmegs were commonly supposed to be derived from the Banda Islands, but it would be seen from the specimens exhibited that they were also imported from the West Indies, Sumatra, Java, Penang, etc. The numbers attached to the specimens referred not to the prices, but to the number of nutmegs contained in 1 lb. weight, since this mode of selling them is adopted in commerce. The collection of gambier and cutch was interesting as showing not only the different qualities but also the different brands of well-known manufacturers, which had been carefully attached to each specimen. The series of benzoins was a particularly good one; and it was much easier to study the characteristic appearance of each of the commercial kinds from a graduated series, than from a few isolated specimens. It would be noticed that the Sumatra benzoin had the peculiar styrax odour which on a former occasion had been attributed to the Penang. It would seem, therefore, that the specimens which he had received previously under the name of Penang were probably those of Sumatra benzoin. Dr. Treub's specimen of Penang benzoin, exhibited at a previous meeting, would therefore be correctly named, and his (the Curator's) remarks on that occasion should be applied to Sumatra and not to Penang benzoin. Of gum arabic there was a good collection illustrating the four ordinary varieties, the white or frosted, which formerly came from Khordofan, but recently by way of Mogador: the second kind, that which was clear inside but slightly frosted or cracked outside, which came from Senegal and Bombay. The Ghatty gum, which had recently come into favour, and which varied very much in character, was not so adhesive as gum arabic, but made a thick mucilage and was useful for making emulsions. The dark clear Australian gum did well for ink, but could not be used for calico printing, as it contained tannin and altered the colours used in printing. There was a complete series of dragon's blood, pipes, fingers, slabs, and the tears. The last named came from Socotra through Bombay, and was, as had been shown by Professor J. B. Balfour, identical with the cinnabar of the ancients. There was also a box containing most of the commercial kinds of rhubarb, which illustrated well the internal colour of different qualities, varying from grey to red and almost black. It was by this characteristic it was generally judged, though partly by its hardness. A specimen of scammony was interesting from being the worst he had ever seen; the price marked on it was 9*s*. 6*d*. per lb. The specimen of olibanum, on the other hand, was so fine that it could probably hardly be matched in London. The Chinese wax was a substance not much imported, being much dearer than ordinary wax; it was much like spermaceti, but harder. It was produced by a species of coccus, something like the mealy bug of the apple tree, which, as well as the cochineal insect, excreted wax, but to a much smaller extent. These was also a collection of galls, including some from China, very irregular in form, with a sort of downy appearance externally. Varieties of this kind came from the Corea and Japan, and though they had a family resemblance, each differed from the others. The cause of the difference in shape in galls had, he believed, never been determined, yet every gall insect appeared to form its own peculiar kind of gall. The ordinary Chinese galls were produced on a species of Rhus (*R. semialata*), but another kind having a pyriform shape, or in smaller specimens of apparently the same gall, a more oval outline, and which were known in commerce as pear or plum galls were produced on *Distylium racemosum*. In all these Chinese galls the insect producing them was an *Aphis*, belonging to the *Hemiptera*, and not like the insect (*Cynips*) producing the oak galls, which belonged to the *Hymenoptera*. He was not aware for what purpose these galls were now used, whether for the extraction of tannic and gallic acid or for the purposes of tanners. At one time there was a considerable demand for the plum galls, but he understood it had now ceased. Lastly, there was a specimen of the gum resin described in 'Pharmacographia' under the name of bissabol, the only gum resin which really resembled myrrh in appearance. Although the produce of a *Balsamodendron* (*B. Kafal*) it appeared in commerce under the name of opopanax. It was, however, entirely different from true opopanax, which had an odour resembling that of a bruised ivy leaf. The bissabol had quite a different odour, which, when diluted, was not unpleasant. It had recently come into the London market in considerable quantities, but was, he believed, principally supplied to the German manufacturers from Trieste, where the gums coming from Egypt were chiefly sorted.

Professor **Trail** said he should be glad to throw any light he could on the subject of galls, but he feared it appealed only to specialists. Useful galls belonged to but very few forms, chiefly oak galls, and of those only a few were used in commerce, principally for the gallic and tannic acid they contained. Many of the other forms contained these acids, but either not in sufficient quantities or the galls themselves were not sufficiently easy of collection for commercial purposes. The Chinese galls were formed by a different group of insects altogether from those which formed the oak galls. On the continent there were eighty or one hundred different forms of galls occurring on the oak, varying considerably in size and in other ways, but most were produced by hymenopterous insects, the so-called gall flies, though a few were made by midges or small two-winged flies related to the mosquito. The gall flies generally formed galls of a woody structure, with a few exceptions; those which were formed in spring and early summer, such as the well-known currant galls on the under surface of oak leaves and on the catkins, looking like a bunch of red currants, were soft and spongy, and contained a large quantity of sap. The greater part of oak galls, however, were of a woody exterior, surrounding a central cavity in which lived the grub or larva. In others, such as the oak apple, a section showed a number of cavities, in each of which was a larva: the number of cavities depending on the number of eggs laid by the parent, and apparently also on the number of punctures. Besides the actual makers of the gall, other inmates were often found living in it and on it, but not producing it. The insects could easily be reared by collecting a number of fully formed galls, and keeping them in a box or jar through winter; they came out in the early part of the summer, and then one would find a number of these guests, some of which were inquilines, whilst others were parasites, the larvæ of which lived on the larva of the gall maker and took its place. In the oak-apple, for instance, would generally be found an enormous number of inquilines and a considerable number of parasites also. For a long time this caused a good deal of confusion. There was also a very curious seasonal dimorphism observed, a spring form and an autumn form, differing so much both in appearance and workmanship that for a long time they were regarded as belonging to different genera. A well known example of this was the currant gall, of which he had already spoken, the autumn form connected with which was the so-called oak-spangle gall, frequently met with on the lower surface of oak leaves in great abundance as a small, flat, slightly conical disc, with a very small cavity in which the larva lived. As the winter passed the gall fell, it swelled, the insect became fully formed and emerged in spring, when it punctured the leaf-buds and produced the currant form. Ten or twelve British oak galls had been found to produce two distinct forms of the same insect, one generally being winged and the other wingless, and each producing a characteristic form of gall. The galls found on the rhus and distylium were the work of green flies or aphides, which were so destructive to flowering plants in the ordinary way by living on the leaves and flowers. In this case the gall was produced, not merely like the oak gall for the protection of the young grub, but to afford nourishment to the insect itself, which lived inside and continued to draw sap from it throughout its whole life. In such galls, therefore, might be found all the stages of development from the egg up to the fully formed aphis. These were frequently met with on the poplar, especially the black poplar; one species attacked the leaves and the other the leaf stalks. Another group of gall aphides produced galls on elm leaves, but the only one deserving special mention was the woolly aphis of the apple-tree, which produced nodular swellings on the roots or branches. This case showed the difficulty of defining the term gall. There were all transitions, from quite larger dwellings to very small ones, according to the number of insects inhabiting them. Further varieties were produced by the gall midges, and mites, which sometimes caused curious hairy growths on the leaves, like velvety patches. Some of the nematodes also produced galls on plants, one species causing such great injury to the roots that serious damage had been done to the sugar beet crop, and an allied form had been very destructive of the coffee plants in Brazil. It would take far too long, in fact, to even name all the different forms. It was not as yet ascertained how each particular species of insect produced its own form of gall, or why in some cases there was seasonal dimorphism and in others not. No doubt part of the difference in effect depended on the tissue attacked and the season, but beyond this little was known. If it were ascertained how such changes were brought about by insects it would throw great light on the pathology of both plants and animals, and he recommended this study to anyone who desired a field of research which offered plenty of scope and was full of interest.

Mr. CHRISTY said the Chinese galls were used by tanners, and up to the time of the Vienna Exhibition it had been supposed that they yielded a tanning principle. Mr. Ramspacker, however, found that was not so, but that they promoted the opening of the pores of the leather and so allowed tannin to enter.

The PRESIDENT presented the thanks of the meeting to Mr. Holmes and Professor Trail.

A paper was then read entitled—

THE CARBOHYDRATES OF MANNA FROM EUCALYPTUS GUNNII, HOOK., AND OF EUCALYPTUS HONEY.

BY F. W. PASSMORE, PH.D.

The paper is printed at page 717, and gave rise to the following discussion:—

Professor DUNSTAN said the material which formed the subject of this investigation was sent over by Mr. Maiden, the Curator of the Technological Museum of Sidney, who had a large number of specimens of Australian produce he was anxious to have examined. As Dr. Passmore had had considerable experience in the examination of carbohydrates he suggested that he should examine this species of manna. It turned out that there was nothing very remarkable in the principal carbohydrate in it, which resembled that found in other varieties, but apart from the results the research had considerable importance, as it showed how an investigation of this kind should be carried on. The principal point was the remarkable agent phenylhydrazine and the necessity for its use in examining any of the carbohydrates. If any one doubted that, let him try to separate lævulose in a pure and crystalline form. Phenylhydrazine formed with the sugars crystalline compounds, having definite melting points, so that it was possible to isolate these compounds and characterize the sugar by their means. It might be said that the brilliant syntheses of sugars recently made by Emil Fischer could not have been effected but for this remarkable reagent.

Professor ATTFIELD said Dr. Passmore had done his work so thoroughly that he had not left much room for discussion by the average British pharmacist, at any rate. That was no reason why the subject should not be brought forward at a British pharmaceutical meeting; it was obviously of great pharmaceutical interest. If at continental pharmaceutical societies such papers were fully discussed as well as welcomed, it was because those societies were older than themselves, who were only just about to celebrate their jubilee. What struck him about the paper was the thoroughness with which the work had been done, and that point should be emphasized in the case of a paper by one of the younger members of the Research Laboratory. It was a typical paper for pharmaceutical workers.

The **President**, in presenting a vote of thanks to Dr. Passmore, said the Society was always pleased to have papers from the Research Laboratory. Dr. Passmore, after being a comparatively short time a student there and elsewhere in England, had been for several years a pupil of Professor Emil Fischer, and had assisted him in some of his original work. He had come back imbued with that spirit of enthusiasm for work which he feared existed to a greater extent in Germany than elsewhere, and he reflected great honour on the Society with which he was connected.

The next paper read was a—

NOTE ON CHAULMOOGRA OIL AND GYNOCARDIC ACID.

BY JOHN MOSS, F.I.C., F.C.S.

The paper is printed at p. 720, and gave rise to the following discussion:—

The **President** asked Mr. Moss if he had any manufacturing process in his mind when he wrote the original paper.

Mr. Moss replied in the negative.

Professor **Attfield** said the question was what was meant by the solubility of the oil in alcohol. If he understood rightly, Mr. Moss shook up 3 grams of oil with a fluid ounce of the alcohol, and a considerable proportion of the 3 grams was dissolved, rather under 1 gram. Possibly Dr. Roux meant that this was not much in proportion to the alcohol employed; indeed, it was obviously only about 3 per cent. Again, when the residue was shaken up with another fluid ounce of alcohol, more oil was dissolved, but less than before in proportion, a little over 2 per cent., which might also be called a small proportion, and in the third experiment there was still less dissolved—under 2 per cent. The extent of solubility of many oils in alcohol was very similar. On the other hand, if Mr. Moss only meant that a considerable proportion of a small volume of oil could be dissolved if one went on adding alcohol to it, no doubt he was right. In the same way it might be said of glass that a considerable quantity was or was not soluble in water. As to the larger proportion of oil being dissolved in the first experiments than in the second and third, that went to show either that the alcohol was not saturated, in which case what became of the value of the figures showing solubility, or that the oil was a mixture. This would form an interesting subject for more experiments than Mr. Moss had already made. From the point of view of proportion of oil to alcohol Dr. Roux was probably right; it was only soluble to the extent of 2 or 3 per cent.; but, on the other hand, if Mr. Moss had only used enough of the alcohol, he would probably have dissolved the whole of the oil.

Mr. Moss said he believed he should. Nothing Professor Attfield had said altered the fact that a considerable quantity of the oil was dissolved by cold alcohol, and if he used enough alcohol probably the whole would be dissolved. In the original paper he had suggested that this was an excellent means of separating the oil into certain constituent parts. One reason why the alcohol dissolved more at first was that the free acid present was far more soluble than the oil itself. In the second experiment 51 per cent. of the oil dissolved right off. The question might be looked at from two points of view; the solubility of the oil in alcohol, or the solvent power of alcohol on the oil. The question how much would be dissolved was very indefinite; but using so small a proportion as one in ten, 3 grams and 30 grams, one-third of the whole was taken up immediately. His sole object in making the experiment was to see whether his previous statement could be substantiated, or whether he must correct it, and he found no reason for making any correction. The only process he was acquainted with for making gynocardic acid was the one mentioned in the original paper. Dr. Roux said Moss's acid was not pure and his was; but when examined they were so absolutely identical that he could not tell one from the other. It recalled the reply given by a classical student in an examination to the effect that the poems attributed to Homer were not really written by him but by another man of the same name.

The **President** in thanking Mr. Moss for his paper said he only regretted that he had not gone still more thoroughly into the matter, so as to entirely demolish his opponent.

The meeting then adjourned.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, February 4, at No. 11, Harcourt Street, Dublin. The President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells; Messrs. Hayes, Beggs, Grindley, Dr. Burnes, Boyd, McNeight, Moore, Johnston, Gibson, Shaw, Hodgson (Treasurer), Professor Tichborne, Simpson and Robinson.

A letter was read from the Privy Council acknowledging the receipt of the resolution passed by the Council at its last meeting in reference to the terms on which persons who were assistants to chemists and druggists prior to 1875 should be admitted to examination.

The President: The matter is still under the consideration of the Privy Council.

Another letter from the Privy Council approving of the regulations which the Council had made in reference to the Society's School of Chemistry was read.

A letter was read from the office of the Inspector General of the Royal Irish Constabulary with reference to the distribution of copies of the Register of the Society to the inspectors of weights.

The President: They have returned to us the names of 606 persons, amongst whom lists of the persons now entitled to sell poisons will have to be distributed.

Mr. Hodgson: We are to send the lists to the centres and they will distribute them for us.

Mr. Boyd: I understand that under the new Act druggists who have been selling poisons do not become subject to any penalty until twelve months after the passing of the Act.

Mr. Hodgson: No.

Mr. Boyd: Therefore the police officials cannot take any action until after the expiration of the twelve months.

The Vice-President: They do not take action, they report to us. They sent for the lists of those who are registered, and we informed them that we would send them to them, and at the same time informed them that they could not take action for a certain time.

Mr. McNeight: The constabulary have been going through the country cautioning shopkeepers that they have no right to sell poisons.

Professor Tichborne: That will hurry them to get on the register.

The Vice-President: We have made a great many persons keep poisons books who never kept them before.

The President: They have up to the 18th of August, 1891, to register.

A letter was read from the General Medical Council, in reference to the application of Mr. Ernest A. Bourke to be registered. The letter stated that the Society's Preliminary examination was recognized *pro tanto* by the Council; but that the question as to the registration of any particular student was not a matter for the consideration of the General Council. Mr. Bourke's examination had been passed exclusively in Ireland, and therefore any question as to his registration came within the province of the Branch Registrar of the Council for Ireland.

The President: Mr. Bourke passed his examination some time ago. This letter seems satisfactory: but they are not satisfied to register him at the Dawson Street Branch office.

Mr. Grindley: Had you an interview with the Registrar here?

The President: Yes. He said that in London they had full power to accept Mr. Bourke's papers, but that unless they did so in London he would not care to do so.

The Vice-President: Call again on the Registrar and show him that letter.

Mr. Grindley: As a matter of fact the young man is fully qualified.

A letter was read from Mr. P. J. Lyons returning his best thanks for having been elected a member of the Council.

A letter was read from Mr. George Lane McCormack withdrawing his resignation.

The President: I am sure you are all very pleased to hear that we shall still have Mr. McCormack on the Council.

A letter was read from Sir James H. Haslett, acknowledging his election as an associate druggist.

A letter was read from Mr. W. J. McNeight acknowledging the receipt of a letter of January 10, informing him that he had been elected an associate druggist, but saying that he thought the Registrar was in error in stating that the guinea fee he had forwarded paid for his membership only to the 30th of next September. He submitted that under clause 13 of the Pharmacy Amendment Act the guinea was a subscription for the whole of 1891.

Mr. Boyd: Will the guinea entitle the member to vote at the next October election as well as at the last one?

The President: Yes, at the annual meeting.

Mr. McNeight: I only want to take care that my name will not be thrown out at the last moment.

The President: I do not see how that will be possible.

Mr. Hayes: It does not depend alone on the subscription, but also on the name being on the list of members. If any one falls into arrear for two years his name is omitted from the published list of members.

Mr. Simpson: Every man whose name is on the registry is entitled to vote.

The Vice-President: A man who is elected in July gets fifteen months instead of twelve for the one subscription.

Mr. Hodgson: Until his name is expunged for nonpayment of fees he is entitled to vote.

The President laid on the table reports from the examiners on the January pharmaceutical examinations. From these it appeared that at the Preliminary seven candidates passed and eight were rejected; and at the examination for the licence eight candidates passed and three were rejected.

A report from the Law Committee was read and adopted.

A report from the Pharmacy Act Amendment Committee dealt with a variety of topics and stated that the following gentlemen had been accepted for registration as chemists and druggists as having been in business before 1875:—Messrs. John McClement, High Street, Newtonards; William Alexander, Great Strand Street, Dublin; Thomas H. Cleave, 131, Georges Street, Limerick; John McHugh, Strokestown; John Grimes, Pomeroy, Tyrone; Patrick Toole, Westport; James Simmons, Bridge Street, Banbridge; John Atkins, Dunmanway; Daniel Browne, West Street, Carrickfergus; William Dobbin, 45, North Street, Belfast; James McCann, Killeshandra; Francis Quinn, Stewartstown, Tyrone; John Richie, High Street, Comber, Co. Down, and Mary White Skerries, Co. Dublin.

A report of the School Committee stated that they had had under consideration the last report of Dr. George Duffey, the Lord Lieutenant's Visitor, and that they recommended the following alterations to be made in the curriculum for the Preliminary examination:—The introduction of algebra to the end of simple equations, the first book of euclid, and elementary mechanics, elementary botany and chemistry to be optional. The Committee could not see their way, the report stated, to the appointment of a second examiner, in consequence of the expense it would involve.

Mr. Boyd: That is a considerable addition to the curriculum.

The President: It is a tremendous addition, but we want to bring ours up to the standard required by the General Council.

Mr. Boyd: What equivalent will candidates who pass this more difficult examination get from the General Medical Council?

The President: None, except that if they want to prosecute medical studies our examination will be received by the Medical Boards.

The Vice-President: And additional gentlemen will come in for our examinations, by which we will make a profit.

Mr. Gibson: I think we have proof to-day that the examination is difficult enough at present. At the last examination only seven candidates out of fifteen passed.

Mr. Boyd: It struck me on reading Dr. Duffey's letter that it was more a want of supervision he complained of than anything else.

The President: He emphasized the fact that some candidates had been allowed to pass who had scarcely a smattering of Latin.

Mr. Gibson said he did not see what use geometry was to their candidates.

Dr. Burns said geometry tended to expand a man's reasoning powers. It was desirable to maintain their standard of education.

Mr. Hayes: There is no boy who has been at any free school who will not be able to pass in the first book of euclid.

Mr. Boyd remarked that statics and dynamics were not on ordinary school courses.

Mr. Simpson: They are coming into them now. In several schools that I know those subjects have been on the courses for the last two or three years.

Professor Tichborne thought that algebra, botany and chemistry should be optional subjects at the Preliminary examination, but that the candidate should be obliged to take one of them.

Mr. Hayes: In the subsequent examination the candidates are obliged to answer in botany and chemistry, whereas they are not in algebra. A boy in order to be a good chemist should know something of algebra, and if he does not know something about it at his Preliminary examination he never will afterwards.

Mr. Robinson: I would keep algebra in, in order to keep up the standard of our examinations.

Mr. Boyd: You will frighten away more students than you will attract if you raise the standard so very much. They will all go in for the Civil Service.

Professor Tichborne moved that botany be an optional subject at the Society's Preliminary examinations.

Mr. Hodgson seconded the motion, which was carried with two dissentients.

Dr. Burnes moved that algebra be an optional subject at the Preliminary examinations.

Professor Tichborne seconded the motion, which was negatived.

Professor Tichborne moved that physics and mechanics be bracketed as one subject, and be optional at the Preliminary.

Mr. Boyd thought too much stress was laid upon the object of securing an acknowledgment of their examination from the Medical Council.

The motion was seconded, put and carried.

The President: The optional subjects for the Preliminary also include, according to the recommendation of the Committee, French, German, or one other modern language.

Professor Tichborne: I think our candidates should pass in one of them. At present they do not pass in any of them.

The report of the Committee was then adopted, and a draft letter to the Privy Council in relation to the letter of Dr. Duffey was approved of.

On the motion of Mr. Hodgson, seconded by Mr. Hayes, the following gentlemen were elected Associate Druggists:—Mr. Thomas Boland, Ballinagh, Mr. Samuel Boyd, J.P., 46, Mary Street, Dublin, Mr. Daniel Brogan, Castlepollard, Mr. Robert Campbell, 40, Hartington Street, Belfast, Mr. Joseph Canavan, High Street, Portadown, Mr. William Doig, 39, Mill Street, Belfast, Mr. P. J. Finan, 80, Market Street, Sligo, Mr. James Gregg, Ballyclare, Mr. Frederick A. Harpur, J.P., Ballinasloe, Mr. J. M'Conkey, Leadbetter Street, Belfast, Mr. John M'Loughlin, Carrigallen, Mr. Thomas W. Reynolds, Scotch Street, Dungannon, Mr. Liddle Thompson, Lisnaskea, Mr. John Watson, Knock, Co. Down, and Mr. Robert Watson, Rathfriland.

On the motion of Mr. Gibson, seconded by Mr. J. H. Shaw, the following gentlemen were nominated for election as Associate Druggists:—Mr. Thomas Henry Cleeve, Sunville House, Circular Road, Limerick, Mr. Stanley Harrington, Trafalgar, Cork, and Mr. W. B. Harrington, Lee View, Cork.

Professor Tichborne postponed a notice of motion of his to prevent Presidents and Vice-Presidents from being elected for more than three consecutive years.

Some financial and formal business having been disposed of, the Council adjourned.

Proceedings of Societies in London.

ROYAL INSTITUTION.

The Rejuvenescence of Crystals.

A Friday evening lecture was delivered at the Royal Institution on the 30th ult., by Professor J. W. Judd, who introduced into his discourse several comparisons between the growth of crystals and animal and vegetable life, which rendered the curiosity-exciting title of "The Rejuvenescence of Crystals" extremely appropriate. The introduction of the microscope into the domain of crystallography, the lecturer said, has effected a wide extension of knowledge concerning crystal morphology and crystallogenesis. Since the days of Robert Boyle the investigations of numerous *savants* in Holland, Germany, and France, and of Brewster and Sorby in England, have opened up a new field of research to the scientist. The knowledge thus acquired has been of inestimable value to the geologist, who is compelled to appeal to the experiments and deductions of chemists and physicists for instances of analogy; but the debt is more than repaid by the new light thrown on questions concerning the formation of crystals by the investigation of natural crystallization by geologists. Nature is unstinting in the expenditure of time upon her handiwork and her slow elaboration of crystals during millions of years accounts for the presentation by some natural products of curious phenomena that are not reproducible in test tubes and crucibles, although the causes of these phenomena may be determined by analysis. The first property of crystals to which Professor Judd drew attention was their possession of the power of resuming growth after an interval, no apparent limit of time existing after which resumption of growth cannot take place. Independently of the proofs of the truth of this axiom furnished from the laboratory, geology affords numerous examples of resumption of growth after an interim of millions of years, and also indicates that crystals formed by one process may continue their growth by another and completely different one. Thus quartz found in molten lava and crystallized from a fused mass surrounds itself with new matter and continues to grow when exposed to the action of silica in the state of solution, and an analogous instance is afforded by felspar. To this alternate cessation and resumption of growth is due the formation of "zone" crystals, in which successive shells of different colour and appearance have been incorporated, as may be frequently observed in the colourless shell surrounding a crystal of the amethyst variety of quartz. The growth of crystals, as in the case of animals and plants, is powerfully influenced by prevailing circumstances, and in the mineral kingdom the principal factors to be considered are the temperature, the rate of deposition, the supply of materials and the presence of foreign bodies in juxtaposition. Recent investigations have shown that the presence of infinitesimal traces of some foreign bodies like water, fluorides, etc., may produce marked modifications of crystalline form, and although not entering into the composition of the crystals, appear to be necessary to that function. Hence they have received the appellation "mineralizers," and may be viewed as analogous to the diastase and ferments of the organic kingdoms. This action sometimes makes itself evident in the change of habit in the system, for instance, growing alum crystals pass from the octahedral to the cubic form if a trace of carbonate of potash be added to the solution, and it is remarkable that the crystals do not increase in measurement until the cubic form is assumed. The differences in colour produced within the crystals by surrounding influences may be very marked or comparatively trivial, and the zones of colour sharply defined or almost imperceptibly intermingled. Changes in rate of growth may be indicated by the formation of irregular cavities within the crystal, filled with gas, liquid or vitreous substance, according to the origin of the crystals from volatile vapours, solution or a fused mass. These characteristics were beautifully illustrated by the lecturer by means of specimens, diagrams and microscopic sections of crystals. A specimen of leucite was shown in which the original crystal had been corroded by the action of solvents, and the dissolved portion partially replaced by foreign amorphous matter during further growth. Another leucite crystal contained a ring deposit of hornblende, an augite crystal showed deposits of felspar and magnetite, whilst the presence of oxide of titanium had been established in a specimen of mica. In most cases Professor Judd pointed out that a succession of zones in a crystal is produced only by substances having analogous composition, as by the further growth of a chrome alum crystal in a potash or ammonium alum solution; but it is not necessary that the constituents of such a crystal be absolutely isomorphous, as is shown by the shells of red tourmaline frequently found surrounding green tourmaline. Further, the monoclinic augite sometimes forms compound crystals with the rhombic enstatite, cleavage cracks passing through both substances alike. It is evident that this intergrowth is not due to similarity of crystalline form, but to analogy in chemical composition, and similar instances may be cited of compound crystals of calcite and sodium nitrate, and of red zircon (a silicate of zirconium) with yellow xenotite (a phosphate of cerium and yttrium). At this stage of the lecture Professor Judd also exhibited various varieties of quartz, including a capped specimen, in which a zone of foreign material had formed a plate of weakness that rendered the detachment of a "cap" easy, and specimens of cotterite and red and amethyst quartz, in which the characteristic appearances are due to the occlusion of carbonate of iron and its subsequent partial or total conversion into oxide. The second property of crystals to which the lecturer made reference was the capability of repairing injuries during subsequent growth, and this part of the lecture was introduced by the experiments of Frankenheim of mutilating crystals and watching their further development under the microscope. The question how far by artificial mutilation particular forms can be given to crystals was next considered, but so much contradictory evidence exists that Professor Judd was able to make very few definite statements. In 1851 Lavalle showed that by cutting off one corner of an alum crystal and placing this mutilated side downwards in an alum solution, the crystal resumes growth, but always retains a plane representing the artificial surface. On the other hand, in 1881 Loir showed that if injuries to a crystal be not too deep they will heal themselves before further growth of the crystal occurs, and by experimenting with alum crystals, he found that mutilated surfaces added new material more rapidly than the sound. As illustrations of such aftergrowth, Professor Judd exhibited microscopical sections of sand-grains and of secondary outgrowths in hornblende. These considerations led to a comparison of the inorganic with the organic world. Only the rhizopods, corals, etc., of the animal kingdom are capable of reproducing themselves from portions cut off from their bodies, but in the vegetable kingdom instances of this nature are very numerous, whilst in the inorganic world the minutest fragments are capable of resuming growth after any interval of time has elapsed. A third property of crystals referred to by the lecturer is that "two crystals of totally distinct substances may be so intergrown as to occupy the same space, or rather, to occupy space between the same planes." A familiar example is the Fontainbleau sand, into the composition of which 40 per cent. of calcite enters without altering the crystalline structure. Professor Judd also exhibited a specimen of orthoclase intermingled with quartz, in which each constituent might be said to form the crystal, since both optically and in its principal features it was a perfect crystal of orthoclase on the one hand and of quartz on the other. Owing to this property or tendency to retain a certain crystalline form, a crystal may undergo profound internal changes, affecting optical and other properties, but so long as portions of the original remains it is still capable of repairing injuries. These internal changes may be brought about by the solvent action of exterior agents, which leads to the permeation of the crystal by liquids and formation of cavities (negative crystals) filled with products of decomposition. This solvent action is well illustrated by the appearance of negative crystals, or ice flowers, in a block of ice when a beam of light is directed through it, and the Schiller structures in labradorite are also of analogous nature. The appearances of cloudiness and opalescence, and the play of colour and reflections at certain angles observed in some crystals are due to such internal alterations having taken place along certain planes by operations of this kind. All these three properties of crystals, Professor Judd said, are represented in the structure of granite, which was really the text of his lecture although not delivered until its conclusion. In a section of tertiary granite from the Isle of Mull, Professor Judd pointed out the intimate incorporation of quartz and felspar and the evidences of the struggle for dominion between these two constituents exhibited in the druses or internal cavities.

SOCIETY OF CHEMICAL INDUSTRY.

London Section.

A paper was read by Mr. W. C. Young, entitled "On Standard Sperm Candles," before the Section on Monday, the 2nd inst. It was chiefly composed of the records of repeated experiments on the illuminating power of standard candles of various makers, and with wicks showing slight differences in structure. The author's general conclusion is that the ordinary standard candle gives a fairly trustworthy result, the variations observed being not too great to incapacitate it for use for commercial purposes. He is unfavourable to its displacement by more modern and accurate standards, urging its simplicity, readiness for use, and fitness for the needs of comparatively unskilled persons. Added to this its portability, and the fact that on a test being disputed, the actual candle used can be again employed by another observer, are points in its favour.

The discussion turned on the advisability of seeking to replace the sperm candle with a better standard.

Dr. Alder Wright touched upon the question as to whether the composition of the so-called sperm candle was approximately constant.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At the last meeting of the executive of the Chemists' Assistants' Association, the following resolution was passed:—

> "That this Council desires to express its deep sense of the loss which it has sustained by the sudden death of its Honorary Secretary, Mr. E. Richards. At the same time it would place on record the high esteem in which he was held by the Council and members of the Association, during the two years in which he performed the responsible duties of Financial Secretary, with marked ability and indefatigable energy."

It was decided also that a fund should be raised amongst the members and friends of the Association with a view of presenting the family of the late Mr. Richards with some testimonial of his services. Subscriptions for this purpose will be received by the President or Secretary of the Association at 103, Great Russell Street.

Electro-Chemistry.

BY T. A. ELLWOOD, A.I.C., F.C.S.

(Continued from page 634.)

In the formation of a salt, a certain amount of chemical force is absorbed which is retained in a latent form, being necessary to keep the salt chemically combined. Now in order to decompose it we must employ an opposing force strong enough to overcome this; or, accepting the theory that the salt has both a basylous or positive and an acidulous or negative radicle, we must employ such a power that they will be severed the one from the other, as their combination offers a resistance to the separation. Though this seems simple in theory experiment proves that the reactions taking place in the electrolyte bath are far more complicated. The actual changes taking place in the electrolysis of water is still a phenomenon needing solution. The primary interpretation is that it is simply a direct separation of ions, thus: $H_2O = \underset{+}{H_2} + \underset{-}{O}$.

It has been proved, however, that simple separation of the ions is not even usually the case, but that intermediate stages of electro-chemical action takes place. The investigations of De la Rue and others tend to prove the probability of the decomposition of water being into hydrogen and hydroxyl. It is also questionable whether water is an electrolyte at all, but that the acid or salt present is the electrolyte and by their decomposition the products decompose the water. The following is an illustration of the probable electrolysis of sodium sulphate:—

1. $\underset{\pm}{Na_2SO_4} = \underset{+}{Na_2} + \underset{-}{SO_4}$.

2. $Na_2 + 2H_2O = 2NaHO + \underset{+}{H_2}$.
$\qquad\qquad\qquad\qquad -$

3. $SO_4 + H_2O = H_2O = H_2SO_4 + O$.
$\qquad\qquad\qquad\qquad + \quad -$

Thus both hydrogen and oxygen are produced at the anode. The intermediate reactions are obvious from the equations.

The process of electro-plating in gold, silver, nickel or copper, is very familiar, hence I will not burden you with long descriptions of the same. It was formerly performed by the use of batteries, and even now the battery is in extensive employment in small operations. In large establishments the dynamo is always used, in Birmingham, Sheffield and Clerkenwell some scores of these machines are engaged in the work. The driving of them is performed by means of gas or steam engines, according to the power required by the machine employed, which depends upon its size and efficiency.

The electrolyte usually consists of a double cyanide, which is the salt most easily decomposed by the current; also, being very soluble it gives an even coating to the articles under operation. In all instances it is necessary to have the articles to be plated perfectly clean, to ensure equal deposit, and also their connection with the kathode must be such as to form a good contact for the passage of the current. The finishing is performed by polishing with the jeweller's match-brush.

The thickness of the coating is ascertained by noting the strength of the current and the time of immersion in the bath, thus the quality A B or C is regulated according to the amount deposited.

Articles can be coated with tin in this manner, but the method will not compete with that now adopted, namely, dipping the clean iron sheets into melted tin, upon which is a layer of oil to prevent oxidation, and then manufacturing the articles from the tin plate. Hence the electro-plating of goods with tin is not likely to prove a commercial success at present. The only advantages claimed for it by its advocates are first:—the articles can be made before turning, and so there are no untinned edges exposed. Secondly, there is no waste of tin on the scrap rejected, which means that the scrap can be used for resmelting, and thus worked over again; and thirdly, much less tin can be used in completely coating than by the dipping process. But as the amount of tin upon the plate is regulated by, or rather regulates the price, the latter claim is useless as an estimate of the advantages of the electrolytic process.

Iron can be deposited from its ammonia salts by the electric current, and electro-deposited iron has been recently recommended for use in the detection of arsenic, as owing to its purity (freedom from arsenic) it may be employed for the generating of hydrogen in Marsh's test. Beyond this the demand for such a product is very small indeed, and its price will preclude its use in any commercial undertaking.

Copper.—Besides electrotyping by means of copper solution, and the use of electricity in obtaining copper from its ores, to which I have referred, we have the Elmore copper depositing process, which has recently been attracting considerable attention. The object of the process is to precipitate or deposit a pure copper of high conductivity from the solution of the sulphate; also for the depositing upon a rotating mandril copper tubes, which would thus be seamless, the hardness being imparted by means of an agate burnisher, having a few pounds pressure, which is in continual operation from one end of the kathode to the other; by this means a high tenacity and great malleability are imparted to the deposited copper. Wire is made from the copper cylinders, by cutting from them spirally a continuous strip, which is then drawn directly to the required diameter, without remelting or heating, and owing to its purity can be drawn as thin as silk. The patentee claims that wire so obtained, compared with the usual standard, has an electrical conductivity of 102 per cent., whatever that may mean.

Aluminium.—This element, possessing such valuable properties for the manufacture of machinery, is a highly lustrous metal, white, with a faint tinge of blue, resists the action of the air and moisture even at high temperatures, is not blackened by exposure to the action of sulphuretted hydrogen or alkaline sulphides, is not attacked by fused nitre, nitric acid or sulphuric acid, although it dissolves readily in hydrochloric acid or free alkalies; it also possesses great tensile strength compared with its specific gravity (2·5), and is very sonorous. Its production at a cheap rate has been a study for experts in metallurgy for a considerable time, but there yet remains to be discovered a satisfactory process. The wide distribution of the element in nature justifies a continued research by investigators. In the field electricians are not at all behind. When several years ago the Oldbury Aluminium Company, having acquired the right of Castner's process for the extraction of sodium, and the invaluable services of Sir Henry Roscoe as their consulting chemist, commenced operations in the chemical production of aluminium with a flourish of trumpets, much was expected from them. Everything appeared in their favour, cheap sodium, cheap chlorine, cheap coal, plenty of ore, and several valuable patent rights. What is the result? The present year has revealed they do not obtain the metal in a pure state, the demand for their article is small, they cannot compete with the electrolytic methods.

Of the numerous electrolytic methods patented, but few are in use, and some of these do not produce a pure article, but very valuable alloys, the most important being the Cowle's process, as carried on at Lockport, U.S.A., and Milton, near Stoke-on-Trent, the latter firm possessing and working the largest depositing dynamo in the world, absorbing 500 horse power for its full load. The process consists in the application of heat produced by the working of the dy of 5,000 ampères by an electro-motive force of 50 v and conducting it in the furnace by means of carb terminals containing a mixture of the oxide aluminium and carbon with any other substance wi which it is desirable to form an alloy. In its produc tion of aluminium alloys the value of the process present consists, the energy required to produce o pound of aluminium being about 18 horse power p hour. Professor Hampe contends that the reaction in two stages, the first being electro-thermic, in whic the ore melts, the second, electrolytic, in which t alumina parts with its oxygen, $Al_2O_3 + 3C = Al_2 + 3CO$.

Cannot a cheaper and more efficient method th this be devised? I think it can, and some ard worker will discover a process whereby the full ben fits of cheap aluminium will be derived. For instanc could not some electrolyte be found to act upon th ores of aluminium acting as an anode, such electrolyt to admit of easy decomposition by the current, th depositing the pure aluminium upon a suitable ka thode?

A further interesting study of the application electro-chemistry, but still in a metallurgical directio is the isolation of the precious metals from their

All the electric methods at present suggested are either a failure or unable to successfully compete with existing mechanical processes, thermal or chemical. One of these methods, for which a patent has been granted, is as follows. The finely pulverized material is allowed to subside in a bath consisting of a mixture of a saturated solution of any suitable iron salt with one of tungstate of iron. Into the deposit a kathode is introduced, the iron anode being in the solution and out of contact with the precipitate, and an electric current is passed with the object of coating the particles of noble metals with iron, when they may be extracted from the residual matter by a magnetic separation.

The iron may be subsequently removed by acid or by roasting. The electric methods, however, generally employed consist in a double electrolysis, the current first decomposing common salt producing chlorine which, acting upon the gold, forms a soluble trichloride: and then from the auric chloride depositing the gold upon the kathode.

How far electricity can be used for the preparation of the non-metals on a convenient scale remains to be proved, but already a method has been devised and patented by Messrs. Robinson and Parker for the preparation of phosphorus direct from bone ash, using a suitable electrolyte. The patentees claim that it is a cheaper method than the chemical one, without its many objections. A factory is in course of preparation in Wolverhampton for the working of the patent.

Electric Bleaching.—We have observed that it is easy to prepare oxygen by the electrolysis of water; hence, why should not this method be used for producing it in a nascent form for use in the arts? When we consider that the great reagent used for bleaching has for years been chlorinated lime, its usefulness consisting in the ease with which it liberates chlorine, which again reacting upon the moisture liberates oxygen in a free state to oxidize, and hence to bleach the articles under its influence, we are led to seek an alternative method, at the same time cheap and effective, by which we can continue our work in case the supply of chlorinated lime should fail.

The failure of the supply of bleaching powder we are seriously theatened with, inasmuch as hydrochloric acid, which forms the chief chemical employed in its manufacture, is the first product of the Lablanc soda process, and this is now being largely competed with by the ammonia process, which bids fair to outrival it. Chemists need therefore be prepared for any emergency that may arise. The preparation has been made by the working of an electrolytic means of producing chlorine and oxygen for bleaching purposes. M. Hermite in March, 1886, patented a method for producing ozone for bleaching, stating that he "has found (what was previously known) that when the sulphates of the alkalies or alkaline earths are subject to electrolysis, using any unattackable or uncorrodible positive electrode and an amalgamated negative electrode, ozone or ozonized oxygen is produced at the positive pole. If the apparatus be short circuited hydrogen is evolved." These reactions are made the source of ozone for bleaching. The same apparatus, or a modification of it, can be used for the production of chlorine from chlorides of the alkalies or alkaline earths, preferably magnesium chloride, whereby goods can be bleached by similar reactions as from chlorinated lime. Suitable mechanical apparatus is easily devised, and these processes can be used commercially. If a dynamo is employed for electrolysing, the scale upon which it can be conducted is equal to that wherein bleaching powder is the factor. Messrs. Cross and Bevan (*Journ. Soc. Chem. Ind.*, vol. vi., p. 171) state, "The bleaching efficiency of the electrolysed solution is considerably in excess of that of a solution of calcium hypochlorite of the same oxidizing efficiency measured by means of an alkaline solution of arsenious acid."

The testing and using of the solution thus produced should be while it is still fresh, as it deteriorates considerably on keeping, which is but what would naturally be expected with solutions of hypochlorous acid, chlorine, ozone or oxygen. The chemistry of the process may be represented by the equations $\underset{\pm}{MgCl_2} = \underset{+}{Mg} + \underset{-}{Cl_2}$. But since magnesium is an element which decomposes water we have a further reaction taking place $Mg + 2H_2O = MgH_2O_2 + H_2$. Still another reaction results, as will appear from those already shown, since we have an alkaline solution produced, simultaneously with chlorine, hence $2MgH_2O_2 + 2Cl_2 = MgCl_2O_2 + 2H_2O + MgCl_2$.

These reactions probably only show a part of the complications taking place, and of the work done by the current, for Dr. Hurter asserts that higher chlorinated compounds of magnesium are found, especially the chlorate; these equations, however, are quite sufficient to illustrate my purpose. Of course you will at once see that other changes must take place if the solution is hot.

In all electro-chemical processes, if the cost of working and production is not within reason of its being able to compete with existing methods of placing the same article on the market, such a process must be deemed a failure. Electrolytic bleaching, Messrs. Cross and Bevan calculate, will compete favourably with the chemical production and subsequent use of bleaching powder. On the other hand Dr. Hurter declares that its present possibility to supply bleaching solutions at anything like a marketable price is entirely out of the question. I have made inquiries of those who have experimented on a large scale with this process, and have seen a couple of dynamos which were put down for the work, but which had to be removed, as it was not advantageous to use them. Whilst recognizing the efficiency of the work accomplished and the results obtained, I think that it is more likely to prove a financial success only in countries where bleaching powder is at a much higher figure than in England. It might possibly pay to work it in America.

The English electric agents for this process of M. Hermite are Messrs. Paterson and Cooper, of Dalston, but hitherto the demand for dynamos for working it has not been very great.

(*To be continued.*)

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, January 22, Mr. F. F. Riches in the Chair.

A paper was read by Mr. T. J. Roberts on "Vegetable Mimetism," giving numerous illustrations of the close resemblance many plants assume to other natural objects, such as insects, stones, etc., and the theories that have been put forward to account for such mimicry.

The paper was followed by a discussion in which the Chairman, Messrs. J. Ince, Browne, S. A. Sturton, Davies, Dunning, Taylor, Sturch, White, and the Secretary took part.

Mr. F. A. Hocking, Reporter on Pharmacy, then read a paper on "Emulsions," giving practical hints for the successful manipulation of various types of emulsion, such as volatile or fixed oils with gums, yolk of egg, or alkali, and concluding with remarks on the suitability for these purposes of various gums now in commerce, and supplied from the Museum by Mr. Holmes. Some arabic gums from the Cape, sold at £10 to £12 per cwt., were found to be quite equal for emulsifying purposes to the best gum arabic at 6*s.* to 7*s.* per pound.

A discussion followed in which the Chairman, Messrs. Elliman, Roberts, Plowright, S. A. Sturton, J. Ince, Davies, Browne, and F. Sturton joined.

After a short discussion, originated by Mr. Morley, on "Lime Juice and Glycerine" the meeting adjourned.

A meeting was held on Thursday, Feb. 5, Mr. W. F. J. Shepheard, Vice-President, in the chair.

A paper was read on "Explosives" by Mr. Stanley A. Fox, who described the composition, properties, and manufacture of ordinary gunpowder, gun-cotton, and nitro-glycerine, with the many special explosives of which these form the basis, *e.g.*, dynamite, blasting gelatine, litho-fracteur, smokeless powders, etc. The fulminates used for detonating were also explained, and the great difference in the results when explosives of the nitro class are detonated or are merely ignited.

The paper was followed by a lengthy discussion, in which the Chairman, Secretary, Messrs. Patchitt, Browne, Taylor, Garnett, F. Sturton, S. A. Sturton, Riches, Dunning, Donington, Whitworth, Harrison, and Davies took part.

After a short discussion on miscellaneous business the meeting adjourned.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The usual meeting of the Association was held on Wednesday evening, February 4, in the Waterloo Rooms. The minutes of two previous meetings were read and sustained.

The President said Mr. Rutherford Hill is comparatively well known to you and hardly needs an introduction, having attended one or more meetings during each of the last two or three sessions. He is full of practical sympathy with such associations in their various fields of activity. To-night he (Mr. Hill) proposes offering some suggestions to a class which is very much to the front and very much catered for just now. Examination is the portal by which almost every walk of life is entered, and without study it is impossible to pass these portals. Many teachers of various kinds are anxious to help the student in his efforts. The teacher proper would make him pass through a course of study in the various subjects, so that he might be thoroughly furnished on all hands. The "grinder" desired to put an edge on his information, so that he might be successful in his encounter with the examiners. Another wished to "cram" him with just enough information of the exact kind to fit him at a little cost in time and money to satisfy any reasonable (or even unreasonable) examiner, which is all that is needed, because really he is quite capable of carrying on business just as he is. Mr. Hill is not connected with either or any class of teachers, but his position brings him into contact with students at a time when they hope to be done with one part of their studentship—for even professors should be students—and become graduates. He has no doubt come across cases where failure instead of success was the result of these efforts. With an observant eye and reflective mind he had doubtless come to some conclusions as to how these failures came about, and by similar observation and reflection on success, he has formed some opinion as to how failure might be made less frequent and success more certain, which we are assured is what our examining body devoutly desires. For all present some useful hint was sure to be found in Mr. Hill's "Suggestions to Pharmacy Students."

SOME SUGGESTIONS FOR PHARMACY STUDENTS.

BY J. RUTHERFORD HILL.

When at the beginning of your session I received an invitation from your Secretary to contribute something to one of your meetings, I felt that the question was one requiring serious attention. I felt that those who had associated themselves together in this Society in Glasgow were doing a good work, and deserved the goodwill and cordial support of all who had the interests of pharmacy in Glasgow at heart. It appeared to me that, though there was not much I could do, I could at least show my goodwill, and that explains my presence here to-night.

It was necessary that I should give some title to what I had to say, and in despair I chose the one which appears in your syllabus. I desire to avoid assuming the attitude of giving advice, for advice, like medicine, is usually nauseous. I am not to attempt anything ambitious, and seniors will forgive me if what I have to say should appear to them like carrying coals to Newcastle or bringing machinery to Glasgow. I desire simply to offer a few suggestions to students of pharmacy arising from my own experience and observation.

One question arises at the very outset, What is a pharmacy student? I find that term is very commonly limited to a young fellow who has gone to a school of pharmacy for a special grind up in order to pass his examinations. I regard that as an erroneous view. In the proper use of the phrase a lad in the first day of his apprenticeship is a pharmacy student. I ought to assume that such a lad has passed the Preliminary examination. If so, then it is eminently desirable that he should at once apply his knowledge of Latin to the reading of prescriptions. For this purpose the ordinary prescriptions in the prescription book answer very well, and in addition he may use Pereira's 'Selecta è Prescriptis.' By this means he keeps up his knowledge of Latin grammar, which most students seem to forget in a few years. Moreover he will find that when the stress of work for the Minor is upon him he does not need to waste time in getting up prescription reading, for he has it at his fingers' ends. Most students make the mistake of leaving this subject till a month or two before the examination, and then it becomes a heavy, irksome task. Of course students should accustom themselves to reading the prescriptions in unabbreviated Latin. I would also suggest the propriety of keeping up and perhaps extending one's knowledge of arithmetic and mathematics. The science of chemistry is rapidly becoming a department of mathematical science, and hence the high value of this knowledge to a pharmacy student.

And now I come to speak of the two sciences which lie at the very foundation of the pharmacy student's work. I refer to chemistry and botany. While a knowledge of these sciences is indispensable to a successful pharmacist, I should like to utter a word of warning, for I have found that many neglect opportunities of learning till they have had an opportunity of studying chemistry and botany. Let me say that is a mistake. Never miss any chance of learning all you possibly can. Be always watchful and you will find you can gather a great mass of general information which falls into place and becomes thoroughly clear and intelligible only after you have studied chemistry and botany, but you have gained immensely by these years of careful observation.

It is not my intention now to dwell upon the question of lectures on the various sciences. I would only say that everyone who can, should attend courses of lectures. They are eminently useful, and a certificate of having attended them sometimes has quite an unforeseen value. I have seen this exemplified again and again.

In the study of chemistry, which includes physics, of course books must be resorted to in the first instance. It is needless that I should say much as to what books should be used. We are so well supplied now-a-days that no one needs to be at a loss. But I would suggest that pharmacy students should as far as possible carry out practically every chemical operation dealt with in the books. It is not necessary to have expensive apparatus. Very good work may be done with very simple apparatus, and it is a good plan to depend largely on one's own resources, for the devising and construction of the apparatus is itself a useful education. I find a great many students read all about elementary gases, their properties and combinations, but they never attempt any practical work because of an impression that complicated and expensive apparatus is required and the operations are very difficult. Here I have an ordinary soda-water bottle and a tumbler, with which I construct a serviceable pneumatic trough. Here I have a test tube containing chlorate of potassium and manganese dioxide. With a perforated cork I adapt a piece of common glass tubing to the test-tube, which passes under the mouth of the inverted soda-water bottle. By this spirit lamp I heat the contents of the test-tube and immediately oxygen gas is given off and collects in the bottle till it is one-third full. I now disconnect the test-tube and attach to the glass tube an ordinary dispensing phial containing zinc and diluted sulphuric acid. Hydrogen is at once liberated and passes into the bottle, which is now full of a mixture of the two gases. On applying a light you have an illustration of the heat and light and explosive violence by which the chemical union of the two gases to form water is accompanied. Thus with the greatest ease and by the simplest apparatus we have performed an experiment which is full of meaning to the student of chemical science and the performing of the experiment fixes the facts indelibly on one's mind. Much of the best work in chemistry has been done, not by those who had splendid opportunities and elaborate apparatus, but by men, such as Scheele, for instance, who, with the most primitive appliances and in humble circumstances, made investigations into the constitution of organic bodies of such extent and importance that, by general consent, he is regarded as the father of organic chemistry. And here I would suggest the great importance to every pharmacist of a knowledge of organic chemistry. Many of the recent additions to the materia medica are of such a character that if we are to maintain our position in dealing with intelligent medical practitioners, and even with the public, we must have a knowledge of their chemical constitution and properties. The study of organic chemistry is dry at first, but once one grasps the outlines and sees how the various bodies are related to one another, it becomes quite a fascinating subject. In the study of physics and the construction and uses of physical apparatus it is also wise to do as much practical work as possible. One sometimes sees a man who has *read* all about a thermometer. You ask him to take the temperature of a liquid which is at say 30° F. while the atmosphere is at 60° F. He inserts the thermometer and *immediately* reads off the temperature, without waiting till he sees it standing stationary in the liquid; or he inserts it and then pulls it out to look at it, forgetting that the mercury immediately begins to change when it is removed. Or if you ask him to state the temperature of the atmosphere he will grasp the thermometer by the bulb, forgetting that he is thereby recording the temperature of his own body. You say of such a man that he may know all about the theory, but he knows nothing at all about the practice, and therefore his reading has been to very little useful purpose.

With regard to botany, while books must be studied, it goes without saying that no man can be a botanist without the practical examination and study of actual living plants. In a town like Glasgow, and with such hours as chemists generally have to endure, it is difficult to get away from the buildings and smoke to the fields and lanes and woods where specimens are to be found. But let me suggest that for a few pence you can procure from any ordinary florist's shop in Glasgow a sufficient supply of fresh specimens to admirably serve your purpose. And then when a chance of getting off to the country does present itself make full use of it. Do not stay to study the specimens on the spot, but rather collect as many as the time will allow, and study them with the aid of such books, for instance, as Hayward's 'Botanist's Pocket Book' or Holmes' 'Botanical Note Book,' on your return to town. Then, again, I find that to many students the department of vegetable histology, or the microscopic structure of plants, is a very dry and heavy subject. The reason for that is that it is mere reading and memory work, because they never use the microscope or try in any way to actually see the structures they are reading about. I notice that recently you had a paper by Mr. Gilmour on the microscope. A knowledge of its practical application in botany and pharmacy is of great importance to pharmacy students, and you will have observed that it is to be introduced to the pharmaceutical examinations. I can well remember that I had read all about the microscopic structure of plants before I had used a microscope. The first instrument I got possession of was a very simple one, just like the one I have here, and it cost me 10*s*. 6*d*. But the first time I used it I felt as if I had been introduced to a new world. What before had been a dreary desert of hard meaningless names became a fascinating amusement, and with that simple instrument I found it possible to go through almost the whole range of vegetable histology. You may read about some characteristic structure fifty times and forget all about it, but to see it once is to remember it always. In order that all may appreciate what I say, I have placed under this small microscope a section of the petal of *Deutzia scabra*, showing exquisitely beautiful stellate hairs. Under this larger instrument I have placed a section of the pseudo-bulb of an orchid, showing starch grains *in situ*; and under the third microscope is a living specimen of *Nitella*, showing that peculiar motion of the protoplasm known as *cyclosis*. A practical knowledge of botanical science lends a new enchantment to a country ramble, and enables us to sympathize with the poet who says:—

"As forth I go upon my way a thousand joys are mine,
The clusters of dark violets, the wreaths of the wild vine;
My jewels are the primrose pale, the bindweed and the rose,
And show me any courtly gems more beautiful than those."

As I have already said the two sciences just referred to lie at the foundation of all our work as pharmacy students. Some slight knowledge of geology and mineralogy is useful, though not essential, and for the few animal substances used in medicine a slight knowledge of zoology is required, but I do not dwell further on these. The pharmaceutical botanist immediately becomes a specialist. He applies his knowledge of botanical science to the study of the history, sources, production, characters, and constituents of the vegetable substances used in medicine, and this special application of botanical science we know under the general heading of materia medica. In this study the book and the specimen should always be before us at the same time. Avoid what is commonly known as "spotting" the specimen by such accidental features as size, shape, or even colour. Look always for characteristic features as detailed in the book, and then you will be able to identify a specimen which you have never seen before. And here again be as practical as possible. For instance, you ask a pharmacy student how he would proceed to detect starch in scammony. He says he would mix a little with water and add a little tincture of iodine. You tell him that would give no reaction, and he looks nonplussed. You remind him that the scammony must be boiled with water, and he immediately says, "Oh, yes, I forgot." Then you ask him to say again what he would do. He says he would boil the mixture and then add iodine. Again you say there would be no reaction and the poor fellow looks hopeless. You remind him that the decoction has to be cooled before adding iodine, and then he sees what a mess he has made of his description. All this is because he has only read about the test, but never tried it practically. Then again it is interesting to see beautiful acicular crystals of sulphate of quinine; but it is a thousand times more interesting to see such crystals which you yourself have prepared from cinchona bark, and if you once perform the operation you never can forget how sulphate of quinine is made. Or, again, the official process for estimating extract of nux vomica looks complicated to read, and yet it is extremely easy to carry out, and once performed it is never forgotten. As in botany, so in chemistry, the pharmacist soon becomes a specialist. He applies his knowledge of chemical science to those multiplex operations, partly purely physical, but largely chemical, which are included under the general heading of practical pharmacy. Many students, I find, leave off the getting up of this department till a few months before the examination, with the result that it is too hurriedly done and is never fully grasped or permanently retained. A much more excellent way is to be always asking the reason why and always applying abstract knowledge to practical work in the pharmacy. Infusion of calumba is made with cold water. Why? Liniment of soap is made at a temperature not exceeding 70° F. Why? And so on.

And now with some general suggestions I draw these rambling remarks to a close. In your reading two points are to be observed. Let it be systematic. Reading snatches of a book or books at any point is useless. When you begin a book, mark always where you leave off, and resume your reading at that point, till you have steadily gone through it all. And also pass no sentence till you have grasped its meaning. It is an advantage, too, not to try too many things at once. Two or three at a time are as much as most students can do properly, and it is real economy to master these before going on to another. It is necessary to have more than one, so that you may have a change if you get wearied; but if there are too many you get distracted and none of them is well done. My next suggestion may seem needless to one with so little leisure as a pharmacist. It is never waste time; you will perhaps say you could not if you would. Well, at any rate, let every moment be turned to some useful purpose, and if the time is so scarce there is all the greater reason to economize. At the same time do not let life be one eternal grind. We must not forget to preserve the *mens sana in corpore sano*, and therefore every wise student will have seasons for recreation and healthy physical exercise. I find that many pharmacy students allow the thought of their long hours to act as a fatal embargo on their studies. They say they are too tired at the end of the day to think of study and pass their time in a mournful dream of some future time when circumstances will be more favourable. That is a mistake. It is not the men who have the best hours who turn out the most accomplished pharmacists. Try to forget the long hours and do the best you can, and you will soon wonder at your own progress. I know what long hours are, and I speak from experience. Other students allow the burden of their studies to weigh upon their minds so heavily that they always have the appearance of persons sentenced to be hanged. That is a bad policy, and it lightens the inevitable task immensely to face it hopefully and go through it with a hearty good will. One gets over the ground with astonishing facility when he works with a determination to win. I often find, too, that when I ask students if they are coming up for examination they answer in the affirmative; but if you ask when, they can give no definite reply. They intend coming when they feel themselves ready. Such vagueness is unwise. It helps to consolidate your work and bring it to a successful issue to fix a date for the examination. Be it six months or a year, fix the date and resolve that, come what may, you are to appear for examination at that time. If you do so you will find, in ninety-nine cases out of a hundred, that the day comes, the candidate is ready, and the examination is successfully passed.

Many promising men, for want of such definiteness, have put off and put off till their opportunity has passed, and they seem likely to put off till the end of time. I would also say that I never like to hear a pharmacy student asking the question *cui bono*? or always looking for the *quid pro quo*. Look well rather to the work in hand and the future will supply a satisfactory solution of all such questionings. You are laying a foundation. Let that be well done and then the superstructure will be noble and worthy. I hear some men say they want only just as much information as will squeeze them through the qualifying examination. Such policy is the very height of folly. They are laying a "shoddy" foundation, and the future career that is to be reared upon it will be like it. Lay the foundation broad, lay it deep, lay it strong, for, mark my words, once it is laid it never can be altered. Let us remember too that the competition of modern life is essentially a competition of intellect, and he who is best furnished intellectually is most likely to hold his own, and it is truer to-day than ever it was before that knowledge is power. Do not run away with the idea that mere scientific knowledge is enough. There are three qualities, it has been well said, essential to the successful pharmacist. He must have the business tact which can only be acquired by years of experience behind the counter; he must have common sense, without which all scientific learning is in vain; and he must have that abstract knowledge which is acquired by the curriculum necessary for the passing of the pharmaceutical examination. I am also strongly of opinion that every pharmacist should aim at passing the Major examination. One other step beyond the Minor is all that is needed, and no man of average ability need fear the hazard. I am convinced that the Major examination is well worth passing for its own sake, and the additional knowledge thus acquired is its own reward. Moreover I know of no more profitable way in which a man who has just passed the Minor can spend a year or two more of his spare time. Before I finish let me make one suggestion personal to yourselves. I think you ought to have in Glasgow a room of your own for meetings with a good reference library and a set of botanical and materia medica specimens. I feel quite sure you are well able to do it, and I would strongly urge you to consider the question. I would also like to say that I regard this Association as an institution of the highest value, and I earnestly hope all pharmacy students in this city will avail themselves of its advantages. You will allow me also to lay aside for a moment my official personality that I may say as a private individual that at an early period of my pharmaceutical career I joined the Pharmaceutical Society, and I have never for a moment regretted having done so. Ever since I entered the ranks of pharmacy I have been a reader of the *Pharmaceutical Journal*. I have criticized the Journal and I am not its apologist, but I am here to testify that I have derived incalculable benefit from the reading of it.

And now I have done. Some may think I strike too high a key and suggest aspirations too lofty for the average student of pharmacy. I have no such intention and have only made ordinary suggestions for ordinary men.

Mr. W. L. Currie said Mr. Hill's address had been interesting and not at all old. There were many points by which even those who had passed the first stage of pharmaceutical studentship were sure to profit. There were some points on which he did not agree with Mr. Hill. He thought it well, for instance, to have a good number of irons in the fire. He strongly approved of Mr. Hill's recommendation to fix a date for going forward for examination and working for that time. He was hopeful that something might be done towards procuring a home for the Association, and looked forward to its accomplishment before another session. He thought the members of the Association were much indebted to Mr. Hill for coming to address them, and proposed a cordial vote of thanks to him.

The President said the gist of Mr. Hill's advice seemed to be "avoid procrastination and combine practical work with reading." With regard to a place of meeting, he might say that the Association did not feel warranted, with the funds at its disposal, in going into any extensive undertaking. He had hoped that in conjunction with an employers' association something of the kind might be undertaken, but so far nothing had been done to bring about such a conjunction, He would ask them to cordially endorse Mr. Currie's motion.

This having been done, Mr. Hill briefly replied and the meeting separated.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held on the 30th ult., when Mr. F. W. Young lectured on "Putrefaction and Infection," being supplementary to a lecture delivered by him before the Association last year on "Putrefaction and Fermentation." Mr. Young briefly reviewed the previous lecture and recapitulated the experiments which had been made in connection with the phenomena of putrefaction and decomposition by Tyndall and others. He then went on to speak of the rise and progress of bacteriological science from the earliest experiments in Listerism down to the recent researches and achievements of Dr. Koch. The nature and causes of infectious or epidemic diseases were described, together with the media by which infection may be spread and diseases propagated. Drinking water and all food sources were shown to be potent agencies in the spread of infectious diseases.

The lecture concluded with some valuable hints on disinfection and general sanitation.

The thanks of the meeting were unanimously awarded to Mr. Young for his valuable lecture.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

The annual assembly was held in the Music Hall Buildings on the evening of Wednesday, February 4. The assemblage was brilliant. The ball room, which was draped and decorated with curtains, shields, mirrors, fairy lamps, etc., presented a very animated appearance, and the music was all that could be desired. About ninety couples sat down to supper in the Square Room, at 10.30, under the presidency of Mr. John Johnston (Messrs. George Reid and Sons). On the Chairman's right and left were Messrs. Cowie, Cran and Spence, the representatives of the junior Association. After supper the Chairman, in a few well chosen remarks, greeted the company, and Mr. Cowie, the President of the Junior Association, replied thanking the Senior Association for providing such an excellent entertainment. Dancing was thereafter resumed and kept up with zest till about 3 a.m.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

At a meeting of the above Association, held on Friday evening, January 30, Mr. W. Gill, Hon. Secretary, in the chair, a paper was read by Mr. A. Eberlin, on "Yeast and Alcoholic Fermentation." The paper, which was of a very interesting and instructive nature, was illustrated by specimens under the microscope.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

At the last meeting held on Thursday, February 5, Mr. F. C. Larkin, F.R.C.S., delivered a most interesting lecture upon "Some Methods of investigating the Physiological Action of Drugs."

The lecturer traced the action of various drugs such as quinine, chloroform, ether, chloral, opium, etc., upon the corpuscles of the blood and upon the tissues generally; and explained the methods adopted for the study of poisonous drugs, particularly upon the blood corpuscles and the ciliæ of the bronchial vessels, by means of the warm stage of the microscope. He also explained and exhibited the various delicate instruments employed for registering the tracings of muscle and pulse movements, and the action of drugs upon them. The lecture was illustrated with the aid of the limelight.

The next meeting will be held on February 19, when a paper will be read by Mr. Ed. Davies, F.I.C., on "Alcohol as a Chemical Study."

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the thirteenth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on Wednesday, February 4, at 9.15 p.m., Mr. A. R. Bennet, Ex-President, in the chair.

The minutes of the last meeting having been read and approved, an interesting paper was read by Mr. H. G. Parker on "Kola—the New Dietetic," in which he sketched the history of the nut, pointing out its importance as an article of diet, and in warlike and social customs among the natives of South Africa. He then reviewed its therapeutic uses, and concluded by comparing it with tea, coffee, and guarana. Mr. Parker showed specimens of the nut as found in commerce.

Mr. G. V. Wright then read a preliminary note on "Tincture of Kino," in which he reviewed the work done with reference to gelatinization of the tincture by previous workers. He next described the different methods of preparing the tincture which he had adopted with a view to determine their relative value as regarded the keeping qualities of the tincture. He had been led to undertake the experiments because of an allegation that the official process did not, as was anticipated, avert the objection as to gelatinization. The time that had elapsed since beginning the work had proved insufficient to furnish any results worth recording, but he promised to submit a further report at some future time.

A discussion followed, and a hearty vote of thanks was awarded to the authors.

Parliamentary and Law Proceedings.

Action Against a Chemist.

At the Westminster County Court on Wednesday, before his honour Judge Bayley and a jury, Miss Lennox, an actress, sought to recover £50 as damages against Mr. Le Maout, a chemist carrying on business in Wardour Street.

The plaintiff's counsel said that on the 17th of December last the plaintiff's sister fainted at the Empire Theatre, and some sal volatile was sent for at defendant's shop. The plaintiff mixed the stuff with some water, and as it smelt strong she tasted it, and it burned her throat and caused her to be sick. One of the actors took her to the defendant and he at once gave her an emetic and then said the girl must have made a mistake and asked for ammonia, which the phial contained. In reality a boy fetched the stuff and not a girl. A doctor had to be sent for. The plaintiff was prevented from following her engagement for nine days, four of which she spent in bed. The boy who fetched the stuff denied that he said he wanted it to clean clothes.

The defendant said he was a Frenchman, and had been in business in Wardour Street for thirty-five years, and had never had any complaint before. He gave the boy ammonia because Frenchmen frequently asked for sal volatile and meant ammonia, and he told the boy it was for cleaning clothes. There was no difference in French in the names of the two compositions. The ammonia was sold as a "pick-me-up."

The jury returned a verdict for the plaintiff for £20.

Review.

SUPPLEMENT TO THE COMPANION TO THE LATEST EDITION OF THE BRITISH PHARMACOPŒIA, including the ADDITIONS, 1890. By P. W. SQUIRE, F.L.S., F.C.S., and A. H. SQUIRE.*

In a small "Supplement" to the well-known Companion, the authors have included the drugs, compounds, and preparations that have recently been made official in the Additions to the British Pharmacopœia. Many of them were already referred to in the "Companion," but they now find a place in this Supplement under their official names. Perhaps the most important feature in this pamphlet will prove to be the remarks criticizing and supplementing the official characters and tests.

Obituary.

Notice has been received of the death of the following:

On the 28th of December, Mr. William Cornish, Chemist and Druggist, Ditchling Rise, Brighton. Aged 76.

On the 24th of January, Mr. Sidney Smith, Chemist and Druggist, Budleigh Salterton. Aged 60 years.

On the 26th of January, Mr. Thomas Henry Hall, Chemist and Druggist, Ashley Colne Road, Burnley. Aged 26 years. Mr. Hall was an Associate of the Pharmaceutical Society.

On the 28th of January, Mr. George Howard, Chemist and Druggist, late of Royal Hill. Aged 77 years.

On the 28th of January, Mr. Thomas Edward Fouraker, Chemist and Druggist, Poreth Street, Exeter. Aged 55 years.

On the 29th of January, Mr. Charles Edwin Gilbert, Chemist and Druggist, Bloomsbury Street, Birmingham. Aged 55 years. Mr. Gilbert had been a Member of the Pharmaceutical Society since 1883.

On the 29th of January, Mr. William Greenhalgh, Chemist and Druggist, Pendlesbury, Lancs. Aged 60.

On the 31st of January, Mr. Edward William Brown, Chemist and Druggist, Highgate Hill, N. Aged 44.

On the 2nd of February, Mr. Thomas Turner, Chemist and Druggist, Market Street, Longton. Aged 52.

On the 7th of February, Mr. Robert Denzil Brown, Chemist and Druggist, Boughton Monchelsea, Kent.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Thornton, Grierson, Hesse, Inquirer, Redhead, Chemist and Druggist.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE DRAFT PHARMACY BILL.

Sir,—Whatever may have been the merits or demerits during the last decade of the oft quoted complaint that "The Society" does nothing for the trade, it must be admitted on all hands that an able and well directed effort is now being made for the future status and remuneration of our calling, and if those who do not belong to the Society do not now join and lend a hand they will amply deserve to be limited to the miserable pittance of a chemist's petty retail for the rest of their days.

To enlist the interest of these outside critics, I think to obtain the best practical result a personal canvass should be made by the local secretaries throughout the kingdom, which would, I believe, effect more than any amount of editorials or official literature.

It is very essential that the proposed Bill should pass with as little friction as possible, and without being altered beyond the recognition of its parent, and as an aid in effecting this the suggestion made by one of your correspondents is I think a most excellent one, viz., that in view of the approaching election all candidates, whether they be Unionists or Disruptionists, should be interviewed on the subject by the local secretaries of the various constituencies, and if the Bill is likely to be introduced during the present Parliament let the members be approached in the same way. I do not suppose many seats would be placed in jeopardy by the loss of the "pharmaceutical vote," but if the scheme were energetically worked, it would be the means of thoroughly ventilating the matter in the proper quarters, and doubtless make success an absolute certainty. The Bill is, I believe, certain to pass, from the energy and ability with which the President is conducting the campaign. It would be, however, an immense advantage for him to have the chemists of the country at his back *en bloc*, when it would be but a question of a short time for our present hybrid calling to be placed upon a proper statutory basis. G. W. BULLEY.

SUGAR IN IPECACUANHA ROOT.

Sir,—Merck, in his annual report just issued, calls attention to the existence of cane-sugar in ipecacuanha root, which fact he states "has not hitherto been established with certainty." In a paper on "Liquid Extract of Ipecacuanha" (*Pharm. Journ.*, [3], xx., 253), by J. O. Braithwaite and myself, attention was called to the separation of a well-crystallized sugar which did not reduce Fehling's solution until after inversion. A portion of this sugar was presented to the Museum of the Pharmaceutical Society, and the remainder sent for examination to Dr. F. W. Passmore, who was at that time studying under Professor Fischer, but as he found it to be identical with cane-sugar no further communication on the subject was made.

My experience also confirms the statement of Merck, that the sugar is not found invariably in the root; in fact, its occurrence is rather exceptional than otherwise. This circumstance may possibly be attributed to the time of year at which the root is collected, rather than to different varieties of the drug, as suggested by Merck.

Southwark, London. JOHN C. UMNEY.

J. Farrant.—(1) *Tinctura Thujæ.* (2) We are not acquainted with this constituent. (3) A cow drink. (4) *Linimentum æruginis.*

"*Devonian*" is recommended to address his question to the editor of a medical journal.

A. Shaw.—Sulphosalicylic acid is obtained by the action of sulphur trioxide on salicylic acid, and also by heating salicylic acid with sulphuric acid.

W. Macintosh.—The questions set at the four Preliminary examinations in the year are printed in the Calendar of the Pharmaceutical Society, to be had from the Secretary, price 2s., post free 2s. 4½*d.*

C. Coulter.—*Marking Ink.*—"Nitrate of silver and bitartrate of potash, of each, ʒj.; Solution of ammonia, ʒiv.; Archil, ʒss.; White sugar, 3vj.; Powdered gum arabic, 3x. Rub the nitrate of silver and bitartrate of potash together, then add the ammonia, archil and other ingredients."

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* London: J. and A. Churchill. Demy 8vo., pp. 24. 1s.

PHARMACOPŒIA TINCTURES.

Of the galenical preparations contained in the British Pharmacopœia, the tinctures occupy a very prominent position both in number and importance. As compared with other similar preparations we find that whereas the decoctions number thirteen; infusions, twenty-eight; extracts, fluid and solid, forty-seven; syrups, fourteen; wines, ten; the tinctures are no fewer in number than seventy-two.

This preponderance in the number of tinctures is doubtless due to the superior extractive and preservative properties of alcohol over those of other menstrua; in fact, there are few drugs for the extraction and preservation of the active principles of which a more or less dilute spirit is not admirably adapted.

The tinctures may be taken as representing in a concentrated form the active principles of the drugs from which they are made, and are undoubtedly on the whole the most stable and reliable of all drug preparations. In view of the important position they occupy as a class of therapeutic remedies, it is of the highest moment that the utmost possible degree of accuracy and exactness as regards strength should be secured.

It must be confessed that in the past too little really practical work has been done on this subject, and consequently the methods employed in the preparation of tinctures have involved unnecessary waste, both of material and spirit. The need of some thorough work on the subject has long been felt by pharmacists, and especially has this been the case with regard to the menstruum question.

The only menstrua at present official are an alcohol of 84 per cent. strength, and one of 50 per cent., and the rule hitherto observed by pharmacopœial committees in their selection of an appropriate menstruum has apparently been to employ the stronger spirit for the extraction of drugs, the active principles of which are of a resinous nature, and in other cases to use the weaker menstruum.

It is generally agreed that the time has come when such a haphazard and rule of thumb mode of procedure should be discarded. The methods employed in the preparation of tinctures should be brought into line with the general improvement which has taken place in the processes followed in the production of other classes of remedial agents; so that they might be more in harmony with true scientific principles. It is satisfactory to know that there is a prospect of such a state of things being brought about, and that useful work on the subject has already been done. The standardization of the tinctures of important drugs like opium, cinchona and nux vomica is a move in the right direction, and the results of an investigation upon the menstruum question, reported to the Leeds meeting of the Pharmaceutical Conference by Messrs. Farr and Wright, show that there is great room for improvement in the selection of menstrua. It is true that the latter work was more or less of a tentative character; and the results of a further investigation are being awaited with interest.

The principal objects aimed at in making a tincture should be, first, to secure perfect exhaustion of the drug with the least possible waste of spirit, and secondly to ensure, as far as possible, constancy of strength in the resulting product. As to the former, it would seem possible, and certainly is desirable to reduce the proportions of drug and menstruum to a more uniform standard. At present the proportions vary between the limits of one to two and one to eighty, and between these extremes are tinctures of no fewer than ten different strengths. It is not too much to say that the quantity of menstruum used is in some cases sufficient to exhaust at least twenty times the amount of drug ordered, whilst in other cases, the amount used is totally inadequate to secure anything like perfect exhaustion.

As to the means to be adopted for obtaining tinctures of constant strength, it would appear to be desirable to carry out, as far as possible, a judicious system of standardization. For some tinctures, however, it is practically impossible to fix standards of any kind, either because it is not known with certainty to what principle or principles their medicinal activity is due, or because their known active principles are not capable of easy estimation. To this class belong such drugs as buchu, orange, gentian, rhubarb, cubebs, senna and others. But there is another class which includes almost all the powerful and poisonous tinctures, the active principles of which are known, are easily isolated and identified, and the estimation of which should not present any great difficulty to the skilled pharmacist. To this class belong the tinctures of those drugs which owe their medicinal virtues to the presence of alkaloidal substances. It is true that in some instances, where two or more alkaloids are present in the same drug, they have been found to exert a medicinal effect somewhat antagonistic to each other, but even in these cases it would be preferable to have some definite alkaloidal standard, fixed by a competent authority, rather than leave matters as they are at present.

In the case of tinctures of drugs containing poisonous alkaloids standardization is imperatively called for. A comparison of the strength of such tinctures as aconite, belladonna, henbane, etc., as sold by retail pharmacists, shows a considerable variation in alkaloidal strength, and there should be no hesitation whatever in endeavouring to carry out a system of standardization with these tinctures.

No doubt difficulties would occur in some cases, but we question whether they would be found greater than those encountered in dealing with such drugs as opium, nux vomica and cinchona, the tinctures of which are already standardized, the former for morphine, and the two latter for total alkaloid.

As to the best method to be followed in carrying out a system of standardization, opinions will differ. Should a definite standard of alkaloidal strength be fixed for the drug itself, as is now the case with opium and cinchona bark? or should the tinctures be prepared from a standardized fluid or solid extract, as with the tincture of nux vomica? or is it merely necessary to have an "irreducible minimum" of alkaloidal content for each tincture fixed by the Pharmacopœia authorities?

Much might be said in favour of each of these methods, and possibly each may be found to possess advantages in special cases.

The subject is one which offers a tempting field for investigation, and it is by steady, careful and persistent work in this part of the pharmaceutical vineyard that some of the most valuable results are to be obtained, and some of the most signal triumphs in the art and practice of pharmacy are to be won.

RECENT DONATIONS TO THE MUSEUM.

TU-CHUNG BARK.

BY E. M. HOLMES, F.L.S.

A few months since some very fine specimens of this bark were presented to the Pharmaceutical Society's Museum by Mr. W. A. Crow, of Hongkong. Some years ago, when making a catalogue of the Chinese collection of drugs formerly belonging to Dr. F. Porter Smith, and presented to the Society by Mr. Thomas Hanbury, this bark attracted my attention, and I asked Mr. Crow to endeavour to procure some of the plant yielding it.

In Dr. F. Porter Smith's work the bark is referred to *Euonymus japonicus.* As this shrub is exceedingly common in shrubberies in this country, I procured a specimen of the bark and compared the two barks with the following result.

The Tu-Chung bark when broken transversely exhibits a series of white shining silky fibres, which can be extended to the length of half-an-inch or more between the two separated portions of bark. Thinking that these might perhaps be the spiral fibre of spiral vessels, as in *Crinum*, I placed it under the microscope, but it showed no trace of spiral vessels. When a portion is held in a flame the odour given off resembled that of burning caoutchouc. On breaking a piece of the bark of *Euonymus japonicus*, it showed a white fibrous fracture, the fibres being woody and of course not extensible.

I therefore concluded that the Tu-chung bark is probably derived from some plant of the *Apocynaceæ* or *Euphorbiaceæ* or other caoutchouc-bearing order of plants. During a visit of M. Pierre, of Saigon, to this country, I showed him the bark, which he suggested might be that of an *Ecdysanthera* or *Parameria.* In the Kew Herbarium, indeed, there occurs a piece of bark on a sheet of *Parameria glandulifera*, Bth. and Hook., received from M. L. Pierre, and the Tu-Chung bark is referred on his authority to this plant in the Kew Gardens Report, 1881, p. 47. This bark, however, is thicker and different in character and shows much less of the silky fibre. (A bark closely resembling it is, however, used in Manilla to make an ointment, which is applied to wounds to facilitate their cicatrization.)

Recently, Dr. A. Henry, who has collected a large number of interesting plants in the north of China, on looking through the Chinese collection of drugs in the Museum of this Society remarked that he had brought home a plant which was stated to yield the Tu-Chung bark. Dr. Henry's collection has been undergoing examination at Kew, and the result of the examination of this particular plant has recently been published by Professor D. Oliver in the 'Icones Plantarum,' and is figured on Plate 1950, under the name of *Eucommia ulmoides*, Oliv., from which we quote the following description :—

Eucommia Oliv. (ger. nov.), flores ut videtur dioici; fœminei achlamydei (fl. masc. non vidi). Pistillum dimerum, syncarpicum. Fructus samaroideus, indehiscens, monospermus, samara periptera tenuiter coriacea stipitata. ovali-oblonga basi angustata apice breviter bifida, divisuris facie interna dense papilloso-stigmatosis. Semen unicum sub apice loculi appensum anguste ovali-oblongum albuminosum testa membranacea, raphe dorsali; embryo centralis rectus albuminæ æquilongus, radicula supera plus minus compressa, cotyledones planæ carnosæ lineari-oblongæ, radicula longiores, funiculus brevissimus medii leviter incrassatus. Arbor 20–30 pedalis. Folia alterna exstipulata petiolata simplicia elliptica acuminata serrata supra glabrata, subtus præcipue in costa nervisque parce pilosula. Fructus in axillis bractarum solitarii, breviter pedicellati; bracteæ squamiformes ovato-rotundatæ concavæ caducæ; samaræ stipes basi articulatus. *E. ulmoides*, Oliv. (sp. unica).

Folia 6–7 poll. longa, 2½–3 poll. lata, in ramulis fructiferis minora 2½–4 poll. longa, 1½–2 poll. lata; petiolus ½–¾ poll. longus. Samara 1⅓–1½ poll. longa, ⅓–½ poll. lata.

Hab., China, Prov. Hupeh., cultivated in the districts of Changyang and Patung. Dr. Henry had never seen it wild, but was told that it occurred wild in Fang and other districts to the north (Nos. 3182, 4683, 7936).

Professor Oliver prefers not to decide, without further material, upon the systematic position of the plant. The samaroid fruit and general habit of the plant suggest Ulmaceæ, but he finds no trace of perianth, and there are no stipules, and in the cell of the fruit which survives and includes the solitary seed, there is present a collateral, or nearly so, pendulous abortive second ovule. He considers it to come near to the tribe *Phyllantheæ* of *Euphorbiaceæ*, but until male flowers have been obtained, as well as young female flowers it will be impossible to speak with certainty. Under specimen 3182 Dr. Henry writes: "The bark is a most valued medicine with the Chinese, selling at 4*s.* to 8*s.* per lb.," and under 4683, "It is planted from the seeds. The tree is cut down in the third to sixth Chinese months and stripped of the bark. During the last twenty years the production seems to be diminishing in Szechwan, from which it chiefly comes, and the price has increased four or five fold." It may be hoped that Dr. Henry and Mr. Charles Ford, the Director of the Hongkong Botanical Gardens, may be able to obtain through English consuls or missionaries complete botanical specimens of this interesting plant, as well as ripe seeds. From the quantity of caoutchouc present in the bark, and, according to Professor Oliver, "in all the younger tissues, excepting perhaps the wood proper," it ought to prove valuable as a source of india rubber (if the substance proves to be as elastic as it is extensible). With respect to the medicinal value of the plant, it is well known that various caoutchouc bearing plants, as in the *Apocynaceæ* and *Asclepiadaceæ*, possess active medicinal properties, and the bark may deserve investigation. From a morphological and histological point of view the plant should also prove interesting, and Professor Oliver hopes soon to be in a position to give a description of the morphological relations and general histology of the cells which give rise to the elastic gum, from specimens in fluid or in the living state.

TESTS FOR HYPOPHOSPHITES.*

BY FRANK X. MOERK, PH.G.

As stated in an article upon "The Estimation of Hypophosphorous Acid and the Hypophosphites,"† there are three tests obtainable with this acid and its salts, which are said to be characteristic: (1) The cuprous hydride precipitate changing upon boiling into metallic copper and hydrogen, this test answering only in comparatively concentrated solutions; (2) the blue colour or precipitate with acid solution of ammonium molybdate, after the addition of a few drops of sulphurous acid; (3) the blue colour with tungstates under the same conditions. The last two tests are obtainable in dilute solutions. The molybdate test, according to E. J. Millard,* is best applied as follows: "To a solution of hypophosphorous acid or any of the hypophosphites the acid solution of ammonium molybdate is added, and then a few drops of sulphurous acid; a blue precipitate is immediately formed, or, if the solution be dilute, a blue coloration is produced which is considerably intensified by agitation or gentle warming." Millard further states that H_2S and $SnCl_2$, as reducing agents do not give the reaction, because they carry the reduction too far, namely, to the brown state. Of salts interfering with the reaction he says: Chlorates prevent it, sulphides produce a brownish-black precipitate that would completely hide it, and thiosulphates reduce the molybdate to the brown state.

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* Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. From the *American Journal of Pharmacy*, December.

† *American Journal of Pharmacy*, 1889, p. 326.

For several years prior to the publication of the above, it was noticed in the chemical laboratory of the College that students *occasionally* obtained a blue colour with ammonium molybdate in a solution containing thiosulphate. Although I often made the test with the same solutions and *occasionally* obtained the blue colour, still the number of times I was successful in this bears a very small ratio to the number of times I was unsuccessful, even though the reagents were added in the same quantities and in the same order.

After a large number of experiments, the difficulty in always obtaining the blue colour was found to be due to the excess of nitric acid present in the solution of ammonium molybdate; for if the greater part of the nitric acid be neutralized by addition of ammonia the test succeeds with thiosulphate even in the cold. With this slightly acid ammonium molybdate solution it is possible to obtain a faint blue colour with sulphites; this, however, shows best by adding a slight excess of ammonia after warming the mixed sulphite and molybdate solutions. It may be stated here that this faintly acid solution does not give the *hypophosphite* test as readily or as nicely as the more acid commercial solution. Using this strongly acid ammonium molybdate solution, the test for hypophosphites can be so modified that sodium sulphate solution, or even a small quantity of thiosulphate solution, may be used in place of sulphurous acid.

In repeating the tests made by Millard, it was found that *stannous chloride*, in moderately dilute solution, *invariably* gave a very fine blue colour with the commercial molybdate solution; the same test carried out with a concentrated solution of stannous chloride added in considerable quantity gave at first a brownish solution, changing on standing to a greenish-blue. It was also found that ammonium molybdate added to complex solutions containing stannous chloride produced a blue colour.

From the above it will be seen that several reducing agents besides hypophosphites have the power of reducing molybdic acid to the blue state, but that only the stannous chloride will do it under the same conditions as the hypophosphites. Millard states in the presence of sulphides, thiosulphates and chlorates, the test for hypophosphites may be obtained after these salts have been decomposed by boiling with dilute hydrochloric acid. This is correct as far as the sulphide and thiosulphate are concerned, but the chlorate boiled with hydrochloric acid liberates chlorine, which oxidizes rapidly the hypophosphite to phosphate, and then a yellow precipitate is obtained when the molybdate solution is added. In solutions containing stannous chloride this latter is not changed by boiling with hydrochloric acid, and hence the solution after boiling will give the blue colour with ammonium molybdate, although no hypophosphite is present.

Considerable interest was excited after the above results were obtained, as to the behaviour of sodium tungstate (also given by Millard as a delicate test for hypophosphites) towards the substances giving, under the proper conditions, similar tests with the molybdate. It was found that thiosulphate and sulphite alone give no blue colour, and stannous chloride produces only a greenish colour or precipitate. Hence, of the two tests this one appears to be the most characteristic of hypophosphites. To obtain this test the solution of sodium tungstate in distilled water (1:100) is acidified (rather strongly) with nitric acid, then the hypophosphite and sulphite solutions added and moderately warmed. The blue colour resembles that of Fehling's solution, and more rapidly intensifies than the corresponding test with molybdate. Experiments made to ascertain how delicate these two tests were, proved that solutions containing one part calcium hypophosphite in 5000 parts of water still gave very distinct blue colorations; in this dilution the molybdate test is frequently obtained of a greenish blue colour, while the tungstate is a very fine blue. Solutions containing 1 part in 10,000 parts of water failed to respond. Millard does not find the molybdate test quite as delicate, he stating that 1 part in 2000 can still be detected; in mixtures he finds 1 in 300 to be the limit.

Experiments were next made to ascertain if it was possible to detect with both the molybdate and the tungstate tests the hypophosphite in presence of the interfering salts, sulphides, thiosulphates, and chlorates. Solutions containing one per cent. of these salts were mixed with equal volumes of a solution containing 0·1 per cent. of calcium hypophosphite, so the solution contained hypophosphite 1:2000 and 10:2000 of the other salts. The *chlorate* prevented not only the molybdate but also the tungstate test for the hypophosphite (even in solutions containing 1 per cent. each of chlorate and hypophosphite). As previously stated, by boiling such a solution with hydrochloric acid, the hypophosphite is completely and rapidly converted into phosphate. After numerous experiments, the following procedure allowed the detection of the hypophosphite: To the mixture of chlorate and hypophosphite an equal volume of 1 per cent. sodium tungstate solution is added, then a crystal of sodium sulphite and nitric acid to acid reaction (should the odour of SO_2 disappear, another crystal of Na_2SO_3 must be added). On slightly warming the blue colour develops; the blue colour is as fine as though obtained from a pure hypophosphite solution. This test is probably successful because the liberated chloric acid or its decomposition product oxidizes first the SO_2 without acting upon the hypophosphite, and, hence, the caution that the odour of SO_2 must be apparent before warming.

The blue, or sometimes a greenish-blue, colour is also obtainable from this mixture of chlorate and hypophosphite with the ammonium molybdate test if applied as above. In this test, using the strongly acid solution of ammonium molybdate, the final addition of nitric acid is not necessary.

A mixture of *thiosulphate* (10:2000) and *hypophosphite* (1:2000) with tungstate of sodium gives a blue colour slightly interfered with by the precipitation of sulphur. With the molybdate test it is best to first boil with HCl until the odour of SO_2 disappears; the solution of above strength will still give a blue or greenish-blue colour.

A mixture of *sulphide* and *hypophosphite* can be tested as follows. Add to the mixture crystallized sodium sulphite and dilute nitric acid until the odour of SO_2 is permanent (the evolved H_2S reacts with the SO_2 to form S and H_2O, so that when the odour of SO_2 becomes permanent all of the H_2S has been decomposed); then add an equal volume of the molybdate or tungstate solution, and apply moderate heat. The precipitated sulphur does not prevent the blue colour appearing in solutions containing as little hypophosphite as 1 in 2000.

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* *Pharm. Journ.*, Jan. 26, 1889. Reprinted in *Amer. Journ. Pharm.*, 1889, p. 129.

In the presence of *stannous chloride* the molybdate test is not available; the tungstate test applied in the following manner will detect hypophosphites in solutions containing 0·05 per cent. To the mixture add a crystal of Na_2SO_3, then acidify with nitric acid, add an equal volume of sodium tungstate solution (1 per cent.), and warm; the blue colour will slowly develop.

This last method of procedure is, I believe, the one leading to best results in detecting the hypophosphites either in simple or complex solutions.

INDIAN AND OTHER PRESERVES.*

The demand for Indian preserves and jams has greatly increased during the past few years. In India preserves and jellies are made of the pear, quince, mango, tamarind, date, banana, guava, and other fruits. In Singapore pineapples are preserved whole, and in the Bahamas the manufacture is also carried on on a large scale, to the extent of nearly 1,000,000 cans annually. Each can of fruit, before the syrup is added, weighs 2 lbs. From 12,000 to 14,000 can be filled in a day, and 25,000 pines are usually consumed daily during the season. In Singapore much enterprise has been shown in preserving tropical fruits. There are two or three firms who deal largely in them.

The Indian preserves were formerly much in request. Thus, in the 13th century the most renowned preserve was a paste made of candied ginger. Among other fruits, etc., preserved in their natural state, in syrup, crystallized with sugar, or made into jelly, are the pineapple, bread fruit, ginger, jack fruit, the papaw, mangosteen, pomeloe, guava, and nutmeg. Although in flavour and preparation these preserves may not equal those of Europe, they make an agreeable change.

Pineapples.—The pineapple is one of the best of tropical fruits, although it is produced of a superior quality by European cultivators. Its sweet and acid flavour, and pleasant aroma, make it sought after by consumers of all classes. One house in Singapore ships about 70,000 tins of this fruit. Pineapple marmalade (thought by some to be the most delicious preserve in the world) might also be sold at *5d.* per pound in London.

Guava Jelly.—There are two species of guava fruit, the red guava, and the white or Peruvian guava. Both make excellent sweetmeat paste or jelly, which is very pleasant and nutritious, from its superior power of assimilation with the gastric juice, and perfect development of saccharine.

It is said that a hundred different preserves could be made from a judicious blending of the fruits of the East and West Indies and South America.

The jamun (*Syzygium jambolanum*), a sort of long, dark, purple plum, the size of a large date, makes excellent preserves, and has exactly the flavour of black currant jelly, to simulate which large quantities are sent from India to England. It is also used for flavouring other jams.

The fruits of *Inocarpus edulis* are preserved in the Indian Archipelago. A sweet conserve is made in India of the fruits of *Terminalia Chebula*. Another is made of the fruits of *Phyllanthus distichus*, at Birbhum in Bengal. The acid calyces of the rosella (*Hibiscus Sabdariffa*) are converted into an excellent jelly, which would be highly appreciated in England, if once introduced. Jam and jelly are made in Canada from the fruits of *Shepherdia argentea.*

The fruit of *Spondias*, not unlike a cherry, is made into jelly. The scarlet fruit of the quandong (*Fusanus acuminatus*), the size of a small peach, makes an excellent preserve for tarts in Australia.

The tamarind plum (*Dialium indum*) of Java has a pod filled with a delicate agreeable pulp, much less acid than the tamarind. The golden drupes of *Spondias cytherea*, or *dulcis*, a native of the Society Islands, are compared, for flavour and fragrance, to the pineapple. The large acid fruits of the kei apple (*Aberia Kaffra*) of Natal can be converted into a good preserve of the red-currant jelly class. The fruit of *Cornea speciosa* is delicious; it is called "mangaba" by the Brazilians, and when ripe is brought in great quantities to Pernambuco for sale.

The fruit of the goumi of Japan (*Elæagnus edulis*) makes excellent preserves, fruit syrups, and tarts. The berries of *Pyrus aucuparia*, and of *P. baccata* are made into comfits, conserves and *compôtes*. The fruits of *Astrocarpum ayri*, of Brazil, are made into an excellent preserve, which is much esteemed in that country.

The fruit of the Chinese quince (*Diospyros amara*) is converted into sweetmeats, of which the Chinese are exceedingly fond.

The bread fruit, in syrup or crystallized, may please native palates but it is not likely to find favour in Europe, being flavourless, and more of a food substance than a fruit.

Preserved ginger is popular in England, but is not much esteemed on the Continent. The Spaniards eat raw ginger in the morning to give them an appetite; and it is used at table fresh or candied. Among sailors it is considered antiscorbutic. The quantity of preserved ginger imported ranges annually from 1,500 to 2,500 cwt., value £3,500 to £4,300. It forms the bulk of the succades received from the Chinese Empire, 18,000 to 20,000 cwt. coming from Hong Kong. Some ginger is also received from India. The mode of preparing it in the East is as follows:—The racemes are steeped in vats of water for four days, changing the water once. After being taken out, spread on a table, and well pricked or pierced with bodkins, they are boiled in a copper cauldron. They are then steeped for two days and nights in a vat with a mixture of water and rice flour. After this they are washed with a liquid of shell lime in a trough, then boiled with an equal weight of sugar, and a little white of egg is added to clarify. The ginger, candied or dried in sugar, is shipped in small squares of zinc. That preserved in syrup is sent out in jars of glazed porcelain of 6 and 3 lbs., and packed in cases of six jars. The quality called "mandarin" is put up in barrels.

The *papaw* (*Carica papaya*) is a fleshy, pulpy fruit, of an orange colour, sweet and refreshing, which is eaten as the melon is in Europe. This fruit, however, in syrup or crystallized, has very much the taste of a turnip.

The *mangosteen* is a fruit about the size of a mandarin orange, of a sweet flavour, accompanied with a slight acidity and an odour resembling the raspberry. It is the produce of *Garcinia mangostana*, and is one of the most delicious and famous of the fruits of the Indian Archipelago, ranking with the pineapple. Presents of baskets of it are sent from Singapore to India and China. It is a pleasant fruit, with a delicate but characteristic flavour, partaking of the strawberry, grape, pineapple, and peach. The happy mixture of tart and sweet in the pulp renders it no less salutary than pleasant; and it is the only fruit which sick people are allowed to eat without scruple. In Cochin China they sell at 4*s.* to 5*s.* the 100.

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* From the *Journal of the Society of Arts.*

The *pomalo* (*Citrus decumana*) is a large fruit of the orange family, with an acid flavour, frequently bitter. The pulp and thick rind, crystallized with sugar, are eatable, but lose much of their natural flavour. It is better known as the shaddock; and the fruit will exceptionally attain a weight of 20 lbs.

The *Mammea apple* (*Mammea Americana*) is abundant in the West Indies. The pulp is of a sweet, aromatic smell, and of a peculiar, yet delicious flavour. It is sometimes sliced and eaten with sugar or wine, and also makes a very good jam by being preserved in sugar. Another tropical fruit, *Mammea sapota*, is known as American marmalade, from the similarity of the flavour of the pulp to the marmalade made from quinces.

The succulent fruits of *Cicca disticha* have an acid sweet flavour, and are eaten cooked, or made into preserve.

The green, fleshy, gratefully acid fruits of *Averrhoa Bilimbi* and *A. Carambola* are preserved, and used for tarts and for flavouring various dishes.

The *Cumquat* or *Kumquat* (*Citrus japonica*). An excellent preserve is made from the sweet peel and acid pulp of this curious small nutmeg-shaped orange in China and Japan.

The red berries of *Carissa Carandas* furnish a well-known substitute for red currant jelly, in India and China.

The Peruvian *cherimoyer* (*Anona cherimolia*) is a highly esteemed succulent fruit, of a most luscious flavour, containing a soft sweet mucilage, resembling strawberries and cream. It is often called the "Queen of Fruits."

The mango, the mangosteen, the custard-apple and the durian, are known by repute only to the people of this country; but while they might easily be frozen and brought here in admirable condition—dishes fit for the gods—no attempt is made to utilize these luscious fruits of India in their fresh state, nor is very much done in preserving them.

The durian (*Durio zibethinus*), although it has a strong offensive smell, is eaten greedily by the Burmese, and as many as 40,000 are annually sent to Upper Burma.

The mango (*Mangifera indica*) is the best fruit in India, as highly valued as the peach with us, and forms a considerable portion of the food of large classes of the native inhabitants. The varieties cultivated are about as numerous as are those of the apple. An Indian gentleman has made coloured illustrations of more than two hundred varieties of this fruit. The quality is difficult to judge of from external appearance. There are large and small, elongated and abbreviated, bright orange-coloured and green. They vary much in taste, some being of the flavour of honey, some of pineapple, some of orange, while others have distinct flavours of their own. A good mango should be as little stringy as possible, and should not have too much of the turpentine flavour towards where it is attached to the foot-stalk; a moderately aromatic savour there is by no means objectionable.

The young unripe fruits are largely consumed in India in tarts, etc., and mango fool there takes the place of gooseberry fool. The half-ripe fruits are also made into a marmalade which resembles much that of apples.

So large is the consumption of this fruit in India that waggon loads, bringing collectively 20 tons of the fruit, have entered the island of Bombay in a single day. The fruit of the finest mangoes have a rich, sweet-perfumed flavour, accompanied by a grateful acidity.

The thick juice is by the natives of India squeezed out, spread on plates and allowed to dry, in order to form the thin cakes known as *amsatta*. The green fruit is sliced and cooked in curry; is made into pickle with salt, mustard, oil and chillies; and also into preserves and jams by being boiled and cooked in syrup. Some varieties of mango have fruits as big as an infant's head, ovate, with a golden skin, speckled with carmine, and a greengage flavour.

The finest varieties of this almost unequalled fruit seem to thrive in Jamaica (where it was introduced about a century ago), as well as in Bombay. It is the popular fruit there with the negroes.

The Siam mango is a tolerable kind, which sometimes grows to 1 pound weight. The egg mango is a small, yellow kind, with too much of the turpentine flavour and too acidulous to be much prized. The horse mango is a very coarse fruit of unpleasant odour, much eaten by the lower classes, and producing cholera, diarrhœa and dysentery. The Bombay mango, termed "Parsee," is known for its lusciousness and delicacy of flavour, the absence of fibre, firmness of flesh, thinness of skin and small size of the stone. It must, however, be admitted that on tasting this delicious fruit for the first time, a slight turpentine flavour is experienced.

A raw guava, or even a raw mango, may not be to every Englishman's palate a satisfactory exchange for a mellow pear or a juicy peach, but preserved mango and guava jelly are things by no means to be despised. Some of these preserved foreign fruits are delicacies only to be obtained at some of the best West end houses, at prices too high for ordinary consumers; but if large quantities were sent into the market, and the prices consequently lowered, the demand would become greater and the sale more profitable, and would probably lead to the introduction of new articles, to the mutual benefit both of ourselves and the growers and preservers of the fruits.

Mango jam is prepared by boiling the mango in syrup, after removing the skins and stones, and the sour juice squeezed out by the free use of forks and soaking in fresh water. Two pounds of mango to 1 pound of sugar is the proportion in which it is prepared.

Bilimbi jam is made by removing nearly three-fourths of the juice of the fruits of *Averrhoa Bilimbi*, and soaking in water, squeezing the fruit and boiling them in syrup. Nelli jam, from the fruit of *Phyllanthus Emblelica*, is made in the same manner; proportion of fruit and sugar same as mango.

From Natal there have been shown at the various exhibitions Amatungula jam, the produce of the fruit of *Arduina grandiflora*, sometimes called the Natal plum. The jam is firm, nearly like that of the quince, and has a rough acid flavour; but is a curious and agreeable preserve.

The gooseberry jelly from Natal is the produce of *Physalis pubescens*. It is pleasantly sharp, without having the rough, metal-like acid of the amatungula. The guava jelly has the full taste of the West Indian preserve. The pineapple jam has the rich, almost too-luscious taste for which the Natal pines are famed. The loquat is a very sweet and fine preserve, slightly resembling quince marmalade, but with less pronounced individual flavour. The fruit is very delicious in its unpreserved ripe state, having the flavour of an apple grafted upon the flesh of the melting peach, with large apple pips taking the place of the stone, and ripening in massive bunches. Like the peach, the fruit is almost too delicate for a preserve. Its most refined and exquisite qualities do not survive the bath of boiling sugar. The rosella is the preserved fruits or calyces of the *Hibiscus sabdariffa*, which makes a most estimable substitute for red currant jelly, particularly relished in hot climates. The grenadilla, the purple fruit of a passion-flower (*Passiflora edulis*), is almost without a rival for delicate fragrance and perfume, has a sweetish acid taste and makes an excellent preserve. The St. Helena peach resembles, in the preserved state, a very excellent yellow plum. The shaddock marmalade might also be spoken of as a worthy substitute for the Seville orange marmalade.

OBSERVATIONS ON THE GUMS YIELDED BY TWO SPECIES OF CERATOPETALUM.[*]

BY J. H. MAIDEN, F.L.S., F.C.S.,

Curator of the Technological Museum, Sydney.

The genus *Ceratopetalum* belongs to the natural order *Saxifragæ* and is endemic in New South Wales. Of its two species the first is *C. gummiferum* (Smith), generally of bushy size, though in favourable localities it attains the dignity of a small tree. It is the well-known "Christmas-bush" of Sydney, and its reddish persistent calyx is very showy. For this reason it was also called "officer-plant" in the early days of the colony, though an officer's tunic is of a very different colour. The second species is a well known gully tree, never found out of moist situations, and is tall, with smoothish bark, bright-looking foliage and white flowers which it bears in abundance. This is *C. apetalum* (D. Don), and its local names are "coachwood," "lightwood," and "leatherjacket."

In describing *C. gummiferum*, Dr. J. E. Smith, in "A Specimen of the Botany of New Holland" (1793) gives an excellent figure of the plant, which he calls the "three-leaved red-gum tree." He says:—"This, Mr. White informs us, is one of the trees (for there are several, it seems, besides the *Eucalyptus resinifera*) which produce the red gum. He further remarks that it is the only wood of the country which would swim in water." (The latter statement is, of course, founded on imperfect knowledge.) This is the first, and as far as I know, the only reference to the gum-yielding propensity of this plant; but it impressed Smith sufficiently for him to give the specific name he did. Mr. White's observation, so early recorded, does not seem to have attracted the attention of subsequent observers.

The first parcel of *C. gummiferum* gum I received was in small tears of a beautiful ruby colour, perfectly transparent, and having a bright fracture. It is powerfully astringent to the taste, sticks to the teeth, and obviously contains a large proportion of gummy matter. This sample was removed from the cut ends of a log, from which it exuded in small drops and in thin pieces which dried very quickly. The tree was 6 to 9 inches in diameter. It seems, as far as our experience goes at present, that ring-barking or wounding the tree, or even cutting it down merely, is of little avail to obtain the gum; the tree must be cut into logs or pieces, so that the timber is open at both ends, before the gum will exude in any quantity. It remains to be seen whether the gum exudes most freely in the summer.

I have received a cake of the substance obtained by draining the ends of a severed log on to a plate. When first received it was exceedingly tough; but on exposure to the air for two or three months it fractured without difficulty between the fingers. The fractures are quite bright. It has no odour. To cold water it imparts a dark, rich orange-brown colour; at the same time the insoluble portion forms a bulky gelatinous mass.

In bulk the gum of *C. apetalum* appears in no way different from that of *C. gummiferum*. It, however, smells more or less strongly of coumarin, which is also contained in abundance in the bark. It is obtained either by wounding the tree or by felling it. In cold water it swells up largely, and at the same time possesses a good deal of coherence. It imparts to the water a pale orange-brown colour and an intense odour of coumarin.

Ceratopetalum gums are kinoid or astringent. They are much of the colour and texture of ruby kino,[*] but unlike those substances, swell up and only partially dissolve. They may be described either as *kinos* or as *kinoid gums*. All the definitions of kino with which I am acquainted allude to the tannic acid contained in them, and make no allusion to any gummy constituents. All the gum of kinos of *Eucalyptus* known to me is readily soluble in water, and is arabin; but in the case of *Ceratopetalum* the gum is present in the form of metarabin. Whether that circumstance is sufficient to remove them from the kinos is a matter of opinion; in any case they form a connecting link between the kinos and metarabic gums. If they be looked upon as kinos, I believe the present is the first instance in which such substances have been recorded from the *Saxifrageæ*.

Ceratopetalum gums form a remarkable group, and at present I do not know any other precisely similar gums. *C. apetalum* is worthy of note as an available source of coumarin, and the presence of that substance sharply separates the two gums. The following difference also appears to be constant. The ash of *C. gummiferum* is quite white, while that of *C. apetalum* is dark brown, very bulky, and difficult to ignite. It contains but a small percentage of iron, but manganese is abundant. The composition of the gums may thus be stated:—

	C. gummiferum.	C. apetalum.
Tannic acid, estimated as gallo-tannic acid . . .	16·76	6·35
Phlobaphenes (soluble in alcohol)	19·5	12·21
Phlobaphenes (insoluble in alcohol, together with metarabin)	41·6	52·09
Coumarin	nil (variable)	2 to 3
Accidental impurity . .	2·5	2·0
Moisture	16·7	20·47
Ash	1·8	3·44
	98·86	99·56

Remarks on the above Table.

1. *Ceratopetalum* gums yield, on treatment with cold water, a residue which consists almost entirely of phlobaphenes and metarabin. That the greater portion of it consists of phlobaphenes is proved by the facility with which continued boiling with water converts it into an equal weight of tannic acid. In fact, if the gums of this genus were boiled with water to begin with, the percentage of tannic acid returned would be between 40 and 50 per cent. in each case. (Actual experiments gave *C. gummiferum*, 49·78; *C. apetalum*, 41·14.)

2. The difficulties surrounding the separation of a mixture of phlobaphenes, insoluble in alcohol, and metarabin, are very great, and my attempts in this direction have not been entirely satisfactory. I therefore have no recourse but to state the result as I have done. But from my experiments in converting the phlobaphenes into tannic acid, the metarabin into arabin, and by observing the physical appearance in water and in alcohol of the original mixture, and other tentative methods, I estimate the percentage of metarabin to be about 8 to 10 per cent. in each case.

ALBUMINATE OF IRON AND ITS PREPARATIONS.[†]

BY DR. ADOLPH TSCHEPPE.

For a few years past some novelties in so-called indifferent iron preparations have been introduced from Germany, now so prolific in new additions to the materia medica. I make special reference to preparations of albuminates and so-called peptonates of iron, which, by the growing favour with which they are received here, have become of sufficient importance to awake the interest of the pharmaceutical profession.

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[*] Proceedings of Linnean Society of New South Wales.

[*] See papers by the author, *Pharm. Journ.*, [3], xx., pp. 221, 321, and 'Proc. Linn. Soc.,' N.S.W., July, 1889.

[†] Read at the recent meeting of the American Pharmaceutical Association, September, 1890.

These preparations are not protected by patent rights or trademarks, so the labour of their investigation is somewhat more profitable than of protected articles, as it is amply repaid by finding the ways and means of preparing them ourselves, not counting in the benefit of increasing knowledge. Besides, their chemistry is less intricate than that of more elaborate chemicals now so steadily appearing, which brings them more into the sphere of the average chemical ability of the professional pharmacist, whose knowledge of the possibilities of the higher spheres of applied chemistry is under the prevailing circumstances of the drug trade in this country necessarily limited.

These preparations are now not altogether new, their formulæ have not been kept secret either, but to the contrary, prescriptions to make them have been as liberally bestowed as the sands on the sea shore, in a spirit of disinterestedness which has been the time-honoured custom in the old world for scientific labours.

But the time, it seems, also in old Germany is passing, when men work for fame more than for money, since it has been found of late that one may attain both, if the work done be worthy of fame and there be money in it.

The albuminate of iron was constructed as far back as 1877, by a Dr. Friese, and has been the object of investigation and discussion of a number of able writers at home. But altogether, such flagrant discrepancies are still existing between formulas, constitutions and appellations of these preparations, that the subject to-day is far from being exhausted or the question settled, and the old quarrels might be renewed on the slightest provocation.

In the United States, to my knowledge, so far, they have received no serious attention, and I hope by introducing the theme to this body, to promote acquaintance with the subject, and by experience gained in its study, to help to diffuse the knowledge so that further investigation and discussion may be invited.

It is a good many years now since it had been discovered that some organic acids, like the citric and tartaric, prevent the precipitation of ferric hydrate by potash; and that this property is not confined to bodies of a decided acid nature, but is also shared by some indifferent bodies, like sugar, has been known long enough to have a formula for soluble saccharate of iron introduced in the first edition of the German Pharmacopœia. This preparation, according to the officinal formula, is obtained by a rather devious route, which may be greatly simplified; but other analogous substances like dextrin, gum arabic, glycerin, albumen and its derivatives and congeners, do not show such difficulties as sugar, and the working of the chemical transformation with them is more translucid. Solutions of these bodies in mixture with ferric salts give on neutralization a precipitate which constitutes a chemical combination of iron with the substance employed; a further addition of alkali redissolves the precipitate, the alkali now entering into the combination.

Before solution in alkali, the precipitate may be freed of the by-products of the chemical exchange, by straining and ablution with water, before the addition of the alkali, in order to obtain the final product in a state of purity. The same object may be attained by subjecting the alkaline solution to dialysis.

The precipitate, except in the case of albumen, is also soluble in diluted acids, but this solution only represents again the original mixture.

In place of the normal ferric salts, basic ferric salts may be employed, which behave the same as the normal; only as it is the acid of the ferric salt which is replaced by the substance used, the new compound will contain a larger amount of iron than those obtained from the normal salts.

These basic iron combinations seem to be more stable than the normal combinations, and are produced generally, when an appropriate substance, being a crystalloid, is mixed with normal ferric chloride, and potassa gradually introduced. By this slow manner all the iron is first transformed into basic ferric chloride, before the combination with the substance is effected; glycerin and sugar form typical examples of this behaviour, and the *modus operandi* of the preparation of the saccharate of iron adopted by the German Pharmacopœia, clearly points to the fact that a basic saccharate is either aimed at or unintentionally obtained.

Colloids, like albumen, dextrin, or gum acacia, prevent the formation of basic iron salt. The albuminate is directly precipitated on addition of alkali to saturation of the acid, showing that a combination is formed, having the constitution corresponding to the normal ferric salts.

But if in the case of crystalloids the manner of addition be reversed, adding the iron mixture to an excess of alkali, a solution corresponding to the constitution of the normal salt is also obtained.

This procedure is not admissible in all cases, as iron hydrate may be precipitated in place of the expected compound. But the normal form may also be obtained from the alkaline solution, prepared as before, by precipitation by acids or more certainly by dialysis.

The passage of the normal to the basic salt may be judged by the change of colour of the solution, which passes from that of pale sherry to that of old port.

The percentage of iron in these compounds is obviously not constant. For albuminates the amount of iron oxide obtained by the calcination of the dried precipitate of the albuminate varies from $\frac{1}{15}$ to $\frac{1}{4}$ and all the intermediate fractions, according as the normal or basic chloride or mixtures of both be employed.

But it may vary still more; alkaline solutions may contain a large excess of albumen, acid mixtures an equally large excess of basic iron. The excess of albumen is not eliminated by precipitation, as is the case with sugar or glycerin, because it is changed in this process into a derivative, which is itself precipitable.

For a specific solution of a ferric salt, the variation of percentage of iron in the compound is a small one, and the proportion in which an appropriate substance combines with the iron of this specific solution may be satisfactorily ascertained.

This determination is effected by adding to a measured volume of a 1 per cent. solution of the substance to be tested, gradually measured volumes of equally diluted solution of ferric chloride, adding after each trial sufficient surplus of caustic alkali. Each test, between additions, has to be made with a fresh sample. The limit of addition is reached when ferric hydrate is precipitated, then the proportions of the volumes of the two solutions indicate the ratio in which the substance in hand combines with ferric chloride.

One part by weight of the following named substances were found to combine with the following parts of solution of ferric chloride, U. S. P.

Glycerin	0·92
Cane sugar.	0·42
Mannite.	1·72
Egg albumen	1·05

The proportion of basic chloride of iron (*i.e.*, dialysed iron) in solution of usual strength (5 per cent. of Fe_2O_3), was 7½ to 8½ parts by volume to 1 of albumen.

The conditions to form this soluble iron compound depend as well on the chemical constitutions of iron salts as of the organic substance. For iron it is required that the salt be a ferric compound, and that the iron be precipitable by alkali in the state of hydrate, and that the combination be effected while the ferric hydrate is in the nascent state.

Therefore, the organic compound must be present before, and, contrary to statements, I never found already precipitated hydrate of iron to dissolve in sugar or any other indifferent substance. As ferric salts, the chloride, sulphate or nitrate may be employed, the phosphate or the alkali combinations of organic acids with iron being excluded.

As a condition for the organic substances, it seems to be required that at least two carbon atoms of the compound should have an exchangeable hydroxyl and one or more in the disposition of carbinol—CH OH= CHOH, or an exchangeable hydroxyl united directly to a carbon atom in the aromatic group.

This easily explains the phenomena, why the tribasic alcohol glycerine, having no carboxyl group in its constitutional formula, forms such a compound, and why all the fatty acids as well as the bibasic, oxalic and succinic acids, cannot form parties to such compound, while lactic, tartaric or citric acids do. It also explains why ferric benzoate is not soluble in alkali, while the salicylate is. Sugars and carbohydrates must have the larger part of their weight prearranged in alcoholgenetic groups, as demonstrated by the facile conversion into the large percentage of alcohol, as they do by fermentation or destruction by heat, and in proteins the pre-existence of similar groups is evidenced by the large production of bromoform under the destructive action of bromine. According to this view, glycol and glycollic acid, as well as the amido compound glycocol of even basic character, would form the lowest chemical compound endowed with the property spoken of.

Most of the reactions named belong in common to albumen and all the other indifferent bodies mentioned. But with albumen the reaction becomes more complicated through reaction belonging to albumen itself.

In view of the very conflicting statements afloat in text-books, representing the various stages of the evolution of the science as attained to day, and the many horrible perversions of truth perpetrated and promulgated occasionally in the periodic press about the behaviour, the reactions and changes of albumen, and in view of the consequent misconceptions of even professional chemists and manufacturing men who manipulate this article, amply evidenced by the constantly recurring, misapplied, wrongful statements and *corpora delicti* furnished by the manufacturing class, it will be advisable to detail such properties of albumen and its changes as come under the conditions and within the scope of this treatise. It is, however, to be understood that the albumen was taken as it is found in nature, without any attempts to purify it and thereby change it to something with which no one else might be familiar.

1. Native egg albumen contains 14-15 per cent. of dry albumen, which in its turn contains some 4½-5 per cent. of ash, which is largely responsible for the condition and reactions of this native albumen. It is slightly alkaline, which causes it to produce small precipitates in neutral solutions of iron salts, its quantity being sufficient to precipitate about ten times its weight of dialysed iron so completely that neither albumen nor iron is found in the remaining fluid.

2. If a solution of egg albumen be mixed with about ½ per cent. of hydrochloric acid (0·5 per cent. HCl) it is transformed into acid-albumen or syntonine. Heat does not coagulate this solution, but addition of alkali to the neutralisation point causes a precipitate of a derivate of albumen insoluble in water, called protein.

This protein is soluble with ease in either very diluted acids or alkalies, again forming salt-like combinations with them. By heating the undissolved precipitate to 80° C., it becomes insoluble in diluted alkalies, and still more so in diluted acids, and is now identical with the coagulated albumen obtained by boiling native albumen.

3. If caustic alkalies in small amounts be mixed with solutions of albumen, or if coagulated albumen be dissolved by alkali, it is transformed into alkali-albumen. This likewise is not coagulable on boiling, but protein, identical with that obtained from acid-albumen, is formed by neutralization by acid. A surplus of acid will bring the precipitate again in solution when acid-albumen is formed. This change from alkali- to acid-albumen may be effected numerous times in the same solution until accumulation of salt interferes.

But if a solution of albumen be mixed with a larger amount of alkali, a precipitate occurs on neutralization which is readily soluble in diluted alkalies, but not in diluted acids.

A precipitate of the same behaviour is also obtained if a solution of albumen be mixed with a solution of a heavy metal, when on neutralization a compound of the albumen with the metallic base is formed, which is easily soluble in diluted alkali, but not in diluted acids, unless the metallic salt be largely predominating in the mixture before precipitation is effected. Neither this nor the reaction previously mentioned is explainable if the egg albumen were a homogeneous mass. But as in neither of the two cases the entire quantity of albumen is acted upon, this differential reaction may be due to separable constituents of the proteidal aggregate as found in egg albumen.

4. If very finely coagulated albumen, especially that obtained by heating acidulated solutions of albumen with alkali chloride, be subjected to peptic digestion under favourable conditions, it is dissolved almost at once. This solution contains acid albumen, which differs in no way from that obtained from native albumen directly. If the albumen was less finely divided, if the conditions were less favourable or the solvent power of the pepsin too low for rapid solution, then the liquid may contain a considerable proportion of the more advanced products of digestion before all the albumen had time to be dissolved, due to the simultaneous action of the pepsin on the albumen already dissolved.

5. If the digestive action be continued on the dissolved albumen, after a lapse of time the solution may be found to respond less promptly to the reaction of alkalies or acids. Nitric acid in the cold will produce a precipitate which dissolves again on warming, while before the precipitate obtained would fail to do so. The albumen has now been changed to a derivate called hæmialbumose or propeptone. Though less distinctly, it still yields neutralization precipitates, and enters into precipitable combinations with heavy metals, including iron, soluble in alkali. Hæmialbumose, like all the previous forms of albumen, is not diffusible.

6. By prolongation of more or less duration of the same conditions and influences, the final product of peptic digestion is reached; the albumen is peptonized. While all the previous derivates retain more or less of the properties of the original albumen itself, an essential change has been brought about by this final transformation.

Peptone is diffusible, and its reactibility with bases has been so diminished that neither alkalies nor most of the heavy metals, except a few of the higher order, form precipitable compounds. With iron peptone forms no compounds.

All the derivates of albumen, except peptone, could be precipitated by saturating their acid solutions with sodium chloride or the sulphates of magnesium or sodium. Pepton thus treated is not affected, but forms a similar precipitate with the much more soluble ammonium sulphate, which reaction has been accepted as the distinguishing test for its estimation and separation from the rest of the other albumen derivatives, and especially also for its separation from the extractive matter left in the final solution.

Peptone is precipitable by alcohol in neutral solution only. If acid or alkaline reaction prevail, no precipitate appears. The same property is also shared by albumen itself, and demonstrates that the affinities for alkalies or acids are not entirely lost in pepton.

Contrary to wide-spread belief, pepton has no colour-test of its own. The so-called Biuret reaction, claimed for pepton, belongs to albumen itself, and is only intensified by its passage to pepton.

As an appendix to this *exposé*, I have yet to mention a peculiarity of albumen, which plays an important rôle in preparation of albuminate of iron.

If alkali be added to an albuminous precipitate for the purpose of solution, a proportion of alkali insufficient for solution of the whole does not dissolve a proportionate part of it, as might be expected from experience with inorganic bodies. The coagulum swells up, becomes a jelly, and finally dissolves to a perfect solution only when the adequate amount of alkali required for its solution has been added. If alkali be added in the same manner to a precipitate of ferric albuminate, the addition of an insufficient amount may have the disastrous effect of decomposing the compound by extracting albumen; so that, when finally the full amount of alkali has been added, the compound is so decomposed that albumen only goes into solution, leaving the iron behind as ferric hydrate. Quantities of material and much labour may be wasted by ignorance or non-observance of this rule.

Not only albumen, but also the other substances mentioned, are subject more or less to this conformity, each showing an individualism demanding a modification of the general treatment outlined. The existence of such individual characteristics may be illustrated by treating mixtures of sugar or glycerine and ferric chloride with alkali in different modalities.

From a solution of cane sugar and iron no precipitate is obtained, if a surplus of potash be added at once; the solution contains the soluble saccharate of iron and potassium; but if the same amount of potash be added guttatim, as is done if dropped from a burette, ferric hydrate is precipitated, and no soluble compound is formed. The same casualty does not occur with glycerin. With iron a soluble compound is formed if the solution of iron chloride be dropped into a mixture of alkali and sugar, while the same proceeding forbids itself if tried with glycerine.

A consideration of the foregoing statements will now enable us not only to understand the theory of the formation of albuminate of iron, but also to intelligently judge the formulas and preparations of the market, and enable us also to formulate the existing relations and conditions into such shape as to obtain preparations of any desired constitution and strength, be it to embody a real chemical compound or a compound only in pharmaceutical parlance—a mixture or concoction.

(*To be continued.*)

THE ALKALOIDS OF WHITE HELLEBORE ROOT (VERATRUM ALBUM).*

BY GEORG SALZBERGER.

The following investigation, began in October, 1885, was directed with a view of isolating the active constituent of white hellebore root, at that time not known in the pure state, and of reviewing the statements of earlier authors concerning the alkaloids of this plant.

The rhizomes of *Veratrum album* were first chemically investigated by the discoverers of veratrine, Pelletier and Caventou,* who assumed that this alkaloid was also the active constituent of the white hellebore. Their erroneous assertion, although unsupported by experimental proof and discredited by the observations of later investigators, has not yet entirely disappeared from works of reference. Eighteen years later E. Simon† isolated from the roots a base that he named jervine, which was first analysed by Will‡ in 1840. On the other hand, A. Weigand and Weppen reiterated Pelletier and Caventou's opinion as to the occurrence of veratrine in *V. album*, which is the more remarkable since the latter chemist introduced an excellent colour reaction for this alkaloid. Dragendorff, however, contradicted their statement, and induced Tobien§ to repeat their experiments. The latter found only jervine and an amorphous base, veratroidine, to the former of which he ascribed the formula $C_{27}H_{47}N_2O_3$ and to the latter $C_{24}H_{37}NO_7$.

Considerable progress characterized the communications of Wright and Luff,* who not only established a more correct formula for jervine ($C_{26}H_{37}NO_3$), but further isolated two other crystalline alkaloids, rubijervine ($C_{26}H_{43}NO_2$), and pseudojervine ($C_{29}H_{43}NO_7$). But since jervine possesses only a slight toxic action, whilst rubijervine and pseudojervine are absolutely inactive, the active constituent of white hellebore root would appear to have been overlooked by these chemists. The chemical individuality of a fourth amorphous base, described by them as veratralbine ($C_{28}H_{43}NO_5$), is insufficiently established.

The results of the present investigation, in which 300 kg. *Rhizoma Veratri Albi*, as well as a small quantity of the seeds of the plant, were manipulated, confirm Wright and Luff's statements regarding the three crystalline bases. But the most active constituent of the root has been recognized in another and extremely poisonous crystalline alkaloid, to which the name protoveratrine has been given. A fifth crystalline base, protoveratridine, has also been met with. All five alkaloids have been prepared in sufficient quantities to allow of elementary analyses and the preparation of their most important derivatives. Other bases appear also to occur in small quantities in the plant, but these have only been obtained in an amorphous condition and are of a non-poisonous nature.

The great instability of protoveratrine necessitates a careful selection of a method for its extraction and isolation. Strong mineral acids and high temperatures must be strictly avoided in its preparation, although the other alkaloids endure less delicate treatment. Two different methods of extraction were found especially of service; 1, the baryta method, by which large quantities of jervine, rubijervine and protoveratridine can be quickly and easily prepared, but no protoveratrine is obtained; 2, the metaphosphoric acid method, which allows of the isolation of crystalline protoveratrine and pseudojervine, and yields small quantities of jervine and rubijervine as bye-products.

The yields of alkaloid differ considerably in the various portions of root under treatment, but it has been observed that the whole rhizome with rootlets (*cum fibrilis*) yields more protoveratrine than the rhizome with the rootlets removed. Probably the method employed in drying the roots has also great influence upon the alkaloidal yield, but since thick rhizomes dry very slowly entire without the aid of higher temperatures, the suggestion of the United States Pharmacopœia to first cut them in transverse slices may be recommended.

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* Translated from a paper in the *Archiv der Pharmacie*, vol. ccxxviii., p. 462.

* *Ann. Chim. et Phy.*, xiv., 69.

† Poggendorf's *Annal.*, xli., 569.

‡ *Am. Chem. Pharm.*, xxxv., 116.

§ 'Inaug. Dissert,' Dorpat, 1877.

I.—The Baryta Method.

Each kilo of the finely powdered rhizome is well mixed with 300 grams powdered barium hydrate and then moistened with sufficient water (about 500 grams) to allow of the easy extraction of the mixture with ether. This quantity of hydrate has been found by experiment to ensure the removal of nearly all the alkaloid in ethereal solution, the process of shaking with ether being, for the sake of safety, carried out in large tin canisters of 10 litres capacity, provided with brass screw-tops and indiarubber washers. About five kilos of ether are required for each kilo of powder, the ether being added in three successive portions. After evaporation of the ether at a low temperature by means of a copious stream of hydrogen, the residue forms a thin dark-green syrup, which possesses an exquisite anise-like odour, and deposits after several days a considerable quantity of hone-shaped crystals. The green mother-liquor is poured off, and the crystals, which consist principally of jervine, washed with ether upon a filter until the washings are colourless. Fifty kilos of powdered root yield about 50 grams or 0·1 per cent. of crude alkaloid. Upon recrystallization of the impure jervine out of absolute alcohol, about 5 per cent. of the nearly insoluble protoveratridine remain undissolved, whilst the alcoholic solution contains about an equal quantity of rubijervine.

As at first the properties or even the existence of protoveratrine were unknown, much time and labour were spent in the manipulation of the mother-liquors from the crude jervine, which still contained large quantities of alkaloid. The syrup was again treated with ether, the insoluble matter removed by filtration and the residue, after evaporation of the ether, triturated with very dilute hydrochloric acid. A green fatty oil, smelling strongly of anise, separated, from which several grams of a light yellow ethereal oil were obtained by distillation with water vapour. The oil had a greater specific gravity than water, boiled between 180° and 220°, and retained its characteristic anethol odour after three years' storage. The hydrochloric acid solution was rendered strongly turbid by ammonia, and upon heating the alkaline liquid a voluminous precipitate formed, which was filtered, washed with boiling water and then dried at the ordinary temperature between unglazed paper. In this way a brownish amorphous powder resulted, which excited sneezing, and with concentrated sulphuric acid gave first a pale rose, then orange-violet and finally greenish-black, coloration.

Since upon heating the alkaline solution, an odour resembling butyric acid ester was detected and suggested decomposition, the further purification of the amorphous alkaloidal mixture by solution in hydrochloric acid and precipitation with ammonia was not attempted. On the contrary, the amorphous powder was repeatedly treated with absolute ether until a body entirely soluble in ether was obtained, further small quantities of protoveratridine and rubijervine being separated by this process. The colourless amorphous powder that constituted the soluble body caused violent sneezing, and 2 milligrams sufficed to kill a rabbit in a short time. It dissolved easily in ether and in methyl, ethyl and amyl alcohols, with difficulty in benzol and ligroin, and melted between 130° and 135° C. Concentrated sulphuric acid gave with this base a brilliant red coloration with faint greenish edge; with dilute hydrochloric acid, a pale, rose-coloured, green fluorescent solution resulted, the colour of which disappeared again on warming; with concentrated nitric acid a faint red coloration was apparent. The combustion of the substance dried at 105° C. gave figures ranging from 66·07 to 67·42 per cent. for carbon and from 8·60 to 9·06 for hydrogen, improbable discrepancies in a body of definite composition. Further it may be observed that these analytical results lie between the figures obtained by Tobein for his veratroidine, 63·41 per cent. carbon and 8·02 per cent. hydrogen, and those of Wright and Luff for veratralbine, 70·96 per cent. carbon and 9·27 per cent. hydrogen. Several other attempts to further purify the amorphous body were also unattended by success, but it is probably a mixture of more or less advanced decomposition products of protoveratrine, standing in the same relation to the latter alkaloid as much of the commercial amorphous aconitine to the crystalline base. It also appears extremely probable that Tobien's veratroidine and Wright and Luff's veratralbine are similar mixtures of decomposition products.

II.—The Metaphosphoric Acid Method.

This method, by which the protoveratrine can be obtained in a pure condition, is the outcome of much careful experiment and continued observation as to the relation of the increase or decrease in toxic activity of the products to the extractive procedure employed. Although protoveratrine can be easily removed from the powdered drug by pure cold water, its isolation in a crystalline state from the extremely acid aqueous extract is a hopeless task.

It is advisable to first extract the crude drug with ether or petroleum ether in order to free it from fatty and resinous matters. About 2 per cent. of a green fat, in which brown resinous lumps and a considerable quantity of characteristic crystals of fatty acids are incorporated, is thus removed. After this treatment the powder is extracted with 80 per cent. alcohol and the solution evaporated in vacuum. The fluid residue is then triturated in portions of 500 grams with 5 litres of water acidulated with acetic acid, the insoluble portion quickly filtered off, and solid metaphosphoric acid added to the solution until no further precipitate occurs. By this procedure a considerable purification is effected, large quantities of amorphous matter, together with much jervine and rubijervine, being thrown out of solution. The voluminous precipitate is quickly removed by filtration, and to the lighter coloured filtrate excess of ammonia is added, which causes no separation of protoveratrine, but a slight flocky precipitate that must also be filtered off before the solution is shaken with ether. Upon distillation of the ether the protoveratrine crystallizes out even in the distillation-flask and, separated from the light syrupy mother liquor, can be easily recrystallized out of strong alcohol, by which means traces of jervine and rubijervine are removed.

From the alkaline liquors, after exhaustion with ether, chloroform removes pseudojervine, but by employment of the metaphosphoric acid method no protoveratridine is obtained, a circumstance that suggests this crystalline base to be a decomposition product of protoveratrine.

Neither protoveratrine nor pseudojervine could be obtained from the extract of the seeds. The precipitate occurring in the filtered acetic acid extract upon addition of ammonia consisted principally of rubijervine, with which traces of jervine were mixed. By extraction of the filtrate with ether, a crystalline base was obtained which gave a violet coloration with concentrated sulphuric acid, melted between 195° and 200° C. and possessed toxic properties similar to but weaker than protoveratrine. Owing to the small quantity, however, its further investigation was neglected.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 21, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

OBJECTIONS TO THE PHARMACY BILL.

WE have received some correspondence expressing approval of the Pharmacy Acts Amendment Bill as far as it goes, but at the same time regret that it contains no provisions in regard to drug stores, or for protecting the title of chemist and druggist from being made use of by unregistered persons. No useful purpose would be served by the publication of these letters, as they are anonymous, and because the several points referred to in them have already been amply discussed; moreover, the PRESIDENT has repeatedly explained the reasons why special provisions of the kind suggested have not been introduced into the draft Bill by the Council. The opportunity may however be taken to point out the incongruity of the objections raised to the Bill as it stands. On the one hand some object to the Bill on the ground that it would prevent unregistered persons from performing duties which, if registration is to be of any value either to the trade or to the public, ought to be scrupulously restricted to registered persons, since the evidence of competence for the performance of those duties furnished by registration is the only ground upon which a claim to the use of the title chemist and druggist can be based. Others again object to the Bill because it does not specifically provide for a restriction of the title, which would be inconsistent with the actual practice of a large number of chemists, who show so little regard for the obligations which the title involves that they carry on branch establishments with apprentices or other unqualified persons in charge of them. In the matter of protection of titles, as well as in that of restriction of company trading, there does not therefore appear to be any sufficient ground for appealing to Parliament, and it is to that conclusion that the Council has come after long deliberation. It is not altogether to the point to say that the title of chemist and druggist is worth contending for; the real question is rather whether under existing conditions it can be contended for with any prospect of success. The means of protecting the trade in regard either to the use of titles or company trading is already in the hands of registered persons themselves, and we fail to perceive how that work can be done otherwise by any outside agency whatever. It may be useful to add that our correspondents above referred to are unconnected with the Pharmaceutical Society.

INFLAMMABLE LIQUIDS BILL.

PROBABLY in consequence of some recent fatal casualties a Bill has been introduced into Parliament by the Home Secretary having for its proposed object to amend and consolidate the law relating to the keeping, selling and conveyance of inflammable liquids. The Bill if passed in its present form would, however, do considerably more than this, since it would extend the application of compulsory regulations as to storage, etc., which are limited in the existing Petroleum Act to liquids "flashing" under 73° F., to liquids having a much higher flashing point. Under the term "inflammable liquids" the new Bill includes, with the exception of "heavy oil," as specially defined, (*a*) liquid petroleum; (*b*) oil or spirit obtained wholly or in part from any liquid petroleum, or from any shale, schist, coal, peat, bitumen, or similar substance; (*c*) any liquid mixture of the above named liquids with other substances; and (*d*) bisulphide of carbon. "Heavy oil," which is to be exempted, is defined as any of the above liquids that has a specific gravity at 60° F. exceeding 1000; or, having a specific gravity of not less than 840, has a true flashing-point at 150° F. For the purposes of the proposed legislation "inflammable liquids" are classified as (1) "mineral spirit," having a true flashing-point below 73°, and (2) "mineral oil," having a true flashing-point above that temperature. The apparatus for determining the flashing-point and the conditions of applying the test appear to be practically those laid down in the Petroleum Act.

The Bill would allow "inflammable liquids" to be kept for sale or private use on any premises without registration or licence, provided that the liquid did not include "mineral spirit" and did not in all exceed sixty gallons, or that, if it did include "mineral spirit," this did not exceed three gallons and the whole amount of inflammable liquid was not in excess of ten gallons. With these exceptions, and subject to certain provisions as to hawking and conveyance, the Bill would make it illegal to keep "mineral oil" except on premises either "registered" or "licensed" under its provisions, or "mineral spirit" except on premises that are "licensed." Even the quantities that may be kept without registration must, in the case of "mineral oil," if kept for sale, be in substantial closed metal vessels, or if for private use be in substantial closed barrels or closed metal vessels, while "mineral spirit" must be kept in separate glass, earthenware or metal vessels, each of which must contain not more than one pint and be securely stopped. The registration and licensing of premises would be vested in the local authorities and be renewable annually, but regulations as to storage are in each case described in the Bill in great detail. In the case of "registered" premises where there is a building in which any persons dwell, the maximum quantity of "mineral oil" allowed to be stored under any conditions would be two hundred and fifty gallons, and in premises where there are no residents the quantity would be regulated by the distance from other "protected works," such as dwelling houses, docks, etc. In "licensed" premises the maximum quantity of "mineral spirit," "mineral oil" and "highly combustible goods"—such as readily ignitable liquids not otherwise affected by the Act, tallow, paraffin, wax or other similar solids—allowed to be kept, and the conditions would be specified on each licence, according to the circumstances of the case.

The Bill also contains stringent regulations as to distinguishing cases containing "inflammable liquids." In the case of "mineral spirit," whether in storage, in course of conveyance, or sold or exposed for sale, the outermost case containing the spirit, or if the spirit be kept in a tank, then the outside of the tank must be marked in conspicuous letters, "Mineral spirit, highly inflammable," and with the name and address of owner or sender or vendor, as the case may be; if the "spirit" be bisulphide of carbon that name also would have to appear. In the case of "mineral oil" exceeding in amount one quart, in the course of being conveyed, the outermost containing vessel must be clearly marked "petroleum," "paraffin," or "mineral oil." The foregoing appears to be the gist of the clauses in the Bill most likely to affect our readers, but it may be useful to add that those who desire further information can obtain copies of the Bill, price 5½*d.*, from Messrs. EYRE and SPOTTISWOODE, East Harding Street, E.C.

In view of the possibility that the institution of a statutory pharmaceutical curriculum may involve the establishment in different parts of the country of teaching centres, in which instruction in special subjects would be most conveniently and effectively given by persons not otherwise engaged in teaching as a calling, attention may be called to two rival Bills providing for the registration of teachers that are now before the House of Commons, since both these Bills would place all but "registered teachers" under the disability of not being able to recover payment for teaching services. The "Teachers' Registration Bill," which would not apply to the educational staff of any university, provides for the registration of teachers who shall have been engaged in teaching for not less than two years before the passing of the Act and of others who hold diplomas from certain educational bodies and have taught for two years in a recognized school. Teachers of special subjects, not holding such diplomas, would in order to obtain registration have to satisfy the Council of their qualification to teach their respective subjects. The Teachers' Registration and Organization Bill, which would not apply to the seven "public schools" or to "elementary" schools, would require similar evidence of qualification from teachers of special subjects before granting to them registration without which they would be debarred from recovering fees in a court of law.

In an indictment for the unlawful administration of phosphorus paste by a girl to her mother, tried at the Old Bailey last week, Mr. Fulton, the prosecuting counsel, commented upon the great facility with which "evil-disposed persons could, if they chose, possess themselves of poison of a dangerous character from general shops and places of that character, which they could not obtain from ordinary pharmaceutical chemists without the authority of a medical man." The jury appended to their verdict an expression of opinion that the attention of the authorities should be called to the loose way in which such poisonous substances are sold at small general shops, in which Mr. Justice Charles concurred, observing that it was a most dangerous state of things that anybody should be able to go into a shop and obtain for a penny that which would destroy four or five lives.

*   *   *

An important advance has recently been made in the interest of the practice of pharmacy in British Guiana. In October, 1884, the chemists and druggists of the colony formed themselves into an association, the value of which has found recognition in an Ordinance of Incorporation granted in August last by the Governor. The objects for which the Association is incorporated are stated to be the advancement of chemistry and pharmacy in the colony; the promotion of the education of intending pharmacists; the consideration of questions connected with the trade of chemists and druggists and the promotion and protection of the trade; the promotion of or opposition to legislative and other measures affecting the trade; the provision of a benevolent fund; and the undertaking, upon request, of arbitration of disputes arising out of trade dealings and the relations of chemists and druggists. The Council of the Association, consisting of nine members, subject to the control of the Association in general meeting, is to have the entire management of the business of the Association, and has power to make bye-laws as to the qualification, examination, election and expulsion of members. The Association is to consist of "members," paying five dollars a year, who are chemists and druggists in business on their own account that were admitted before the 5th of March last or have passed an examination in chemistry, materia medica, pharmacy, and reading and dispensing prescriptions, and "associates," paying three dollars yearly, who are assistants that were admitted before the above date or have passed an examination in the primary rules of the Latin grammar and arithmetic, and shown a fair knowledge of the drugs and poisons in common use. In addition the Council is empowered to admit as members or associates, without examination, persons possessing certificates or diplomas issued by other similar bodies. The organization is, however, at present only in the voluntary stage, and the Ordinance contains no special provision as to protection of titles or regulation of sales.

*   *   *

The death is announced of Apotheker Alexander Gustavowitsch Forsmann, Director and Honorary Member of the St. Petersburg Pharmaceutical Society. The deceased will be remembered by some of our readers as having been a delegate from the St. Petersburg Society to the last International Pharmaceutical Congress held in Brussels.

Proceedings of Societies in London.

ROYAL INSTITUTION.

LORD RAYLEIGH ON PHOTOGRAPHY.

The postponed lecture on "Some Applications of Photography" was delivered by Lord Rayleigh at the Royal Institution on Friday, the 6th inst. Notwithstanding the comprehensive nature of the title, the lecturer confined himself mainly to the consideration of the application of photography to the investigation of phenomena that are too rapid in occurrence to allow any well-defined image to be formed upon the retina of the eye. The demand for short exposures has resulted in the introduction of moveable shutters of different ingenious designs, and by this means such photographs as of the progressive poses of a horse in various gaits have been obtained. In other instances the employment of "instantaneous" light has yielded more successful results, and for the elaboration of this method the degree of instaneity of "flash" lights from various sources has been determined. Rotatory plates or sirens are, the lecturer said, efficient instruments for the computation of the duration of flashes caused by the projection of solid particles, as magnesium dust, into a non-luminous flame, since even when only a moderate speed of rotation is attained, movement can be distinguished during momentary illumination by such means. The electric spark, however, stands a much severer test, and no movement can be discerned in a plate rotated at a speed as high as consistent with safety when suddenly illuminated from such a source. Recourse must then be made to the revolving mirror, and with this instrument Professor Rew of New York has observed that although the duration of the electric spark varies with the length of circuit, the time occupied in the main discharge is never more than one-millionth part of a second, and with small circuits is reduced to one-twentyfive millionth, that is to say, about the same fraction of a second as a second is of a year. But although the electric spark is thus distinguished by its degree of instaneity, it is not easily adapted to photography, owing to the difficulty experienced in the condensation of the light by a photographic lens. This difficulty may, however, be surmounted by suitable manipulation, and the spark between the outside coverings of two Leyden jars, which possessing little tension need no insulation, can be employed, as Lord Rayleigh showed by a series of photographs, to record the various phases in the bubbling of gas from a fine nozzle into water or the forms assumed by a jet of water playing into air. In the first case it can be thus seen that distinct spherical bubbles of gas are formed immediately upon issuing from the immersed nozzle, whilst a jet of water consists at first of a cylindrical column and subsequently breaks up into drops that follow each other in too rapid succession to be visible to ordinary vision, though the naked eye can discern that the disintegration is earlier and more regular when the jet is disturbed by the vibrations of a tuning-fork. In photographs the column of water is seen first to assume a "varicose" appearance, if this physiological term be permissible; alternate swellings and contractions become visible, and the contractions develop into mere connecting ligaments that finally break and follow the loosened terminal globule in the form of one or more smaller globules, a disintegration which is of course due to the surface tension of the water. Lord Rayleigh then proceeded to illustrate other analogous yet distinct classes of unstable jets. As sensitive flames could not be easily employed for lecture experiments, the lecturer showed the production of "water-flames" by injecting a fine jet of a coloured into a colourless liquid. The instantaneous photographs of these flames indicated that they vibrated regularly, if external disturbances were carefully avoided, and that the jets did not assume a varicose but a sinuous appearance, the exterior curves being characterized by peculiar protuberances or "horns." This deviation from analogy in water-jets and water-flames Lord Rayleigh believed to be due to symmetrical differences in the disintegrating forces, and that only symmetrical forces produce varicosity. A different class of phenomena was the next subject of consideration, and it was shown that by the aid of photography even such a rapid occurrence as the breaking of a soap bubble can be studied in its various phases. Shot moistened with alcohol have been the means selected for breaking the soap-film, but experimental ingenuity has been taxed to arrange apparatus to ensure the simultaneous breaking of the film and passage of the electric spark. The first idea of dropping two iron balls from an electro-magnet, one of which should break the film and the other determine the spark, had to be abandoned, as a momentary hesitation occurs in the release of the balls by the magnet when the circuit is broken. The difficulty was finally overcome by arranging two finger-and-thumb springs at suitable distances, which simultaneously released the two balls. It was then found that a deviation of three-hundredths of a second determined the success or failure of the photograph, so that Lord Rayleigh calculated the velocity of the thickened edges of the broken film of medium thickness to be about sixteen yards per second. As the potential energy of the film is proportional to its area, and this potential energy is expended when the film is broken in producing the velocity of the thickened edge of the unbroken portion, it can be easily understood that the speed of the thickened edge will depend on the thickness of the film. Lord Rayleigh's figures, therefore, correspond closely with Dupré's estimate of thirty-two metres per second for a very thin film. The concluding portion of the lecture was devoted to the consideration of the connection between aperture of camera and definition of optical images. Lord Rayleigh proceeded to show that within certain limits the two are directly proportional, and instanced the use of large telescopes, in which the size of the lens is not increased because more light is required, but because the definition is inherently bad with a small aperture, however good the lens may be. A ray of light proceeding from a mathematical point cannot, he said, be collected in another mathematical point by the most perfect instrument attainable, since there is always a certain amount of diffusion. Consequently there must be a region in the neighbourhood of the mathematical focus wherein a lot of light is collected, but if it be granted that this is not a mathematical point, then there must be a definition of image. The lecturer then showed that although a well-defined image was obtained on a photographic plate with five-hundredths of an inch aperture, the definition was entirely lost when the aperture was contracted to half that diameter. At this stage the presence or absence of the lens makes no difference in the clearness of a photograph, but it is found that by the further contraction of the aperture to a certain minimum in the absence of a lens, the definition is considerably increased. This fact has been utilized in so-called "pin-hole" photography, and the recent researches of Professor Petzval of Vienna, Captain Abney, and others have established a relation of aperture to focal length. In conclusion Lord Rayleigh exhibited a photograph of a group of cedars taken at a distance of seven feet without lens, as well as a "pin-hole" photograph of a more comprehensive landscape which would compare favourably in definition with many obtained by more complex instruments.

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

A meeting of the London Section was held on Monday, Feb. 16, at Burlington House, when a paper on "Incandescent Gas Lighting" was read by Mr. W. MacKean. The author dealt chiefly with the lamp known as the Welsbach, consisting of a "mantle" of refractory oxides heated by the flame of a bunsen burner, the whole being protected by a glass chimney. The "mantles" are conical hoods made of cotton thread dipped in a solution of the salts of one or more of the rare earths dried and the organic part of the structure burnt away leaving the threads entirely composed of corresponding oxides. The use of a chimney is necessary, not only to protect the fragile mantle but to aid the draught, and ensure vigorous and complete combustion.

Although zirconia is largely used yet other rare earths have been experimented with, and the mantles as at present made consist of mixtures such as the following:—

	Parts per cent.		
	I.	II.	III.
Oxide of zirconium	20	40	30
Oxide of lanthanum	40	60	40
Oxide of thorium	40		28
Oxide of cerium			2

The first two mixtures give a white, light while the third, containing cerium, has a yellow tone. With much cerium the tint becomes orange and is useless for lighting purposes. Mixtures giving a slightly yellow tint are to be preferred, as not only has the light a greater power of diffusion, but the mantles themselves last better. Didymium has been tried, but appears to deteriorate. In all cases the light at first emitted is brighter than it is after some hours' work; the subsequent diminution is more gradual and the light tends to become whiter. Many factors have to be considered in the production of a good mantle. Some mixtures are inconveniently brittle, while others are not permanent enough in their light-emitting power, or, as already stated, give too white a light. The earths must be free from certain impurities; magnesia and alumina are objectionable, while traces of iron are mischievous in the highest degree. It is essential that an oxidizing flame should be used and that the combustion should be as perfect as possible.

The advantage of a good system of incandescent gas lighting over more sweeping changes in our methods of illumination lies largely in the ease with which the burners may be applied to existing fittings. One condition must be secured, namely a gas supply at a pressure of at least one inch. As to the durability of the mantles it is stated that it may be taken that renewal is necessary after a life of 300 working hours, equivalent to about six months use—rather a low estimate of the number of hours per day during which the burner is alight, as it seems to us. Water gas has been tried for heating Welsbach lamps, but has been found wanting.

In the discussion which followed the reading of the paper Mr. Bernard Dyer remarked on the prevailing ignorance of most chemists on the subject of the rare earths; their very rarity has prevented the attainment of any familiarity with them. It was particularly interesting to see a commercial process in which they were dealt with as quite ordinary substances. The diminution in the light given out by an incandescent gas burner was sometimes very marked, as he knew from personal experience. The possibility of the recovery of the earths from old mantles, and that of their altering in properties by continued ignition and becoming insoluble, as does alumina, were mentioned by Mr. Allen, while Mr. Sutherland drew attention to the real usefulness of a light that was capable of showing colours in their natural tones for laboratory purposes.

In the course of his reply Mr. MacKean mentioned one interesting fact, namely, that zirconia, at one time a most costly material, could now be obtained from American sources for two shillings per pound.

Messrs. Cross and Bevan (the latter chemist being spokesman) communicated a note on "The Volumetric Estimation of Alumina," a subject which has given rise to some difference of opinion between themselves and Professor Lunge. As our readers are probably aware, the authors independently rediscovered about two years ago that when an aluminate is titrated with standard acid, using methyl orange as an indicator, the alumina functions as a base, but shows neutrality, not when the ratio of acid to base is as 6 to 2 but as 5 to 2. To this Professor Lunge has taken exception, and Messrs. Cross and Bevan have had titrations made by independent observers in order to settle the point. They find their contention borne out, and express themselves at a loss to understand how the difference between themselves and Professor Lunge on a simple matter of fact can have arisen. They showed a striking experiment confirmatory of their position, by adding to an acid solution coloured with methyl orange the quantity of alkali demanded by their hypothesis, and to a similar solution the amount that would be necessary were Professor Lunge correct, the neutral point being reached in the first case but not nearly attained in the second. In the discussion which followed Mr. Bertram Blount said that the evidence put forward by the authors was so weighty that it was difficult to do other than agree with them; a cause of discrepancy in titrations made with methyl orange by different observers might possibly be a slight colour blindness in one or other; cases had occurred to his knowledge of persons being unable to use methyl orange with accuracy on account of this defect of vision.

Mr. Allen said that methyl orange was a rather elastic term which might include several substances; some methyl orange was useless as an indicator because of the impurities it contained.

Another member stated that some methyl orange that had come under his notice consisted of a mixture of two different substances, which gave opposite end reactions and was therefore impossible to use. The purity of the methyl orange used by both disputants appears, however, established, as they exchanged samples without affecting their results, which remained as discordant as before. A solution of what can be only a very simple question is much to be desired, and would best be effected by the work of a third experimenter working quite independently.

CHEMISTS' ASSISTANTS' ASSOCIATION.

ELECTRO-CHEMISTRY.

BY T. A. ELLWOOD, A.I.C., F.C.S.

(*Concluded from page* 634.)

Electro-Chemical Analysis.—I will now briefly refer to a method of analysis which bids fair to become a useful and at the same time an accurate method for nearly all the metals, and what is equally well in its favour, it is a great economizer of time, which is always an important factor with the analyst. I do not claim any originality in the methods or results, which I shall bring before you, but having tested many of them practically I am convinced of their great utility even to those who only occasionally require analytical methods. And as I have always maintained that every pharmacist should also be an analyst, I may say in answer to critics that this branch of knowledge is of interest even to a chemist's assistant; if it is not I pity or else blame that assistant. The mere tyro in practical chemistry is aware of the electro chemical deposition of arsenicum or mercury upon copper, or that of antimony upon platinum; for who, having done anything in chemical analysis is not familiar with the brilliant deposit of mercury upon copper when an acidulated solution is boiled with it? or in the latter case mentioned, which is more illustrative of electrolytic reaction, which of you has not deposited the black looking element antimony upon the bright surface of platinum by means of zinc and an acid?

Here we have metallic electrodes, platinum acting as the kathode and zinc as the anode, the antimony solution being the electrolyte together with the acid. For example, a solution of antimony chloride is taken with excess of hydrochloric acid. We have the excess of acid acting upon the zinc.

$$\underset{+}{Zn} + \underset{\pm}{2HCl} = \underset{\pm}{Zn\,Cl_2} + \underset{+}{H_2}$$

The hydrogen in its passage to the kathode decomposes the antimony solution.

$$\underset{\pm}{2SbCl_3} + \underset{+}{3H_2} = \underset{+}{Sb_2} + \underset{\pm}{6HCl}$$

Hence we have the positive antimony depositing upon the platinum kathode.

This, then, is a simple illustration of electrolytic analysis, and you can see that not only can it be utilized qualitatively, but also quantitively. Though this form of analysis is not new, as the example evidences, yet its application as a general laboratory method on a more extended scale for many of the other elements, is but of recent date, and of course various improvements in the detailed manipulation and in the apparatus employed, are constantly being discovered, and must be conscientiously investigated before it can be advanced as an improvement upon the old trusty chemical system. Doubtless the investigator to whom we owe most for the advancement of electro-chemical analysis is Prof. Classen, of Aachen, who has not only tried the various methods suggested during the last ten years, but has discovered many others, and has written a treatise upon the subject, which may be relied upon as a safe text book by the student of this particular branch of chemical research.

The cleanliness of this system, the simplicity of the apparatus required, and the want of very little attention, make it just the method for adoption by the pharmacist who is anxious to make himself likewise a reliable analyst, and who is desirous of using his knowledge to the advancement of his business and his *locus standi* with the medical world and scientists generally.

Taking as a guide the methods recommended in Classen's treatise, already referred to, of which there is an American translation, I performed the experiments with a slight modification of the descriptions, using in each simpler apparatus, less costly and easily fitted, although no doubt not so accurate as more elaborate instruments; still with a slight mechanical knowledge, many efficient instruments can be devised out of old burettes, glass tubes, strips of metal, etc.

First there is the battery to decide upon and arrange. Doubtless the use of storage cells is a great advantage as giving a more regular current without the necessity of recharging during the operation. But there is the difficulty to be encountered, How to recharge them or get them recharged for the next experiment, especially as there is not always the opportunity of effecting this by means of a dynamo. Their use therefore falls out of the question of initial investigation.

Almost any battery will answer the purpose if kept properly charged, and connected in such a way as to give a steady current. At first I used an old bichromate battery which I had by me. But the electromotive force seemed to vary so greatly that I dispensed with it, and fitted up three Bunsen's cells; the objection to them is the fumes produced by the decomposition of the nitric acid. Having seen a suggestion that the use of bichromate of potassium and sulphuric acid, in place of nitric acid, is equally as efficient, I substituted chromic acid in the porous cell with very good results. By the connection of these three cells in series a current is obtained of a strength of a little over one ampère. Classen recommends a battery giving 10 to 15 c.c. of electrolytic gas per minute, and as we have mentioned one ampère is equal to 10·436 c.c. of the gas. The electro-motive force of each cell would be about 1·5 volt.

Instruments.—In order to measure the strength of the current we must have some kind of voltameter. This I arranged out of a couple of glass tubes, one of which I graduated, using for it a broken burette; my type was that of Classen.

The graduated tube was cemented at the bottom to a bulb (thistle-headed funnel), in which platinum terminals had been fused; the other tube was connected by means of indiarubber pipe similar to an Allen's nitrometer. The instrument is filled, as suggested by Faraday, with sulphuric acid, s.g., 1·22.

The evolution of gas on connecting with the battery is read off as in the nitrometer; that is, by adjusting the levels of the liquid by means of the indiarubber tube.

To ensure the current remaining constant a rheostat or resistance coil is necessary, and this can easily be arranged by insulating a piece of wire of known resistance, and inserting it in the current, arrangement being made for lengthening or shortening it as the current strength may require. In my working, however, I dispensed with this, regulating the current by means of short circuiting with thin iron wire, as the current need only be approximately estimated, a slight increase or decrease not affecting the reaction so far as accuracy goes, but only as regards the time occupied; for since by Faraday's law every substance has an electro-chemical equivalent, the deposit is in direct ratio to the time and strength of current.

The stand I used for the work was constructed from the glass insulating stand of the prime conductor of an electrical machine, with the rings from a retort stand. The dish employed was of nickel lined with platinum, though this is said not to be so accurate as one entirely of platinum. Its capacity was 140 c.c. about. I also tried a copper dish, which in some instances was equally as effective, and the cost of this more in accordance with my purse than that of platinum at present price.

All metal exposed to acid fumes must be varnished.

Experiments.—The first thing is to get a suitable electrolyte, one that will form soluble salts with the metal. These are the acids, ammonio salts, oxalates, sulpho salts, and alkalis.

Bismuth.—Nitric acid being a good solvent of the bismuth salts, can be used for their formation, and also for their electrolysis. I however prefer sulphuric acid, as the current is more regular and there are no noxious fumes evolved to corrode the metals around, neither is it so likely to redissolve the deposited bismuth. The current should be equivalent in strength to the evolution of 2–3 c.c. of electrolytic gas; and the solution kept slightly warm will facilitate its deposit. In all instances a warm solution tends to reduce the resistance, and frequently to promote chemical action.

Example:—

Bismuth oxynitrate taken. . .	1·05 grams.
Treated with H_2SO_4 to form solution and electrolyte.	
Amount of bismuth calculated .	·7195 gram.
Amount of bismuth found. . .	·723 gram.

$BiONO_3,H_2O = 305$.

Copper.—This operation may be conducted in a similar manner, but here I have found Classen's method to be easier and more reliable. The copper salt is dissolved in a saturated solution of ammonium oxalate with excess of oxalic acid; as it is a great advantage to keep the solution acid, more acid can be added as the deposition progresses. The solution should be kept slightly warm, say at a temperature of about 120° F., and a current equal to 3-4 c.c. of gas per minute employed. Very accurate results are obtained. In drying the kathode containing the deposit, in this and other instances, the temperature should not exceed 212° F., as some metals are so liable to oxidize if this be exceeded. Example :—

Sulphate of copper taken. . .	3·2 grams.
Copper calculated	·8134 gram.
Copper found	·813 gram.

$CuSO_4{\cdot}5H_2O = 249{\cdot}4$.

A solution of copper nitrate was also taken, of unknown strength, and estimated for copper, both electrolytically and gravimetrically, with the following results :—

1. Gravimetric method.

Solution taken	20 grams.
Copper found	·433 gram.

2. Electrolytic method.

Solution taken.	50 grams.
Copper deposited.	1·083 grams.

This proves the accuracy of the electrolysis compared with the purely chemical. Should arsenic, however, be present with the copper, it is necessary to first remove it, which can easily be accomplished by evaporating it several times on a water bath with a hydrochloric acid solution of bromine, the arsenic escaping as the volatile tribromide. The copper salt is then decomposed with sulphuric acid and the electrolytic process then adopted.

Estimation of Cadmium in presence of Zinc.—The metals are converted into sulphates by decomposition of their mixed salts with sulphuric acid, a solution of sodium acetate is then added, and enough acetic acid to give it a distinct reaction; it is then electrolysed in the warm solution by a low current. The process occupies about six hours, the cadmium being completely precipitated.

Silver and Nickel.—These are electrolysed from their double cyanides with potassium, and offer no difficulty. The solution is best if kept at a temperature of 120° F. No attention is required, and the metals are completely precipitated, and hence give very accurate results.

Example.—Silver coin taken, weighing 3·4 grams, was converted into its potassiocyanide and the result electrolysed.

Silver found 3·142 gram.

Iron.—The iron salt is converted into a sulphate or chloride and treated with potassium oxalate, using sufficient to redissolve the precipitate at first formed; ammonium oxalate is then added in large excess of the iron salt present. A current of about one ampère is used to effect the electrolysis. Either a hot or cold solution may be used. Ferrous salts or ferric are equally well precipitated, but from the quantivalence you will see that a ferric salt takes longer time.

Examples—

Taken solution of dialysed iron. .	10 grams.
Iron found by deposition	·348 „

The Pharmacopœia says "100 grains by weight affords a precipitate with a solution of ammonium, which washed, dried, and ignited, weighs 5 grains." Assuming this to be ferric oxide, dialysed iron should contain 3·5 per cent. of the metal compared with 3·48 per cent. obtained by the electrolytic analysis.

Numerous other applications of this mode of analysis can be seen from these examples, and I can say that its study is useful and interesting, its results definite and accurate, and, I doubt not, its prospects good.

Lead and copper may be estimated simultaneously in the same solution, the lead depositing as the peroxide and the copper in the metallic state.

Gold, mercury and platinum are electrolysed in solutions with sulphuric or nitric acid; antimony and tin, by solution of their sulphides in sodium or potassium sulphides, and a large number of the metals as double oxalates or ammoniosulphates.

Qualitatively, electrolysis is extremely delicate for the detection of gold, mercury or arsenicum, and its application needs still further investigating.

I trust I have not wearied you with this very desultory paper, but hope that I may have awakened someone's enthusiasm, who will prosecute the further research in the employment of electricity. If this paper has not been too dull and monotonous, I hope on some future occasion to give you results of work I am now engaged in.

The President said the Association was indebted to Mr. Ellwood for his excellent and exhaustive survey of a very important subject. Notwithstanding the great expectations from electricity, it was remarkable that no great advance had been made during the last ten years, and there was little doubt that the science was yet in its infancy. Mr. Ellwood had said that the electricity in certain cases of reaction must be regarded as the cause, and the chemical change the result. No doubt this was true in some abnormal cases, but in by far the majority of chemical changes where electricity was produced, the converse seemed to be the case, and the electricity, as it were, a bye-product. He should like to ask Mr. Ellwood his experience with various kinds of cells. A modified form of Bunsen (Smee's shape with Bunsen's elements) had been found extremely useful. With regard to electric lighting the great need was to produce sufficient intensity of current without the expenditure of so much mechanical energy; at present the cost of the steam engine almost neutralized the great saving in plant materials over gas, while the loss by friction was enormous. No one probably knew more of the practical working of electro plating than Mr. Ellwood, and his remarks on that branch of the subject were especially valuable. He should like to ask him if he had seen the process known as "acierage" in use, and whether it was of the practical value claimed for it. There was no doubt that pure water was not an electrolyte. Bunsen had shown the presence of free nitric acid in water collected after a storm. At the same time, if water did not conduct electricity it was difficult to explain the great conductivity of frictional electrical machines during damp weather. The most interesting part of the paper to a pharmacist was the section on electrolysis applied to analysis, and they would all admire Mr. Ellwood's ingenious substitutes for elaborate apparatus. The processes were extremely simple and very accurate. He should like to ask Mr. Ellwood if there was any method of rapidly ascertaining the end of any of the reactions that occurred, and the time usually required to complete them.

Mr. Helbing, commenting upon the practical importance of electrolysis, said he had had experience in the use of many of the processes described for analytical purposes, and especially in forensic analysis, where it was extremely useful, in that it afforded an actual result; one that could be seen. This was strikingly so with mercury. He had used the same process for the determination of mercury in urine when he had occasion to report upon the medicinal action of the various mercury compounds.

Mr. Smith asked if the author had any practical experience of the thermopile, as a friend had found it very useful for commercial purposes.

Mr. Ellwood in reply said it was for a long time supposed that chemical change was the precursor of electricity, but the more recent theory was that electricity was the cause and chemical change the effect. He had found an ordinary Bunsen to be the best cell. The question of a more economical mode of generating electricity involved many considerations, such as calorific calculations, the friction of the pulley on the fly wheel and of that on the dynamo, the horse power and how much of it could be converted into work, and the amount of work absorbed by exciting the magnets, etc. It was not unusual to get in dynamos only 93 per cent. of actual efficiency, frequently indeed only 85 per cent., and he had known it as low as 70 per cent. If the electromotive force were low, high efficiency was not likely to be obtained. Pure water, doubly distilled and free from dust, was not an electrolyte; the deleterious effect of moisture upon electric machines was due to the fact that it was impure and contained particles of dust, etc., whilst further deposits of moisture altered the temperature of the machines. In electroplating one coating of silver was usually sufficient, but many firms put on two or more. The tensile strength of aluminium could not be over estimated, and the fact that it was more useful in alloys was due to the difficulty in obtaining the metal pure at a price that would enable its introduction to pay. 95 per cent. of the aluminium produced was used in various bronzes. The failure of the Aluminium Company was chiefly due to the fact that they could not get the metal free from silica, which made the alloys brittle. Freshly precipitated calcium phosphate was used in the phosphorus process. The end of a reaction in electrolysis could be determined in the ordinary way, by drawing some of the solution into a capillary tube and testing on a plate with a colour reagent. He had never tried the method suggested by Mr. Helbing for detecting mercury in urine, although he could see its practicability. He had not used the thermopile; he thought there would be a difficulty in obtaining a constant current.

A meeting of the Association was held at 103, Great Russell Street, on Thursday, December 4, the President, Mr. A. Campbell Stark, in the chair. In the absence of the author, Mr. Seccombe, Honorary Secretary, read a paper on:—

PASTURE SOILS.

BY MISS MUNRO.

In this paper Miss Munro gave the substance of a communication on "The Herbage of Old Grass Lands," contributed by Dr. Freane to the Journal of the Royal Agricultural Society in 1888. This communication had its origin in an attempt to determine the species in the herbage of pastures to which their fattening and dairying qualities are due. The different sorts of grasses especially are so difficult to distinguish when closely grazed and never allowed to flower, that considerable difference of opinion as to their identity exists, some authorities, for instance, denying the persistence of perennial rye grass, whilst others maintain that it is one of the most valuable grasses for yield even in the oldest pasture lands. To determine this point a number of sods of grass and soil, 2 ft. by 1 ft., taken from pastures in different parts of the country, were transplanted into the Botanic Garden at the College of Agriculture, Downton, when the herbage was allowed to flower, and the species determined. A sample of the soil from each turf was also analysed mechanically and chemically. Twenty-seven samples were thus treated, and from the chemical analyses of the soils it was inferred that the chief characteristics of pasture are, in the first place, the unusually large amount of organic matter in the soil, containing nitrogen in a form available for plant-food; this is due to the continual growth of the roots and fibres of the herbage, the accumulation of which goes on much faster than decay. When it is remembered that soils are classified as rich or poor, according as they contain a large or small amount of humus, the importance of this point can hardly be over-estimated. Indeed, Sir John Lawes considers the accumulated vegetable matter of a soil as the stock of "fertility" on which we are continually drawing in crops taken off arable land after breaking up pasture. Secondly, the small amount of lime, this having been washed out by rain water containing carbonic acid gas in solution. Thirdly, the usually small quantity of phosphoric acid. This is a peculiarity of old dairy pastures and land upon which young stock is raised.

The species of plants found in the different cuttings of turf are set out in the following lists, in order according to the frequency of their occurrence:—

Of the Gramineous Herbage—

Perennial rye-grass occurred	in 24	of the 25 turves.
Florin	in 21	„
Crested Dogstail	in 21	„
Yorkshire fog	in 20	„
Rough-stalked meadow grass	in 19	„
Sweet scented vernal grass .	in 12	„
Rough cocksfoot	in 12	„
Sheep's fescue and other varieties fescue . . .	in 11	„
Timothy, or meadow catstail	in 9	„

Of the Leguminous Herbage—

White or Dutch clover	occurred	in 22	turves.
Purple or meadow clover	„	in 10	„
Common birdsfoot trefoil	„	in 5	„

Of the Miscellaneous Herbage—

Species of buttercup	occurred	in 22	turves.
Narrow-leaved mouse-ear chickweed	„	in 18	„
Ribgrass or plaintain	„	in 10	„
Common sorrel	„	in 9	„

The grasses constituted 58 per cent. by weight of the total herbage on twenty-five of these turves taken together.

Perennial rye-grass amounted to 65 per cent. of the total grammeous herbage. It was found to be absent only on two turves, one from Elvaston, Derby, and one from Pitfour Castle, Perth. The analyses of the soils of these two pastures show them to be rather poorer in composition than most of the others. It is well known that rye-grass likes a rich soil and can be forced to almost any extent by liberal manuring, sewage irrigation, etc.

White or Dutch clover, the only leguminous plant occurring in any quantity, was found on all but three, and in a turf cut from one of the noted Stilton cheese pastures in Leicestershire, it formed *over one third* of the herbage.

The Leguminosæ formed about 9 per cent. of the total herbage. The 33 per cent. of miscellaneous herbage needs no remark. On many of the sods weeds grew, which stand no chance of flourishing in closely grazed pastures.

The President said he had listened with deep interest to Miss Munro's excellent paper, and could not help noting the comprehensive manner in which the subject had been treated.

Mr. W. Lloyd Williams remarked that though such a subject as the analysis of soils might at first sight appear to have little to do with pharmacy, yet to the country chemist it was of undoubted interest. Much of his business was agricultural, and there was no better way of winning the respect of the British farmer than to show oneself conversant with the things that interested him. Cheshire was one of the best dairying counties in England, yet no soil was sampled from there. He had heard that buttercups in pasture were evidence of poor soil. He believed that it had been shown conclusively that there was no better means of enriching soil than irrigation with sewage—a fact full of significance in relation to the question of sewage disposal. He concluded by proposing a hearty vote of thanks to Miss Munro for the valuable paper just read.

Mr. Shepheard said that from personal observation he did not think the presence of buttercups in the pasture affected the quality of the soil. Sewage was certainly a good fertilizer, but care was necessary to prevent cattle drinking it in the ditches, as in this way disease might be communicated.

Mr. Helbing referred to the importance of species of the order Cyperaceæ in determining the value of grass or hay, and asked if there was any allusion in the paper as to whether the composition of the soil had any relation to the nature of the herbage, particularly so far as the Cyperaceæ and Graminaceæ were concerned. Samples of hay were sometimes taken to the chemist, with the request that he would determine how much of the Carex species they contained and how much Graminaceæ, as on these factors depend the value of the produce. The question of sewage irrigation was of great interest; very great attention was being directed to the subject in Germany, especially with reference to the cultivation of medicinal plants. At the International Medical Exhibition in Berlin he had seen some very fine specimens of aconite and belladonna leaves (both said to be very rich in alkaloids), which had been grown in that way.

Mr. Richards also referred to the omission of Cheshire. Many acres of rich soil outside Cheshire were covered with sea water. Some of the best mutton came from Wales, and there the soil was largely ferruginous and clayey. Warwickshire and Worcestershire were also omitted, yet a great deal of pasture was farmed in those countries.

Mr. Seccombe said it had occurred to him that for the estimation of phosphoric acid, a standard solution of acetate of uranium might give more accurate results than the molybdate of ammonium process, but Miss Munro rightly explained the advantage of the latter, the success of which would not be affected by the presence of the iron and alumina in the soil. Mr. Seccombe remarked on the convenience of employing the standard uranium solution for the estimation of phosphoric acid in urine and in manure. In reply to the President he was not aware that the authoress had used any other process for the estimation of the mechanical constituents than that of separation by sifting or washing, as described in the commencement of the paper. Cheshire and other counties, including Cornwall, were omitted, but he did not think this significant. In answer to Mr. Helbing the subject of the relationship between the chemical constituents of the soil and the plants which appeared upon it, was a very interesting one, and doubtless these latter were greatly influenced by, and indeed, their growth largely depended upon the nature and condition of the soil in which they grew. He fully endorsed all that had been said in reference to sewage irrigation. Mr. Seccombe concluded by seconding the vote of thanks to the lady who, at much self-sacrifice through continued indisposition, had given them the able paper he had had the honour to read that evening. He thought it would be well if all those who gave promises of papers would emulate the example Miss Munro had set them in this particular.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Midland Counties Chemists' Association was held on Tuesday evening, the 17th inst., in the Mason College, Birmingham, Mr. A. Southall, President, in the chair. The receipt of the Calendar of the Pharmaceutical Society for 1891, from the Secretary, and the 'Year-Book of Pharmacy' for 1886 from Mr. E. C. Naish was announced. The following paper was then read on—

Tinctura Quininæ Ammoniata.

BY H. D. ADCOCK.

In the "Review of Year 1890" in *Pharm. Journ.* of January 3, may be seen a paragraph touching on ammoniated tincture of quinine, in which Mr. Lunan had proposed to use carbonate of ammonium in place of solution of ammonia, "because it has been found that carbonic acid gas is a powerful solvent of quinine." This would seem to imply that there is a difficulty in making tinct. quinin. ammoniat. with solution of ammonia. Not many weeks since I heard of a London chemist using heat in preparing this tincture.

But for these facts I should never have presumed to give this short paper on what even to all here tonight may be deemed so simple a matter, but I trust from what I have mentioned you will not consider me altogether out of place in bringing the matter before you.

By rubbing down the sulphate of quinine in a mortar before adding the proof spirit, I have found but little difficulty, without heat; but the following is a process easy of manipulation, requiring but ordinary care and perfect in results.

℞ Sulphate of quinine . . .	160 grains.
Solution of ammonia . . .	2½ fluid ounces.
Rectified spirit	℥xj. and ♏ 105.
Water to	20 fluid ounces.

Rub down the quinine in a glass mortar to fine powder, add the rectified spirit and stir; now add the solution of ammonia, then the water in such quantities that any turbidity caused by each portion disappears before adding more, filter.

Where practicable (as shown by Mr. Lothian) allow to stand four days and filter from deposit, this latter precaution doing away with the slight deposit found in this tincture after standing a few days. The resulting tincture is, of course, in exact accordance with the requirements of the Pharmacopœia, the seeming extra spirit being necessary to allow for the contraction in volume of the spirit and water when mixed.

In the discussion which followed, in which Messrs. the President (Mr. Alfred Southall), Perry, Gibson (Wolverhampton), Cripps, Lowther, and Alcock took part, there seemed to be a consensus of opinion that little difficulty was required in making the preparation without the application of heat (as recommended by the Pharmacopœia) and with pure materials and ordinary care.

A vote of thanks was accorded the author on the proposition of Mr. Gibson (Wolverhampton), seconded by Mr. Perks.

In the absence of Mr. Robinson, who was announced to read a paper on "Chemistry of the B.P. Addendum, 1890," and who had telegraphed during the day that bereavement prevented him from reading his paper, Mr. John Barclay, B.Sc., read a paper on the "Respiration of Plants." The paper was illustrated by experiments, and in the discussion which followed, Messrs. the President, Cripps, Perry, Alcock, and others took part.

Mr. Cripps proposed, and Mr. Perry seconded, a vote of thanks to the author for his paper.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

The fourth ordinary monthly meeting of the session was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday, February 11, Mr. H. Kemp in the chair. In the absence of the author a paper was read by the Hon. Secretary, entitled "Foods and their Uses," by J. Redhead.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held on Thursday evening, the 12th inst., when Mr. James McDonald, dispenser to the Dundee Royal Infirmary, read an excellent paper on "Dispensing." Many valuable hints were submitted for the handling of difficulties, which were much appreciated by the members, particularly the younger portion, for whom the paper was specially intended. A code of rules for the dispensing and checking of prescriptions, which is very strictly adhered to with excellent results in one of the best dispensing establishments in Glasgow, was read by Mr. McDonald.

Considerable discussion followed the reading of the paper, which was taken part in by most of the members, and the author was awarded a hearty vote of thanks.

Parliamentary and Law Proceedings.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* MARY ANN PRICE.

Before His Honour Judge Abdy, on Friday, February 13, at the Romford County Court, the Council of the Pharmaceutical Society of Great Britain sued Mrs. Mary Ann Price, of 32, East Street, Barking, for a penalty of £5, for keeping open shop on November 17, 1890, for the retailing, dispensing, or compounding of poison, and a further penalty of £5 for taking, using, or exhibiting the name or title of chemist, both being contrary to the provisions of the Pharmacy Act, 1868.

Mr. T. C. Granger appeared for the Council.

Mr. Martelli appeared for the defendant.

Mr. Granger applied to amend the particulars by alleging that similar penalties had been incurred by the defendant on November 14, 1890, at 18, Broadway, Barking, and on November 26, 1890, at 1, King David Lane, Shadwell, but as the Council had no desire to press for accumulated penalties, he should only ask for one penalty for each offence.

His Honour expressed approval and allowed the amendment.

Mr. Granger, in opening the case, stated that the defendant was the wife of a registered chemist, who resided and carried on business at Arundel. The defendant had separated from her husband and had for some time been living at 32, East Street, Barking, where the business of a chemist and druggist had been carried on, and where on November 17 last some laudanum had been purchased, the label on the bottle bearing the name "Price and Co., Manufacturing Chemists, 32, East Street, and Broadway, Barking, also King David Lane, Shadwell." The businesses carried on at Broadway, Barking, and King David Lane had recently been formed into a company, styled "Mabyn and Co., Limited." By the articles of association of the company it would be shown that the defendant was the vendor to the company of those businesses. At each of the shops a poison had been purchased on the dates mentioned, of which he would give proof, and he should ask His Honour to find that defendant was keeping open shop for retailing, dispensing, or compounding of poison and using the title of chemist, and had thereby rendered herself liable for the penalties sued for.

W. J. Hobbs examined by Mr. Granger: I am house porter at the house of the Pharmaceutical Society. On the 14th November last I purchased at 1, King David Lane, Shadwell, twopennyworth of laudanum, and on the 26th November last I purchased at 18, Broadway, Barking, twopennyworth of laudanum.

Cross-examined: At King David Lane I was served by a man named Hampshire. I did not know him personally. I have identified him since. I do not know the defendant. I only saw Hampshire in the shop. At 18, Broadway, I was served by a young man. I have since ascertained that his name is Benson.

Mrs. Yallop examined by Mr. Granger: I live in Barking. On the 17th November last I went to 32, East Street, Barking, and purchased twopennyworth of laudanum.

Cross-examined: I did not see the defendant.

Mr. T. U. Price examined by Mr. Granger: I am a registered chemist. My business is at Arundel and I reside there. About July, 1889, I assigned the lease of 32, East Street, Barking, to my wife. From that time I ceased to have any interest whatever in the business carried on there. I made over the stock in trade to my stepson, Northwood. He was the proprietor of that business. My wife did not carry on that business. She lived at East Street. I purchased King David Lane business for my stepson. I formally assigned that business to him about January, 1889.

Cross-examined: I cannot say I was successful at East Street. King David Lane was an old business. I have not had anything to do with the Broadway business.

Mr. Hayman examined by Mr. Granger: I am from the office of the Registrar of Joint Stock Companies, Somerset House. I produce the file of "Mabyn and Co., Limited."

Mr. Granger: The memorandum of association of that company contains the following: "to acquire and take over as a going concern the business of a chemist and druggist now carried on by Mrs. Mary Ann Price at 1, King David Lane, Shadwell and 18, The Broadway, Barking," and the defendant subscribes for 660 £1 shares out of a total of 1000 which form the capital of the company.

Mr. E. J. Eastes examined by Mr. Granger: I am an analyst and assistant to Professor Attfield. I have analysed the contents of the three bottles produced and I find each to contain a preparation of opium known as laudanum.

Mrs. Mary Ann Price examined by Mr. Martelli. I have not kept open shop for the sale of or sold poisons at either of the three places. I have never used the name or title of chemist. I did not pay the rent. Northwood paid it. I did not take any of the profits. The business at East Street was my son's. Mr. Price assigned the lease to me. 18, Broadway, was also my son's. I never lived at the Broadway. My son turned the two businesses into a company. He gave me the 660 shares.

Cross-examined: About the close of last year he said a company would be formed, and I should have 660 shares. I lived at East Street until about last October, then I went to live at King David Lane.

Herbert Northwood, examined by Mr. Martelli: I am living at 1, King David Lane, Shadwell. I am not a registered chemist. I acquired the Shadwell business some time in June, 1889. I managed the business with Mr. Hampshire. I employed a qualified assistant. I know now that I was infringing the Pharmacy Act. I purchased the Broadway business of Barry. I paid the rent. I turned the business into a company because I knew I was infringing the Act.

By His Honour: When did you learn that?—I learnt that from the inquiries plaintiffs were making about the business of Price and Co. I took legal advice. My name did not appear, in order to protect myself against the Pharmaceutical Society.

Cross-examined: 32, East Street has been re-assigned.

Mr. Martelli addressed His Honour at considerable length, and submitted that the defendant had not kept open shop at either place, or used or exhibited the title of chemist.

His Honour: I am satisfied that Mrs. Price was the owner of these businesses, and that it was all sham that Northwood was carrying them on. I am satisfied of this by the evidence given on behalf of the defendant, and by the manner in which Mr. Price gave his evidence. Then the file of "Mabyn and Co., Limited," has been produced, and I am bound to consider the importance of the statement therein. It is obvious that the intention of Mrs. Price was to induce persons to believe that she was carrying on the businesses which she conveyed to the company. The labels used at East Street and the other shops bear the name of Price and Co., and I entertain no doubt that Mrs. Price was in fact keeping the open shops. I give judgment for the plaintiffs for the two penalties.

Mr. Granger: I apply under the statute for costs on the higher scale.

His Honour: Certainly. This is a case of public importance. The statute creating these penalties is for the protection of the public.

Reviews.

The Treatment of Syphilis of the Nervous System. By Julius Althaus, M.D.*

The substance of this little treatise was communicated to the International Medical Congress at Berlin, 1890. It contains an account of the method employed by the author in treating syphilis in its primary, secondary and tertiary stages; especially those manifestations which occur in connection with the nervous system. Dr. Althaus insists on the advantage of the use of a preparation which he calls "carbolized mercurial cream," and it is administered by injection. He maintains that the carbolic acid used in the mixture has the power of blunting the sensibility of the skin in all but "hypersensitive" persons. It is, therefore, a painless method of treatment, and as it is strongly recommended in this little *brochure*, probably many practitioners will be induced to give the method a trial. The method of preparing the cream is given in detail in the book.

Kemp's Guide to Health for India and the Tropics.†

This convenient and useful little book has been compiled for the purpose of affording a concise and simple account of the dangers to health likely to be encountered in the tropics, and the readiest means of avoiding and overcoming them. The advice given is generally good and reasonable. The book may be recommended to those who are so unfortunately situated as to be at a distance from a good doctor.

BOOKS RECEIVED.

Commercial Botany of the Nineteenth Century. By John R. Jackson, A.L.S. London: Cassell and Co., 1890.

A Manual of Organic Materia Medica. Being a Guide to Materia Medica of the Vegetable and Animal Kingdoms. By John M. Maisch, Ph.M., Phar. D., etc. Fourth edition. London: Hirschfeld Bros. From the Publishers.

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* London: Longmans, Green and Co. Pp. 35.

† Bombay: Kemp and Co.

Obituary.

Notice has been received of the death of the following:—

On the 24th of January, Mr. Samuel Burdge, Chemist and Druggist, High Street, Bristol. Aged 63 years.

On the 3rd of February, at Handsworth, Mr. James Withers, Chemist and Druggist, Great Lister Street, Birmingham. Aged 75 years.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Milk of Sulphur.

Sir,—On several occasions there have appeared in the Journal suggestions for the modification of the present formula for pil. rhei co. In my opinion it requires no alteration at all. With regard to the paper on the sale of milk of sulphur, in the Journal of January 3, it seems to me beside the question to go into the history of the origin of this ancient chemical. The charge against it has been that when prepared with lime, sulphuric acid and sulphur, it is an unwholesome medicine, and therefore should not be allowed to be sold. Now where is the evidence to support such a charge? In none of the cases hitherto read have any facts been brought forward to prove its unwholesomeness. The various prosecutions have been founded upon nothing more substantial than the assumptions and opinions of a few of the witnesses. If this had been a newly invented drug there might be some excuse for urging that as it contained sulphate of lime it would probably prove hurtful when taken internally. But in the presence of the facts that it has been in use something like two centuries and received official sanction from the highest authorities, whilst no recorded case of injury resulting from its use has been produced, it does seem rather like presumption for any man, whether M.D., public analyst, or chemist, to declare it to be unfit for use.

A few years ago I looked for evidence that might prove its hurtful nature; but I succeeded in finding only a case, reported one hundred years ago, where a patient who had taken flowers of sulphur daily for two or three weeks experienced certain ill-effects.

However, it is desirable to have the dispute settled, and whichever way the decision goes will matter little.

Respecting black sulphur, the fact of it containing small quantities of arsenic was known many years ago, and on that account it has been preferred for external use in skin affections.

John Eagle.

A Kingsland Query.—Information on the subject is already too widely diffused and acted upon to necessitate further publicity. In regard to any particular case we should recommend you to obtain legal advice.

E. Ansall is recommended to consult his medical attendant.

"*Glaswegian.*"—Every person who passes the Minor examination and receives from the examiners a "certificate of competent skill and knowledge and qualification," is at once registered as a chemist and druggist under the Pharmacy Act, 1868, and the occurrence of the name on the Register is legal evidence of the qualification. At present there is no separate fee payable for registration.

NOTICES OF MEETINGS.

School of Pharmacy Students' Association.—Thursday, Feb. 26.—Paper on "Field Botany," by Mr. H. Garnett; Report on Analytical Chemistry, by Mr. W. F. J. Shepheard.

Chemists' Assistants' Association.—Thursday, Feb. 26.—Paper on "Telephone and Phonograph," by Mr. J. J. Smith.

Communications, Letters, etc., have been received from Messrs. Williams, Cripps, Naylor, Wiebert, Woollatt, Progress.

"THE MONTH."

Photography of Colours.

Considerable interest has been recently excited by the presentation of a series of stable coloured photographs of the solar spectrum to the Academy of Sciences, in Paris, by M. G. Lippmann. It may be remembered that in 1848, M. E. Becquerel succeeded in photographing the solar spectrum by allowing a ray to impinge upon a plate of silver covered with subchloride of silver; but the image produced was not fixed, and although permanent in the dark it was destroyed by light. M. Lippmann (*Comptes Rendus*, Feb. 2, p. 274) has obtained more permanent results when employing the sensitive reagents, developers, and fixing materials in ordinary use, but modifying the physical conditions that usually obtain. The two essentials demanded for colour photography are the continuity of the sensitive medium and the presence of a reflecting surface behind the plate. Continuity is defined as the entire absence of granules; that is to say, the iodide or bromide of silver must be so disseminated throughout the layer of albumen, gelatine or other transparent and inert medium, that no granules can be observed with the aid of a microscope. Such a plate is transparent, or at most possesses a slight blue opalescence, and, provided with a posterior reflecting surface of mercury, M. Lippmann exposes it and developes and fixes the image as if to obtain a black negative of the spectrum. The result is, however, different, for the stereotype shows a negative coloured image of the spectrum by transmitted and a positive coloured image by reflected light, and the colours so obtained have been submitted to the most intense electric light without undergoing any alteration. Theoretically the formation of these colours is explained on the same principle as Newton's rings; that is, by the interference of the incidental ray with the ray reflected from the mercurial surface. The bands of maximum and minimum brightness, representing the coincidence and antagonism of the vibrations of the incident and reflected rays, produce corresponding deposits of silver in the sensitive medium. These layers have a maximum thickness of the interval between two bands of maximum brightness, that is to say, of half the amplitude of a vibration of the incidental ray. When the photographic plates are therefore observed by transmitted or reflected light they present an appearance analogous to that of mother of pearl or other iridescent bodies, due to the interference of the deposits of silver of varying thickness with the vibratory motion of the constituent rays of solar light; but, as in this instance the variations in the thickness of the deposits are regular, the iridescence assumes the form of coloured bands.

Action of Anti-pyretics.

The action of antipyretics may be supposed to be due to the limitation of the oxidation processes and consequent lowering of heat development, or to an increase in the heat radiation from the surface of the body. Moreover they may have a purely local action, *i.e.*, on the cellular tissue, or they may influence the nerve centres regulating the development or radiation of heat. Messrs. Sawodowsky and Podanowsky consider that they have proved that the lowering of temperature produced by antipyrin and antifebrin is attributable exclusively to their influence upon the brain centres regulating the temperature, which occur in the corpus striatum (*Apot.-Zeit.*, Feb. 11, p. 87). The authors, in an experiment, cut the brain of an animal through close behind the corpus striatum and thalamus opticus, so as to isolate the organism from the heat centres, while the connection with the respiration and vaso-motor centres was retained. Although the animal so treated lived for some time and the arterial blood pressure and breathing remained unaltered, the body temperature fell continuously. Even injections of the most powerful pyretics, such as putrescent matter, caused not the slightest rise of temperature, although all the other symptoms of putrescent infection were present. Equally powerless were antipyrin and antifebrin to hinder in the slightest degree the fall of temperature. The skin temperature also remained entirely unchanged, although in the case of normal animals this rises considerably after the injection of antipyretics. An apparent exception was noticed in the case of quinine hydrobromide, but this was attributed to the known action of bromine. The conclusion drawn by the authors is that the action of quinine salts, resorcin and thallin, in lowering the temperature is dependent upon their specific influence upon the temperature regulating centres situated in the anterior part of the brain.

New Synthetic Remedies.

The records of the German Patent Office appear to promise quite a crop of additions to the competitive materia medica, though the new comers do not seem to have arrived yet at the dignity of bearing convenient registered names (*Pharm. Zeit.*, Feb. 11 and 18, pp. 97 and 115). Patent 55,026 relates to the preparation of benzoylamidophenylacetic acid by treating amidophenylacetic acid in alkaline solution with the calculated quantity of benzoyl chloride. It is said to crystallize in white needles that melt at 175·5° C. and to form very soluble salts with alkalies. It is claimed to exercise a valuable disinfecting action upon the intestinal canal, which is said to be shared by the phenyl ester of the acid. Patent 55,007 is for a method of preparing alkylsulphonate salts, said to have a future in pharmacy, by the action of sulphites of alkalies, alkaline earths or heavy metals upon the corresponding alkyl sulphates. The reaction is represented by the equation:—

$$\left.\begin{matrix}CH_3\\ Na\end{matrix}\right\} SO_4 + Na_2SO_3 = \left.\begin{matrix}CH_3\\ Na\end{matrix}\right\} SO_3 + Na_2SO_4.$$

Patent 55,009 has to do with the preparation of dichinoline derivatives. *m*-Amidophenyl-*p*-methoxychinoline is treated in the cold with glacial acetic acid and then by subsequent heating converted into a mixture of two isomeric methoxyoxymethyldichinolines, which are easily separated by conversion into their sulphuric acid salts. The compound least soluble in hot sulphuric acid, named "β-basis," yields upon reduction a tetrahydro product that is alleged to possess the same properties as quinine in respect to malarial fever, without any injurious bye-effects. Lastly, patent 55,119 covers three different methods of preparing *o*-nitro-*m*-methoxyphenyllactic acid, as well as a method of preparing from this compound by reduction *p*-methoxydioxydehydrochinoline, which is also alleged to possess highly valuable properties as an antipyretic in malaria.

The behaviour of antipyrin in the presence of mercuric chloride forms the subject of a communica-

Antipyrin and Mercuric Chloride. tion by Mr. Petsche (*Pharm. Rund.*, Feb., p. 34). He states that upon mixing cold aqueous solutions of antipyrin and mercuric chloride a white precipitate is formed. This disappears upon heating the liquid to boiling, but after keeping it at that temperature for a time a brown resin-like substance is deposited, which, when separated, dissolves in nitric acid and is coloured scarlet by sulphuric acid. This resinoid substance dissolves in boiling alcohol, and is partially deposited again from the liquid on cooling. The insoluble portion when dried yields a reddish-yellow powder, acid in reaction and bitter in taste. When heated on platinum foil it melts and takes a scarlet colour before charring. It dissolves in nitric acid and the yellow solution becomes scarlet when sulphuric acid is added, but upon being heated turns yellow again, and eventually evaporates with a white fume, leaving no residue. With hydrochloric acid it gives a yellow solution that becomes red upon being heated, and leaves a yellow residue upon evaporation. A solution in hot alcohol gives a white precipitate with ammonia water, but not with water acidulated with hydrochloric acid. The portion of the original resinoid substance soluble in cold alcohol is obtained upon evaporation as a white readily powdered resin, acid in reaction, and very bitter, and giving colour reactions very similar to those of the insoluble resin. It differs, however, in dilute hydrochloric acid throwing down a white precipitate from an alcoholic solution.

Resopyrin. At a recent meeting M. Portes called attention to a compound of resorcin with antipyrin, to which the name "resopyrin" had been given. The compound crystallizes in colourless oblique rhombic prisms, soluble in alcohol and insoluble in water. It is obtained by mixing solutions of the constituents in proportions corresponding to their chemical equivalents.

Cocaine and Mercury Compounds. A delicate reaction between cocaine hydrochloride and calomel has been observed by M. Schell (*Journ. Pharm. Els. Loth.*, Jan., p. 8). If a trace of cocaine hydrochloride be mixed by means of a dry glass rod with a very minute quantity of calomel, and the mixture be breathed upon, the moisture that condenses is sufficient to cause it to blacken immediately. No other alkaloid has been found to give the same reaction, but atropine and calomel acquire a similar coloration in boiling water or alcohol and water. It is curious to note, however, that in the case of atropine it occurs with the free alkaloid and not with a salt, whilst in that of cocaine it occurs with a salt and not with the free alkaloid. Herr Brunner also has called attention to the incompatibility of some preparations for outward application, in which a cocaine salt is ordered in conjunction with a mercurial compound (*Apot.-Zeit.*, Feb. 11, p. 86). An ointment of mercuric oxide and cocaine hydrochloride, for instance, is ordered in ophthalmic practice, but after being kept for a time the anodyne effect of the ointment gives place to a pronounced caustic action, due to the conversion of mercuric oxide into oxychloride. An ointment of cocaine hydrochloride, silver nitrate, and vaseline, sometimes ordered as a dressing for wounds, is also liable to undergo alteration through formation of silver chloride, but it is pointed out that this change can be retarded by thoroughly mixing the solution of silver nitrate with the vaseline before adding the cocaine hydrochloride.

Pomegranate Root Bark. A few months since Herr Aweng published a communication upon pomegranate root bark, which pointed to the conclusion that the bark, when kept, becomes less active through a change in the condition of the alkaloids (*Pharm. Journ.*, Aug. 2, p. 82). Commenting upon this paper Dr. de Vrij states (*L'Union Ph.*, Feb., p. 50) that in 1874, with a view to decide this very point, he used some bark that he had brought home from Java and kept in a tin box eleven years. From this bark he prepared an extract by displacement with cold water, and this extract, of which the yield was about 30 per cent. of pilular consistence, was found to be active in every case. He therefore considers it to be an old prejudice, though a widely spread one, that requires the use of fresh bark. In addition, he refers to the occurrence of three varieties of the pomegranate plant in Java, and confirms the statement of Professor Stoeder (*Pharm. Journ.*, Nov. 8, p. 379) that the bark from the white flowered variety is the most valuable of the three. Dr. de Vrij is of opinion that the best form in which to administer this medicine is as a dry powdered extract, obtained by exhausting the powdered bark with cold water, the powder to be enclosed in wafers.

Cytisine and Ulexine. A good illustration of the marvellous activity in chemical investigation existing in the present day is to be seen in the numerous communications published upon cytisine, the alkaloid of the laburnum, since only a few months ago, mainly upon physiological evidence, Professor Kobert suggested its identity with ulexine, the alkaloid of gorse. Immediately afterwards Messrs. Gerrard and Symons pointed out in this Journal ([3], xx., 1017) that the physical and chemical characters of ulexine differed from those attributed to cytisine. Next, in November last it was mentioned in these columns (vol. xxi., p. 470) that Dr. Partheil had, in a preliminary communication, disposed of one of the supposed differences, cytisine prepared by an improved method having in his hands given results corresponding to the formula $C_{11}H_{14}N_2O$, which is that originally attributed to ulexine by its discoverer, Mr. Gerrard. About the same time Herr v. d. Moer presented to the Gröningen University an exhaustive dissertation upon cytisine, which has since been made more accessible than it was in its Dutch form by a *résumé* in German communicated by Professor Plugge to the *Archiv der Pharmacie* (Jan., p. 49). Herr v. d. Moer prepared his cytisine by exhausting finely ground laburnum seeds with cold water, allowing the acid turbid liquor so obtained to stand, and effecting concentration by removing ice formed during the winter. The concentrated liquid was treated with neutral lead acetate, filtered and residual lead removed, and the filtrate, after being made alkaline with soda solution, shaken repeatedly with chloroform, which removed the cytisine, thus disposing of Husemann and Marmé's statement that it was insoluble in chloroform. After full investigation of the chemical, physical and physiological properties of cytisine and their comparison with those of ulexine, the conclusion was arrived at that there is no difference, and that they relate to one and the same compound. Herr v. d. Moer prefers, however, to represent the composition of the alkaloid by the formula $C_{11}H_{16}N_2O$, which he claims to be more in accord also with the combustion figures of Messrs. Gerrard and Symons. Incidentally he also criticized some of Dr. Partheil's results. To this Dr. Partheil responded by publishing a fuller account of his investigation (*Apot.-Zeit.*, Feb. 7. p. 78), concurring in the identity of cytisine and ulexine, but maintaining the correctness of the formula $C_{11}H_{14}N_2O$. According to Dr. Partheil cytisine forms two well-defined platinum salts and two gold salts. Still another communication upon the subject has been made to the Berlin Chemical Society (*Berichte*, Feb. 5, p. 255), by Messrs. Buckha and Magalhaes, which is practically confirmatory of Dr. Partheil's results.

Reddening of Carbolic Acid.

The cause of the intense red coloration frequently observable in carbolic acid after storage for a short period, has been the subject of much patient investigation in continental pharmaceutical circles during the last decade. The ill-success that has attended many of these researches is no doubt due to the small quantity of impurity or impurities necessary for the production of a visible effect, so that the absolute conditions under which reddening occurs have been recognized by a few observers only, and the nature of the chemical changes involved is still a matter of uncertainty. The first general impression that the reddening of carbolic acid is a sign of insufficient purity has been removed by the observation that this property is also possessed by synthetic phenol, concerning which there can be no question of contamination with tarry products. Moreover, it has not been shown that the reddened phenol has deteriorated in medicinal value; but the preference for a colourless preparation is only natural, and is expressed as a demand in the new German Pharmacopœia. Hager first stated that a red coloration can be produced in carbolic acid by ammonium nitrite, and later Finzelberg, Meyenbeck, Fabini, and others attributed the same effect to the action of several heavy metals, notably that of copper. These latter observations are in accord with the fact that pure carbolic acid shows less tendency to redden when not stored in metallic cases. E. Fabini, in a series of articles in the *Pharmaceutische Post* (Jan., pp. 1, 25, 41, 61), now claims to have isolated the red colouring matter in an approximately pure state, and to have determined the exact conditions of its formation. He further indicates the probable courses of the reactions involved in the synthesis of the dye, but this suggestion must be substantiated by further data before it can be seriously considered. By further study of the action of copper on carbolic acid Fabini found that the colouring material was formed most rapidly by digestion of cupric sulphate, instead of the metal, with the ammonium salt of carbolic acid. Prepared by this method and extracted with ether the dye proved to be a black, odourless and tasteless resinoid body, that sublimes upon heating, gives a characteristic blue coloration with concentrated sulphuric acid, and yields a residue in which no trace of copper can be detected. It dissolves in alcohol with a red brown, in ether with yellow and in chloroform with yellowish red colour, and even in the proportion of 1:300,000 produces a beautiful red colour in carbolic acid. He suggests that copper enters the phenol molecule with simultaneous elimination of water according to the equation $Cu + 2C_6H_5 \cdot OH = (C_6H_5)_2 \cdot CuO + H_2O$, and that the phenyl copper oxide so formed is reduced by further phenol molecules to copper and an oxidation product of carbolic acid, which he does not pretend to identify. The process repeats itself and is thus one of continual oxidation. In support of this theory he states that though a trace of copper will produce a large quantity of dye, carbolic acid completely freed from all traces of metals does not redden, nor is the coloration produced so long as an oxidation agent, like hydrogen peroxide, is present. The presence of ammonia, or rather the ammonium salt of phenol, appears to be also necessary to the formation of the dye, and some connection apparently exists between the ready absorption of ammonia from the atmosphere by carbolic acid, the liquid nature of the ammonium salt and the occurrence of the red coloration in the liquefied portion of the carbolic acid. If copper and ammonia be present in the carbolic acid, the access of air does not appear to affect the result, since according to Fabini the phenol can supply its own oxygen for the oxidation process. The remedy appears to be the total prevention of contact with metals during the process of manufacture and storage.

Aldepalmitic Acid.

Mr. Wanklyn has supplemented the paper on the constitution of butter read recently before the Society of Chemical Industry (*Pharm. Journ.*, Jan. 24, p. 647) by a communication to the *Chemical News* (Feb. 13, p. 73), wherein he further describes aldepalmitic acid, which he considers to be the hitherto unrecognized principal constituent of butter fat. The new acid is represented by the formula $(C_{16}H_{30}O_2)n$, the *n* of the formula representing at least 2. It is said to differ from palmitic acid also in specific gravity and melting point, but especially in its behaviour towards 85 per cent. alcohol. At ordinary temperature the solubility of the two acids in alcohol of this strength is stated to be nearly the same, but whilst the solubility of palmitic acid increases slowly as the temperature rises that of aldepalmitic acid rises very abruptly, so that at 25° C. it is soluble in its own weight of alcohol. As the alcoholic solution of aldepalmitic acid cools the liquid gelatinizes and Mr. Wanklyn states that the new acid is in this way capable of solidifying five times its weight of alcohol.

Oleum Tiliæ.

At the last meeting of the Berlin Pharmaceutical Society Herr Müller called attention to the fixed oil obtainable from the seeds of the lime tree as a substance deserving more attention than it has yet received (*Pharm. Zeit*, Feb. 11, p. 97). Herr Müller described the oil as equalling in colour and taste the finest Provence oil, and as being free from any bitter or aromatic after-taste. It is a non-drying oil and, according to the speaker, does not become rancid. One remarkable property attributed to this oil is its unchangeability by cold, it being alleged that even in a freezing mixture of salt and snow showing a temperature of −21·5° C. it was not frozen. The seeds of the common lime (*Tilia parvifolia*, Ehr., var. *intermedia*, DC.) were stated to yield as much as 58 per cent. of the oil, exceeding in this respect the most used oil seeds. In the discussion that followed some doubt was suggested as to the relatively high yield of the oil and as to its capability of resisting exposure to sunlight without becoming rancid.

Asafœtida Oil.

An exhaustive paper on the essential oil of asafœtida has been published by Dr. Semmler (*Archiv*, Jan. 26, p. 1). The crude oil is described as varying only slightly in its composition, dark brown in colour, and lævogyre. It does not distil at ordinary pressure, but with 9 mm. pressure boils at from 40° to 165° C. One sample had a sp. gr. at 15° C. of 0·9843 and another of 0·9789. Among the constituents separated were four sulphuretted compounds. One, which constituted about 45 per cent. of the crude oil, is represented by the formula $C_7H_{14}S_2$; it is colourless, lævogyre, has a sp. gr. at 15° C. of 0·9721, and boils at from 83° to 84°. Another, constituting about 20 per cent. of the oil, is represented by the formula $C_{11}H_{20}S_2$; it is colourless, mobile, lævogyre, boils under 9 mm. pressure at 126° to 127°, and has a sp. gr. at 14° C. of 1·0121. Two other disulphides, present only in small quantity, are represented by $C_8H_{16}S_2$ and $C_{10}H_{18}S_2$. In addition a terpene, $C_{10}H_{16}$, probably identical with pinene, was found, and a blue oxidized constituent similar to that occurring in some other essential oils.

Acid Solvent for Cellulose.

Hitherto no acid solvent for cellulose has been known that does not bring about marked changes in its composition and properties in effecting the solution. Messrs. Cross and Bevan announce (*Chem. News*, Feb. 6, p. 67) that if zinc chloride be dissolved in twice its weight of acetic anhydride a liquid is obtained (sp. gr. 1·44) that dissolves cellulose instantly and without sensible modification. The observation is considered to be of importance, as it allows of the investigation of some points in the constitution of cellulose, for the determination of which an acid solution is an essential condition.

Glycero-Alcoholates.

At the last meeting of the Paris Society of Pharmacy, M. Petit presented a note upon the employment of a mixture of water, alcohol and glycerine, in such proportions that "a litre of the liquid weighs 1000 grams at 15° C., and a cubic centimetre corresponds to 50 drops" (*Journ. Pharm. Chim.*, Feb. 15, p. 208). This liquid he proposes to use in the preparation of 1 in 1000 solutions of crystallized digitalin, crystallized nitrate of aconitine, strophanthin, etc., and 1 in 100 solutions of trinitrin, picrotoxin, and sodium monosulphide. He proposes to apply the name "glycéro-alcoolés" to this class of preparations.

Germicide Action of Urine.

In a recent communication to the Hygiene Institute at Würzburg, Dr. Erich Richter called attention to the action of fresh urine upon pathological ferments (*Apot.-Zeit.*, Feb. 11, p. 86). He stated that he had found really fresh urine capable of destroying anthrax and cholera bacilli pretty energetically, as well as typhus bacilli, though with less certainty. In almost all cases an inhibiting power of the urine upon development was observed. This action of urine is attributed by Dr. Richter primarily to the acid phosphates it contains, since a solution of monopotassic metaphosphate of a strength corresponding to urine exercises a similar action, whilst when carefully neutralized with alkali it has scarcely any toxic action. But, besides the acid phosphates, urine appears to contain other substances capable of killing bacilli, or such substances are developed in it by heat, since urine evaporated to half its original volume is powerfully active. In such urine acid phosphates are no longer present, as these would be converted by an hour's boiling into ammonio-potassium phosphate, the ammonia required for the neutralization of the acid phosphate being derived from the urea. The carbonic acid of the urine appears to take no part in the action.

New use for Thymol.

Surgeon-Major E. Lawrie reports in the *Lancet* (Feb. 16, p. 364) the cure of two cases of chyluria dependent on filariæ in the blood, by treatment with thymol. It was administered internally in doses of one grain every four hours, gradually increased to five grains. This discovery is the more important that there has been hitherto no known remedy for the disease.

The Java Coca Plant.

According to an article in *Teysmannia*, by Dr. Burck, the Coca plant cultivated in Java is not, as supposed by Mr. Thiselton Dyer, an intermediate form between *Erythroxylon Coca*, Lam., and *E. Coca*, var. *Novo-granatense*, Dyer, but a distinct variety, for which Dr. Burck proposes the name var. *Spruceanum*, Burck. The Kew plant (var. *Novo-granatense*) would appear to represent the Huanuco coca of commerce, since the seeds were obtained from Huanuco. This plant has been distributed to the British Colonies, but has not been introduced into Java. The Java plant (var. *Spruceanum*) was grown in Java from seeds obtained from the firm of Herman Linden, in Ghent, in 1876. It is named *Spruceanum*, in honour of Dr. Spruce, whose specimens from Rio Negro, in the Kew Herbarium, are said by Mr. Dyer to agree with the Java plant. According to the latter, the Java coca is also cultivated by the Agri-horticultural Society of India, at Alipore and Darjeeling. Dr. Burck considers the plant chiefly cultivated in British India to be sufficiently distinct to be described as a new species under the name of *E. Bolivianum*, Burck. He received living plants of this variety from Messrs. T. Christy and Co., and seeds from the Botanical Gardens at Calcutta, and herbarium specimens from the Peradeniya Gardens at Ceylon. According to the analyses quoted by Dr. Burck, the *E. Coca*, var. *Spruceanum* affords about four times as much alkaloid as *E. Bolivianum*. The latter, although it has never been distributed from the Java Botanical Gardens, has been repeatedly grown there from seeds purchased in Ceylon and London. Dr. Burck quotes illustrations of these coca plants, which are more easily referred to than the figures in *Teysmannia*. The *E. Coca*, var. *Novo-granatense* has been figured in the *Garden*, 1876, p. 445, from the plant grown in Kew Gardens. *E. Coca*, var. *Spruceanum* is illustrated in the La Maout and Decaisne, 1876, p. 332, and the *E. Bolivianum* in 'Das Coca Blatt,' Vienna, 1886. It will therefore be comparatively easy to distinguish the leaves as met with in commerce. The leaves may be distinguished by the fact that in *E. Bolivianum* the upper surface of the midrib presents a prominent ridge or crest, and the leaves are thicker, green above and lighter green below, and more elliptical; whilst in *E. Coca*, var. *Spruceanum* the midrib does not present a ridge on its upper surface, the leaves are light green in colour above and pale below, and are more tapering below. These features should also serve to distinguish the Coca leaves imported from Peru and Bolivia.

Kudzu.

Pueraria Thunbergiana, Bth., a leguminous plant from Japan, which has a large starchy and fibrous root, and which is described as a beautiful trailing shrub, has recently been introduced into cultivation in France (*Gard. Chron.*, Feb. 14, p. 211). As the plant produces abundance of root and the stem yields a strong fibre, it is likely that the cultivation of the plant will spread in Europe. Starch from the root was exhibited at the Health Exhibition at South Kensington and appeared of excellent quality, being free from smell or unpleasant taste and yielding a large percentage of starch-jelly. The starch under the microscope appears muller shaped, but many of the grains are angular at one end and rounded at the other, are destitute of the marked hilum frequently found in the starch of leguminous plants, and bear more resemblance to those of colchicum.

Ipoh Poison.

In the Kew *Bulletin* for February a long correspondence concerning the ipoh poison of the Malay Peninsula is published, and attention is directed to the fact that there is a form of *Antiaris toxicaria* (regarded by some botanists as a distinct species under the name of *A. innoxia*) which does not contain antiarine and does not possess poisonous properties. The word ipoh, like upas, according to Blume, means poison; hence "ipoh kayu" means the poison tree and "ipoh akar" the poison creeper. Of the latter no mention, except the name, is made in the *Bulletin*. It is in all probability *Derris elliptica*, the poisonous active principle of which was recently obtained and reported on by Dr. Greshoff (*Pharm. Journ.*, [3], xxi., p. 559). That *Derris elliptica* forms an ingredient of one of the three varieties of Malay arrow-poison has been shown by Newbold ('Brit. Settlements in Malacca,' ii., pp. 399-406), and the composition of the three varieties of Malay ipoh poison was mentioned in this Journal, [3], xvii., p. 5.

Kath or Pale Cutch.

The pale variety of cutch described in Pharmacographia (pp. 242, 243) forms the subject of another article in the Kew *Bulletin* for February, in which some analyses of Burmese and Kumaon (or pale) catechu are compared by Mr. N. Warth, who finds that the latter contains about twice as much catechin as the former. In the suggestion at the close of the article that as the pale cutch so closely agrees with gambier, it would probably be readily accepted by tanners as a substitute, the relative market values of the two products appears to be lost sight of, the pale cutch being about four times the value of gambier (Dymock, 'Mat. Med., W. India,' pp. 285, 415). It should be noted also that the aqueous solution of catechu, of which pale cutch chiefly consists, does not give a precipitate with gelatine, and therefore could not form leather until turned into catechu-tannic acid by the aid of heat or other means.

African Kino.

Among the timbers of Yoruba-land mentioned in the Kew Bulletin is that of *Pterocarpus erinaceus*, the tree from which the original kino introduced into Europe was obtained, and which seems to have been less liable to gelatinize than the other kinds of kino subsequently introduced. It is singular that the timber of this tree should now be imported as rosewood, whilst the drug should have entirely disappeared from commerce.

Iroko tree.

A tree of the Yoruba country known as Iroko has been identified at Kew as the *Chlorophora excelsa*, Benth. and Hook., and is a near ally of the Fustic tree (*Chlorophora tinctoria*) of Brazil. The chief point of interest connected with it is that the timber resists the white ant. It probably therefore contains some principle distasteful or injurious to these destructive insects, and which might be worth investigation (*Kew Bulletin*, February).

Davallia Mooreana.

Several correspondents of the *Gardeners' Chronicle* (Jan., p. 151, etc.) have pointed out that this fern causes irritation of the skin when handled, especially when the skin is moist with perspiration. A peculiar smarting around the eyes, nostrils, and arms was experienced. The sensation is compared to that given by rubbing a little of the sap of a *Dieffenbachia* (*Aroideæ*) on the tip of the tongue, or to the sting of *Wigandia* rather than that of a nettle. The irritation is attributed to the spores, but the cause evidently requires further investigation.

Loco Weeds.

In the *Pharm. Rundschau* (January, p. 8), Dr. T. J. Power and J. Cambier report the discovery of toxic alkaloids, but in very small quantity (0·2 gram from 3 kilos of *Astragalus*), in two of the plants known as loco weeds, which in the United States are said to cause a peculiar wasting disease fatal to cattle. The plants examined were *Astragalus mollissimus*, Torr., and *Crotalaria sagittalis*, L. The alkaloid of the former in the dose of 0·1 gram produced frothing at the mouth and a profuse flow of saliva, which is one of the symptoms produced by the loco weeds. An illustration of the *Crotalaria sagittalis* accompanies the article.

Adulteration of Drugs.

Mr. A. P. Brown has published in the *Bulletin of Pharmacy* (January, p. 10) an account of the adulterations he has met with in drugs in the United States, from which it would appear that adulteration takes place to a much greater extent than in this country. Of three hundred specimens examined the author found that nine-tenths were adulterated. In lycopodium he found 25 per cent of starch. Cream of tartar was adulterated with terra alba, sulphate of lime and starch, and superphosphate of lime was frequently sold for it. Every specimen of spices purchased at retail stores was adulterated, and powdered cassia was adulterated with powdered cedar wood. Powdered rhubarb was found to be adulterated with terra alba, corn starch and turmeric, and powdered gum arabic with dextrine.

Quebracho Bark.

The first of a series of articles on botany and materia medica appears in the *Bulletin of Pharmacy* from the pen of Dr. H. H. Rusby, on *Aspidosperma Quebracho*. It forms a useful summary of the dispersed literature concerning this plant, and contains an excellent illustration of the tree and the leaves, flowers, fruit and seeds. He remarks that no adequate physiological or clinical investigation has ever been accorded to the alkaloids obtained from the bark by Hesse, although it has been reported that aspidospermine, locally injected in ½-grain doses, frequently cures otherwise intractable cases of erysipelas.

PHARMACY ACT AMENDMENT BILL.

The following is the text of the Pharmacy Acts Amendment Bill, as finally adopted by the Council for introduction into Parliament:—

1. *Interpretation.*—In this Act—

The term Pharmacy Acts shall mean the Pharmacy Acts, 1852 and 1868, and the Pharmacy Act (1868) Amendment Act, 1869; the terms "Pharmaceutical Chemist" and "Chemist and Druggist," shall have the same meanings respectively as in the Pharmacy Acts; and "The Society" shall mean the Pharmaceutical Society of Great Britain.

2. *Extension of powers with respect to examinations and otherwise.*—The powers of the Pharmacy Acts with respect to examinations required for obtaining certificates of qualification under the said Acts, or either of them, shall be extended so as to allow of the division of the said examinations into preliminary and other parts of the same: also to allow of or require periods of time and courses of instruction between any of the said parts; and to require that persons before presenting themselves for the final part of an examination shall deposit with the registrar under the said Acts certificates of their having duly attended courses of instruction in chemistry, botany, and materia medica, and of their having for not less than three years in the whole served in the open shops of Pharmaceutical Chemists or Chemists and Druggists, or in public hospitals or public dispensaries, as apprentices or pupils of persons qualified in accordance with the law of the country in which they are carrying on business to practise pharmacy in that country.

3. *Power to make bye-laws for carrying out the provisions of Clause* 2.—It shall be lawful for the Society from time to time, by bye-laws duly confirmed by the Privy Council, to regulate the said division of examinations and also the said periods of time and study between any of the said parts; also to allow and provide for and to regulate the reception of certificates issued by other examining bodies in lieu of or so as to satisfy the Examiners in lieu of the preliminary part of any examination; also to provide for and to regulate the courses of instruction in Chemistry, Botany and Materia Medica, to be duly attended as aforesaid; also to provide for and to regulate the forms of certificates to be for any purpose of this Act deposited with the said Registrar; and also to provide for and to regulate the notices to be given and fees to be paid by persons intending to present themselves for examination in any part of an examination or desiring any registration under the said Acts or either of them.

4. *Persons eligible for election as Student Associates.*—Every person who at the time of the passing of this Act shall have been duly registered as an Apprentice or Student and shall have been admitted into the Society under the provisions set forth in Section X. of the Pharmacy Act, 1852, shall be registered as a "Student Associate" of the Society; and every person who thereafter shall become eligible for admission into the Society under that section shall be eligible for election as a "Student Associate" of the Society. A "Student Associate" shall contribute to the funds of the said Society the same annual subscription as an Associate.

5. *Chemists and Druggists after examination eligible as Associates; Chemists and Druggists in business, or who have attained the age of* 25 *years eligible as members and for election to the Council.*—Every person who shall have been registered as a chemist and druggist under the Pharmacy Act, 1868, by reason of having obtained a certificate of qualification from the Board of Examiners shall be eligible to be elected an Associate of the Society according to the bye-laws thereof, and every person who has obtained or who shall obtain registration as a Chemist and Druggist, and is in business on his own account, or has attained the age of twenty-five years, shall be eligible to be elected a member of the Society according to the bye-laws thereof, and shall thereafter be eligible for election to the Council of the Society, but the said Council shall not at any time contain more than ten members who are not on the Register of Pharmaceutical Chemists; and no person shall in right of membership acquired pursuant to this clause be placed on the Register of Pharmaceutical Chemists.

6. *An unqualified person not to compound for sale or to keep open shop for compounding medical prescriptions.*—It shall be unlawful for any person to keep open shop for compounding medical prescriptions, unless he be a pharmaceutical chemist or chemist and druggist, or a medical practitioner acting within the exemptions concerning certain medical practitioners made by the Pharmacy Acts, or a person acting within the exemption concerning certain executors, administrators, and trustees, made by section 16 of the Pharmacy Act, 1868. And it shall be unlawful for any person to compound medical prescriptions for sale unless he be a person holding one or other of the qualifications set forth in the foregoing portion of this section or be acting under the supervision of such qualified person. Provided nevertheless that nothing in this section contained shall prevent any person registered under the Veterinary Surgeons Act, 1881, or holding a certificate in veterinary surgery from the Highland and Agricultural Society in Scotland, from dispensing medicines for animals under his care.

7. *Penalties for infringements of provisions in Clause* 6. *All penalties to be retained by the Society.*—Every person acting in contravention of the preceding section numbered 6, shall for each contravention be liable to pay a penalty of £5, and the said penalties of £5 may be sued for, recovered and dealt with in the manner provided by the Pharmacy Act, 1852, for the recovery of penalties under that Act, and all and every sum and sums of money which shall arise from any penalties for offences incurred under section 6 of this Act or under the Pharmacy Acts shall be paid to the Treasurer of the Society and shall by him be applied to the purposes of the said Acts and this Act or either of them.

8. *Exemption of all registered chemists from Jury Service.*—Every person registered as a chemist and druggist shall be exempt if he so desires from serving on all juries and inquests whatsoever, and the name of any such registered person shall not be returned in the list of persons liable to serve in such office as aforesaid.

9. *Rotation of members of the Council.*—In lieu of the provision contained in the Royal Charter of Incorporation of the Society that two-thirds of the members of the Council shall in every year go out of office, it is hereby enacted that one-third of the members of Council shall in every year go out of office in rotation, and the Council of the Society is hereby authorized and empowered to make, alter, and amend, the Bye-laws of the Society accordingly.

10. *Extent of Act.*—This Act shall not extend to Ireland.

11. *Short title of Act.*—This Act may be cited for all purposes as the Pharmacy Acts Amendment Act, 1891, and shall be construed as one with the Pharmacy Acts, and shall come into operation on the first day of January, one thousand eight hundred and ninety-two, but no bye-law for the purposes authorized by sections 2 and 3 of this Act shall come into operation prior to the first day of January, one thousand eight hundred and ninety-six.

12. *Repeal.*—Section 14 of the Pharmacy Act, 1852, and sections 18, 19 and 20 of the Pharmacy Act, 1868, are hereby repealed.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 28, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE PHARMACEUTICAL SOCIETY AND THE TRADE.

TAKING advantage of the extended circulation of this week's Journal to all registered chemists and druggists in the kingdom, we have printed at page 762 the draft Pharmacy Act Amendment Bill, as it has been finally revised by the Law and Parliamentary Committee and adopted for introduction into Parliament. A further opportunity will thus be given to members of the trade for considering the provisions of this Bill, and we also take the opportunity thus afforded to offer some general remarks on the subject. Though much consideration has been given to various suggestions that have been made, the alterations in the Bill have been very slight, and the Council has decided unanimously that it comprises all that can be attempted at the present. The clauses 2 and 3 relate to the acquisition of powers for altering the mode of conducting the examination which the present Act requires that candidates shall pass before being legally certified as competent chemists and druggists by being placed on the Register. The object of the alteration is not to increase the difficulty of the examination; but to establish a more systematic educational training that will promote and facilitate study during apprenticeship, and thus render the passing of the examination more convenient, as well as easier, for duly educated candidates, and make it, as a test of fitness for registration, less a matter of uncertainty than it has been. The alterations contemplated under those powers would be the result of bye-laws to be passed for the purpose by the members of the Society, subject to approval by the Privy Council. The rearrangement of the examination, to which the term "curriculum" has been applied, being thus in the hands of members of the trade, would be adapted to provide for the necessity of the Preliminary examination being passed before apprenticeship is entered upon, and in that particular alone the general interests of the trade would be promoted. The clauses 4 and 5 of the Bill provide for a reconstitution of the Society, by which every registered Chemist and Druggist will become eligible as a member, and increased scope be given for their representation on the Council. The object of the sixth clause is to restrict to legally qualified persons the compounding of prescriptions, which is not now their exclusive right, except in the case of medicine containing scheduled poisons. The seventh clause provides the penalties for infringements, and the eighth for the exemption of registered persons from jury service. Much has lately been said about the rights of chemists and druggists, though it is difficult to say what are the rights which chemists and druggists especially possess. As a matter of principle, there can be no question as to the propriety of certain functions being restricted to persons who are duly qualified in that capacity. From a rational point of view the compounding of medicine is peculiarly a duty of the kind referred to, but chemists and druggists as a class have no exclusive right even to that. In fact it appears, on looking into the matter, that although the Pharmaceutical Society has in the past done much to improve the position of the class there is still much more need for establishing due rights for that class than there is opportunity for conserving any existing rights. It has sometimes been assumed that the necessity of passing an examination in order to be registered, of itself confers a right to certain compensatory privileges, but this is a mistaken view. The demand of the law for examination is one enforced solely for the safety of the public, and although, by its operation, it may become advantageous to chemists and druggists it does so only as an incidental effect. Their claim to the possession of any privilege must be equally based upon consideration of the public interest. It is the fitness of chemists and druggists for the performance of certain duties which is the true basis of any exclusive privilege, and therefore it is in the interest of chemists and druggists that they should zealously support any endeavour to render the preliminaries of registration as far as possible a thoroughly efficient test and evidence of fitness.

The claims that are now urged on behalf of the trade by certain of its members present in themselves evidence of a want of agreement in the views as to the means by which the general interests of the body are to be promoted. On the one hand there is the claim for legislative protection of chemists and druggists against the competition of trading companies; and on the other hand there is the claim for recognition of unregistered persons as being lawfully competent to perform the functions of registered persons, if acting as the deputies of the latter. Both of these claims have been put forward with persistency, and although both of them could scarcely be advocated by the same person, they have individually found vigorous supporters in members of the Society's Council. It is a mistake, therefore, to say that the Council fails to represent the views of the trade, even under existing conditions. If there is any failure to give due effect to certain views in directing the action of the Council, the fault lies to a great extent with the members of the trade who, believing those views to be sound, place themselves in a position of incapacity for anything but complaint that the Council does not adopt a course of action consistent with their desires. But as a matter of fact, both of the claims above mentioned have found representatives in members of the Society's Council, at whose instigation they have been carefully considered and frequently discussed by the Council. The result has been that there was such an overwhelming adverse opinion as to the wisdom of urging those claims, that in both instances the advocates of them have frankly admitted that the demand for their adoption by the Council is not adequately supported. The ground for complaint, therefore, if there be any, is not deficient representation even of those who do not belong to the Society; but, on the contrary, it consists in the self-extinguishing apathy of those who complain that their views are not acted upon. Instead of attaching themselves to the Society and thus acquiring power to give practical effect to their views, they stand aloof and maintain an incapacity for anything but discontent. It is this state of disintegration, obtaining with regard to the greater portion of the trade, that constitutes the great obstacle to the advancement of the interests of the body, and until that radical defect be remedied by the consolidation of the trade with the Society, little improvement in the condition of affairs can be hoped for. That consolidation is the only basis upon which any feasible attempt can be made for securing the protection which is so generally felt to be necessary. It is certainly desirable that the titles reserved by the Pharmacy Acts should be fully protected. But that must be done by the trade. The administrators of the law would be unlikely to look with favour upon claims for protection in the use of titles put forward by persons who systematically disregard the required connection of those titles with functions for the performance of which those titles are the only evidence of legal qualification. It is only by harmonious and concerted action to such ends within the body of chemists and druggists that any measures for the protection of their common interests can be developed. The Society's Council holds that it is fallacious to hope for the attainment of such a result by mere legislative measures. In that view the Council is supported by the large majority of those who take an active interest in its work. It is, therefore, utterly unreasonable to complain of the Council for not adopting a line of action which it considers inexpedient, and which the supporters of the Council recognize as being impolitic. It would be still more unreasonable to offer opposition to the Bill which the Council has decided to introduce, since the contents of that Bill are almost universally admitted to be satisfactory, so far as they go. It is only on the ground of what the Bill does not provide for that there is any dissent. But if in regard to the points which the Bill does not touch any section of the trade believes that they can be successfully urged upon the favourable consideration of Parliament, the rational mode of taking that course would be for the supporters of that belief to get amendments proposed on their behalf whenever the Bill reaches the stage of Committee. The **President** has stated, on behalf of the Council, that if this course be adopted it will not be opposed by the Council. Consequently, though the Council declines to take the initiative by introducing into the Bill clauses which are held to be of a doubtful nature, there is no real ground for the trade to offer opposition to the Bill as it now stands.

In regard to the merits of the claims upon which there are differences of opinion it is essential that they should be considered from such a practical point of view as would be taken by the Legislature. In this connection it must be remembered that however strong may be the conviction on the part of chemists and druggists that their business requires protection, however earnest may be their desire to obtain protection, such a view of the matter must be expected to have but comparatively little weight with Parliament. The predominating principle of the legislation affecting chemists and druggists has throughout been consideration for the interest and safety of the public. Whatever benefit was to accrue to chemists and druggists, whatever restriction put upon trade operated in their favour, the advantage they might thus derive has always been regarded and treated as a matter altogether subordinate to the public interest. Nor can it be expected that this ruling principle will now be less rigidly adhered to by Parliament in dealing with proposed amendments of the Pharmacy Acts than it has been hitherto. Moreover it is to be feared that in the period which has elapsed since the passing of the Pharmacy Act, 1868, the practice of chemists and druggists has not generally been such as to conduce to the cultivation of their interests, or such as to place them now in a favourable position for advancing the claim for a proprietary qualification that would make company trading unlawful. Some of the recent utterances on the subject of titles and of unqualified assistants are calculated to raise the question whether it is merely the title or the exercise of their art that chemists and druggists desire to have protected. The restriction put upon certain portions of the business of a chemist and druggist, and the demand for a legal qualification of those conducting it, have been looked upon by chemists and druggists too much in the light of privileges conferred upon them, rather than as provisions merely establishing a general disability to do certain things, unless specified conditions were complied with as safeguards of the public interest. Since no one is compelled to become a chemist and druggist, the idea that the necessity of first passing a qualifying test confers in itself any right to claim privileges is a fallacy. Chemists and druggists have also, in some instances, committed the fatal mistake that, considering themselves thus the possessors of a privilege, they have not scrupulously endeavoured to guard it in their own interest. On the contrary they have too often acted upon the assumption that they were entitled to delegate their supposed privilege to persons who did not equally possess their own legal qualification. Hence the establishment of branch shops, left in charge of apprentices and unregistered assistants; a practice that has been eminently detrimental to the conservation of the interests of the body at large. Thus the wholesome idea of the importance of legal qualification as well as technical competence on the part of every proprietor of a chemist and druggist's business has been obscured and to some extent negatived. By that pernicious practice a way has been opened for the opinion to gain acceptance with the public and the Government, that if the person actually conducting the duties of a chemist and druggist's business be a legally qualified person, all the requirements of the law are satisfied so far as it is intended to provide for the public safety. Therein lies the foundation for the development of what has been, from the chemist and druggist's point of view, aptly designated "the monstrosity" of seven unregistered persons being able to do what any one of them cannot do lawfully. Therein lies the justification of the judgment of the law courts by which the operation of the Pharmacy Act, 1868, was diverted into an altogether unintended channel, and therein lies the source of the immediately pressing abrogation and curtailment of the interests of chemists and druggists. Though the Pharmaceutical Society has been for the last fifty years endeavouring to promote the general interests of chemists and druggists it has not received due support from the great majority of those whose interests are at stake. It has been contended that the Pharmaceutical Society is too exclusive, and that membership is not attainable with sufficient facility. We will not discuss this point, or even endeavour to show that the opportunities which have been offered in the past for joining its ranks were all that might have been afforded; but reference may at least be made to the fact that the Bill which the Council now contemplates introducing would remove any objection of that kind. If it be passed there will be ample opportunity for every individual carrying on the business of a chemist and druggist, and even for those at present in the position of assistants, to unite in association with their brethren in supporting the organization which was founded half a century ago for their special benefit. Therefore we do not hesitate to say that for those who have any just conception of the mode in which promotion of their present or future interests is to be realized, there is no other course open to them than that of becoming, not only members of the Pharmaceutical Society, but also active workers, in their several localities and according to their individual abilities, in the task that was commenced fifty years ago by ALLEN and BELL, and has since then been continued by the band of disinterested workers in the cause of pharmacy by whom they have been succeeded.

THE BENEVOLENT FUND.

THIS week a copy of the Society's Journal will be sent to every person on the Register of Chemists and Druggists for Great Britain, mainly in order to place before them a statement of the position of the Benevolent Fund. From the time of the passing of the Pharmacy Act, 1868, this fund has been, in addition to the necessity for registration, one of the few bonds of union by which the body of chemists and druggists in this country are connected with each other. Disunion is still, as it has been in the past, the especial bane of this class of the community. In spite of the efforts that have been made by the Pharmaceutical Society to unite the trade, that condition still continues, though without any sufficient cause. Those who profit by the maintenance of disintegration in the ranks of chemists and druggists have hitherto had the advantage of sustaining their influence in that direction, although they have not succeeded in securing any substantial benefits for the general body or even for those who are so misguided as to believe in them. The establishment of a system of general registration of all persons entitled to carry on the business of a chemist and druggist, secured by the Act of 1868, was a step that should have been followed by a further more intimate incorporation of the trade. The difference made for chemists and druggists by the passing of that Act was to give the body a recognized position in place of no position at all, and the maintenance of the Register by the Pharmaceutical Society is an important service freely rendered. Had there been any community of interests among chemists and druggists, or any due appreciation of the mode in which even diverse interests are to be conserved and advanced by those engaged in a partially consolidated occupation, a further advance would have been made from within their ranks. One of the objects of the founders of the Pharmaceutical Society was to promote the interests of the somewhat heterogeneous class of persons who in 1841 could lay claim to the designation of chemist and druggist.

See advertisement pages iv. and v. Primarily the object of the Society was to establish pharmacy in this country upon a basis compatible with the position it holds in other civilized countries. In that enterprise it was well supported from many sides, but not to the extent that it should have been by the majority of those who at that time were entitled by usage to be regarded as belonging to the class of which the Pharmaceutical Society was to be the representative. By the Act of 1868, however, the advantage of identification by means of a Register of recognized persons was secured, and by the liberality of the Executive body of the Society, the provision that had been established at first for the benefit of necessitous members of the Society was extended to all persons who were or had been entitled to registration. But that liberal act has not been more than partially responded to by the trade at large, even in regard to its particular object. The number of subscribers to the Benevolent Fund is still not more than some fifth part of the total number of registered persons. Consequently the capability of the Council to respond to the many demands which are made upon it for assistance are proportionately limited. With these few remarks we commend to the consideration of those who will receive this copy of the Journal, the information given in respect to the Benevolent Fund at page 784, and the claims which it has upon all who are engaged in the business of chemists and druggists.

OPPOSITION TO THE INFLAMMABLE LIQUIDS BILL.

In reference to the Inflammable Liquids Bill introduced by the Government and now before Parliament, a *résumé* of which appeared in last week's Journal, page 747, we understand that a vigorous attempt is being made to oppose the passing of the measure. The dealers in petroleum products are apprehensive of serious interference with their business in the event of its becoming law. A circular has been issued by the Chairman of the Petroleum Defence Association representing that the provisions of the Bill seriously menace the interests of those engaged in the mineral oil trade, and urging, therefore, a strenuous opposition to it. With the object of stimulating action in that direction, a printed copy of a letter to be immediately addressed to members of Parliament has been sent with the circular, in which it is stated that the effects of the proposed measure would be ruinous to the trade, inasmuch as they would tend to increase the cost of petroleum lamp oil, to throw an additional burden on ratepayers, and to create a great public grievance bearing heavily on those of the working class, who are the largest consumers of this article as their chief lighting material, and in a large measure the means for heating and preparing their daily food. It is further stated that petroleum lamp-oil is essentially different from the petroleum spirit, upon the sale of which there are already such legislative restrictions that the trade in it is seriously curtailed. It is suggested that if the provisions of the Bill, now before Parliament, should become law, the petroleum lamp-oil industry will share a like fate, and that as the proposed Bill would operate in restraint of a trade that is alleged to be unattended with any exceptional dangers, it is incumbent upon all those connected with the storage and sale of petroleum lamp-oil to solicit their Parliamentary representatives to oppose to the utmost what is regarded as an unwarrantable attack upon this branch of trade.

The adjournment *sine die* of the milk of sulphur case, reported on page 713 and page 780, does not amount to a decision of the question raised; but though the case for the defence was not gone into the remarks of the magistrate decidedly appear to indicate that he would have been guided by the final result of the Knutsford case. As the matter now stands it is a question of fact that is to be decided, viz., is milk of sulphur precipitated sulphur as defined by the British Pharmacopœia? It is suggested that this question should be determined by a reference to the General Medical Council, and a settlement of it by that authority would no doubt obviate in the future the serious inconvenience and damage resulting from prosecutions instituted on the assumption that the preparation known as milk of sulphur is a fraudulently adulterated article.

* * *

On Wednesday evening Professor Liebreich announced to the Berlin Medical Society that the anti-tuberculous remedy which he claims to present advantages over that of Dr. Koch, is cantharidate of potash. The ordinary dose injected was stated to be two decimilligrams in solution, which is said to be sufficient to excite a serous transudation that is supposed to have a definite influence upon bacterial action, acting as a local disinfectant.

* * *

The Annual Dinner of the Chemists' Assistants' Association is to take place on Thursday next, at the Holborn Restaurant, when the chair will be taken by Mr. Thomas Tyrer.

* * *

Replying to a correspondent in the *Ceylon Observer*, Dr. Trimen mentions that the dandelion plants in the Hakgala Gardens, raised from seeds obtained from Northern India, do not form large roots in the poor soil. Escapes from the garden have, however, already occurred, and the dandelion has commenced to establish itself as a "wild" plant in the island.

* * *

According to a return just presented to Parliament the £217,359 5*s*. 4½*d*., already announced as having been received on account of the medicine stamp tax in the year ending 31st of March, 1890, represented the taxing of 26,692,885 separate articles.

* * *

We understand that classes for local students have now been arranged in connection with the Dundee Chemists' Assistants and Apprentices' Association. On Monday evenings Pharmaceutical Chemistry will be taught by Mr. J. A. Kinnear, and Pharmacy by Mr. G. Little; on Friday evenings Botany will be taught by Mr. W. G. Smith, B.Sc., and Materia Medica by Mr. W. Mair. There will also be a class for "preliminary students" on Tuesday evenings.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The third evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, February 18, at 8.30. Mr. William Gilmour, F.R.S.E., in the chair.

The minutes of the last meeting were read and approved. An apology for absence was intimated from Dr. Inglis Clark.

A discussion, adjourned from last meeting, was resumed on the—

ADDENDUM TO THE BRITISH PHARMACOPŒIA.

The first communication was—

NOTES ON THE B.P. ADDENDUM.

BY GEORGE COULL, B.SC.

In the following remarks on the 'Additions' to the British Pharmacopœia, I merely wish to give my own experience of a few of the preparations. It is common in papers on the 'Additions' to undertake the criticism of the entire book, when the majority of articles have mere truisms appended to them—this does duty for criticism.

I have nothing to say regarding the chemicals—these were gone pretty fully into by Mr. Dott and Mr. Macpherson at our last meeting—save that I disagree with one of our trade organs when it says we ought to get no indication regarding the origin of organic products in the Pharmacopœia. I think the more information the Pharmacopœia gives us the more useful it is. Many a country pharmacist possesses a B.P. whose library is destitute of other works of reference. Consequently if the B.P. does not give him the information he wants concerning the manufacture of the newer remedies, he is ignorant of a matter of which it has been impressed on us again and again it is to our advantage to know all the details.

Acetum Ipecacuanhæ has not been improved by being changed from the B.P. formula (to make it conform to Pharmacopœia methods), except in so far as the quantity of acid is increased; simple maceration, instead of percolation, and a coarser powder would have been improvements.

Emplastrum Menthol is a most satisfactory preparation. If the formula had indicated at what temperature of the mixture of wax and resin the menthol is to be stirred in, so as to have a minimum of loss, it would have been more complete. I find that if the menthol is added at once, when the temperature of the mixture is between 65° C. and 70° C., and then stirred smartly, it dissolves almost at once, and no further heating is required.

In the preparation of the extracts we are advancing with the times in specially adapting the menstruum to the drug, but with regard to the tinctures in this connection, we are not making much headway.

How inconsistent it is that a preparation, supposed to possess all the therapeutic virtues of a drug in a very concentrated form, should be made with a menstruum weaker in spirit than another preparation only one-tenth of its strength! It is said we must conform to the methods of the Pharmacopœia; but if the 'Addendum' allows us to dispense with maceration for two days and adopt percolation for a one in ten tincture, it ought surely to allow us to alter the menstruum and so bring us into conformity with the advanced usages of other countries.

The doses of both the liquid extracts are smaller than those of the U.S.P. preparations, especially *Ext. Hamamelidis Liq.* The dose in the 'Addendum' is 2–5 min. and in the U.S.P. ½ drachm; but one medical man in America prescribes it in teaspoonful doses four times a day, and the authors of the U.S. Dispensatory state, as an addition to this, that it may be given in double the dose with impunity.

They are both one preparation, the American one being prepared with a menstruum, slightly stronger in spirit than ours. I noticed a statement the other day in one of our journals that the U. S. preparation was a little weaker than ours, 3 pints of liquid extract being the produce of 50 ounces (av.), while 1 pint of our preparation is obtained from 20 ounces (av.). They are practically the same, the writer having overlooked the fact that the old wine pint of 16 ounces is official in the U.S.P. It would be interesting to know how there happens to be such a discrepancy between the doses.

Mistura Olei Ricini.—In common with almost everyone who has tried to make an emulsion of this by the official formula, I failed. This preparation has been the butt of much sarcasm with certain people. Now I think it is rather a convenient article, because if it is not required as a purgative it may be used as a hair-dressing.

Granular Effervescent Preparations.—Phosphate and sulphate of sodium make very fair granules. They would both be made more palatable by the addition of a little sugar, especially the latter, which is very bitter. In the case of the two foregoing salts the whole of the water of crystallization is driven off. Why should only three molecules be removed in the case of magnesium sulphate? The process adopted for the latter effervescent preparation is not at all satisfactory. It contains too much moisture and too much citric acid. The mixture, when heated, becomes so soft that the prolonged heat required to bring it to a proper condition must necessarily lead to some loss of carbonic acid.

Suppositoria Glycerini.—The official formula yields a very good mass. This is one of the most useful additions to the Pharmacopœia. The best result is obtained by the use of good sheet gelatine.

Syrupus Ferri Subchloridi.—This is one of the most welcome additions, from a therapeutic point of view, but from a pharmaceutical standpoint it is not by any means perfect. The medical man prescribes this preparation, which does good; but so far as the Pharmacopœia is concerned, he is ignorant of the amount of ferrous chloride he has administered. If all the iron were used up to form ferrous chloride the syrup would contain 4·25 grains $FeCl_2$, or 6·66 grains $FeCl_2, 4H_2O$ in each fluid drachm. This, however, would require theoretically ℥ij., ʒiij. and ♏xij. of hydrochloric acid; in reality more, because when the iron and acid are in exactly equivalent proportions the action ceases before all the iron is dissolved. Then, again, if all the acid were used in making the salt each fluid drachm would contain only 3·53 grains $FeCl_2$ or 5·53 grains $FeCl_2 4H_2O$. I found that in preparing liquor for a gallon of syrup the 24 ounces of fluid which I began with had evaporated to less than 1 pint when the action ceased. On filtering, washing the filter, making up to 1 pint and estimating, I found that the product contained as nearly as possible 24 grains $FeCl_2$ in 1 fluid drachm, equal to 3 grains in each fluid drachm of the syrup. The official formula does not say that the solution of iron is to be made up to a certain volume before adding the syrup, and as the loss by evaporation will vary considerably, there will necessarily be a variation in the density of the finished product. The official specific gravity is given as 1·34; this could only be obtained under uniform conditions not secured by the official formula. The whole formula is characterized by a want of scientific precision. We attempt to standardize galenical preparations; why should we not adopt such a method in the case of a chemical solution which admits of being standardized with mathematical accuracy? I should suggest that a strong solution of ferrous chloride be prepared, estimated in the usual way with potassium bichromate and diluted so that one pint would contain 3840 grains $FeCl_2$. This solution, mixed with seven pints of simple syrup, would give a product of definite density and constant strength, neither of which objects is attained by the official formula.

Fehling's Solution.—It would be a distinct advantage to have the quantities in this formula stated in metric equivalents. In the case of solution No. 1 the quantities can be easily converted, but the same remark does not apply to solution No. 2. This would not be of much consequence were the solution to be used only as a qualitative test for picrotoxin, but it is largely used also as a quantitative test in the estimation of sugars, and for this purpose metric measures are universally employed.

Tinctura Strophanthi.—I have grave doubts as to the complete exhaustion of one ounce of seeds by ten ounces of rectified spirit.

In conclusion I feel that in spite of some inconsistencies the work of the compilers is on the whole worthy of all praise. One is inclined to overlook minor defects from a justifiable feeling of joy generated by the knowledge that pharmacists have at last been officially recognized and accorded their due place as compilers.

Mr. **Rutherford Hill** said he was disposed to concur with the other speakers in saying that those responsible for the 'Additions' had done the work so well that nothing of any great importance was left for the critics to speak about. Taking the items in order it occurred to him to make the following observations:—

Acetanilide.—In Squire's 'Supplement' just published, it is stated that "The perchloride of iron test is not applicable to the boiling saturated aqueous solution as described in the 'Additions,' but to a *cold* saturated solution." This was evidently a mistake, as the test was directed to be applied to the saturated solution "when cool," and if this precaution was attended to the official test would be found to be quite accurate. It would have been better, however, to have said "when *cold*." In a recent paper in the *Journal of the Chemical Society* one of the characteristic reactions of acetanilide given was that a boiling saturated solution gave a red colour with perchloride of iron, but if the solution was allowed to become cold before adding the perchloride there was no coloration. In the same paper the melting point of acetanilide, after drying on a water-bath, was said to be 114° C.

Eucalypti Gummi.—The "characters and tests" appended to this substance appeared to be very meagre and insufficient. It might be said that no characters at all were given, for nothing was mentioned but its solubility in water and rectified spirit, and this was what belonged to the category of "tests" in the usual acceptation of that word. By quoting the characters of "kino" as given in the 1885 Pharmacopœia he showed how striking the omission was. There ought to have been some description of the colour and appearance of the drug, for in the absence of such a description "kino" would answer to all the official requirements. It might be described as "In dark reddish brown or ruby-coloured masses or grains, which when in thin fragments are seen to be transparent, of a garnet red hue, and quite amorphous; not so dark as, but resembling, kino in appearance. It is tough and difficult to powder, intensely astringent, and when chewed sticking to the teeth and tinging the saliva blood-red." Speaking generally of the "characters' of the crude drugs in the 'Additions' he thought there was evidence that the hand which so well supplied this portion of the 1885 Pharmacopœia had had no share in the work.

Extractum Euonymi Siccum.—In Squire's 'Supplement' it was stated that 16 ounces of euonymus bark, *treated by the official process*, yielded 4 ounces of dry extract, of which ¾ ounce was milk sugar. The product therefore contained 81·25 per cent. of dry extractive. He could not understand how this could be if the official process was followed, because according to that process the product should be so adjusted as to contain 80 per cent. of dry extractive. It would seem as if a brittle mass was obtained before the calculated degree of desiccation had been reached. If that were so some allowance for it would have to be made, and a larger percentage of milk sugar added than experiment seemed to require. Squire found that their product was deliquescent, and when powdered set to a hard mass even in a stoppered bottle. Such a condition would be very inconvenient, and was no doubt due to the fact that the product contained 1·25 per cent. more of extractive than the official formula allowed. At the last meeting Mr. Dott had said he did not think tests should have been given to guard against the presence of barium salts and other additions, because these could not be present in the properly prepared article, and would undoubtedly be regarded as sophistications. He could hardly agree with such a statement. He thought one of the functions of tests was to enable the pharmacist to satisfy himself that the official formula had not been departed from. If all substances were properly prepared of course they could afford to dispense with all tests. But he did not think it was wise thus to take the thing for granted. It was well known that many preparations were sold as "euonymin," and it would have been an advantage to have had some characters and tests by which sophistications or substitutions could be readily detected. It would have been useful had the percentage of ash and the solubility in water and rectified spirit been stated.

Gelatinum.—It had been said, with some truth, that the official characters did not fix a definite standard of quality for this substance. He had found that none but the finest qualities, however, such as French sheet gelatine would answer the official requirements of absence of colour and odour. He showed samples of the latter and also of a shred gelatine of London make which was extensively used. The latter had a distinct yellowish colour and the hot solution had a very marked glue-like odour. He showed also glycerine suppositories made with the former which were comparatively soft and beautifully clear, while those made with the latter were yellowish, opaque, and much tougher. He found that, following closely the official instructions, 55 grains of the sheet gelatine in three minutes absorbed 145 grains of water, whereas, under the same conditions, 55 grains of shred gelatine absorbed only 43 grains. This, of course, made a very great difference in the practical working of the formula.

Liquor Cocainæ Hydrochloratis.—It looked as if two principles were adopted in the preservation of this solution, and it was like a case of hanging a drowned man. The development of micro-organisms is first prevented by sterilization of the water by boiling. Having no confidence in the efficacy of this principle the same object is attained by the addition of salicylic acid as an antiseptic. He could quite see the need for an antiseptic, because even though the solution was sterilized to begin with, every exposure to the atmosphere would involve re-infection. He could not, however, see the use of both precautions, and the boiling might have been omitted without disadvantage. He agreed with Mr. Macpherson that the introduction of an *aqua acidi salicylici* would be a great convenience for the making of this and other similar solutions.

Liquor Trinitrini.—He observed that Dr. Stockman, in his recently published "New Official Remedies," described nitroglycerine as nitrate of glyceryl, $C_3H_5(NO_2)_3$. It had been usual to speak of it as trinitroglycerine and write the formula $C_3H_2(NO_2)_3 3HO$. He found, however, that it gave the reactions of a true nitrate, and the first formula was the more accurate. It was interesting to note that nitroglycerine or nitrate of glyceryl possessed all the therapeutic properties of a nitrite. This at once suggested the question, would not nitrate of ethyl have the same therapeutic value as nitrite of ethyl or sweet spirits of nitre? If so, a solution of ethyl nitrate would probably be more stable than the present *spiritus ætheris nitrosi*. He understood there was some practical difficulty in preparing ethyl nitrate, but if there were a demand for it this difficulty would doubtless be overcome. The point was one that deserved investigation.

Picrotoxin.—*Cocculus indicus* should have been inserted in the usual way, with the usual characters, as the source of picrotoxin, just in the same way as cevadilla is inserted as the source of veratrine. He observed that Stockman described picrotoxin as a glucoside, but he did not think this point had yet been clearly determined.

Syrupus Ferri Subchloridi.—It was a pity the strength of this syrup had not been stated. Of course it could be found by calculation, but medical practitioners, who most required to know, could not usually afford the time to do so. It would be a distinct advantage to prescribers if the Pharmacopœia stated the quantity of metallic iron in all official iron preparations.

Tinctura Strophanthi.—He observed that the process of removing the oil from the seeds by percolation with ether had been made official. He thought there was considerable risk that by such a process a portion of the active constituent would be lost, and probably it would have been an advantage to have adopted the process recognized in the last German Pharmacopœia, namely, to remove the oil by expression.

Mr. **Gibson** said he thought all the formulæ in the 'Additions' were satisfactory. A good deal of criticism had been bestowed upon the *mistura olei ricini*, but he had found no difficulty in making it. He did not consider the quantity of oil of lemon in it excessive and the liquor potassæ had the effect of modifying the oil and neutralizing its acrid properties. If the quantity of water in the case of the effervescing preparations was carefully driven off the result would be found to be quite satisfactory. In the case of the effervescing sulphate of magnesia it was perhaps a little difficult to remove the necessary percentage of water, but if this were done it would not be too soft and a good granule could be obtained. He was disposed to agree with those who doubted if the strophanthus would be thoroughly exhausted by using ten ounces of spirit, and he also thought expression would be preferable for removal of the fixed oil, as some of the active constituent was likely to be washed through with the ether.

Mr. **Boa** said he did not quite agree with the statement that boiling the water for *liquor cocainæ hydrochloratis* was unnecessary. He thought the solution was better preserved by the salicylic acid when the water had been previously sterilized by boiling.

Mr. **Gorrie** said tartrate of emetine was a much more stable salt than the acetate, and a preparation containing it in solution would be more likely to be satisfactory than the *acetum ipecacuanhæ*.

Mr. **Arthur** made observations on the following:—

Adeps Lanæ.—There was a commercial article known as wool fat, which was quite different from "lanoline," but the latter was superior for many pharmaceutical purposes.

Emplastrum Menthol.—He showed a sample of the plaster spread on chamois skin leather. He found the plaster was of suitable consistence and could be very readily spread with a plaster iron just warm enough to keep the plaster soft. The spreading should be rapidly done and the plaster sent out with a muslin cover over the face of it, to be removed before applying. He thought this plaster was a step in the right direction. It was soft, pliable, and comfortable to wear, like the American plasters, which were an improvement on the plasters generally in use in this country.

Liquor Cocainæ Hydrochloratis.—Salicylic acid was used to preserve this solution. Dr. Argyle Robertson, after some experiments, had fixed upon boric acid as the best antiseptic for these alkaloidal solutions. He (Mr. Arthur) had used it extensively for solutions of atropine, duboisine, and cocaine, and found that in the proportion of 8 grains to the fluid ounce it kept them indefinitely. It was also free from the objection to which the official liquor was open of acting on the iron mounts of hypodermic syringes. If a piece of steel were placed in liquor cocainæ hydrochloratis the solution would very speedily become pink from formation of salicylate of iron. With boric acid no such action took place.

Liquor Trinitrini.—The 'Additions' gives a formula for the preparation of this solution, but he should like to know where they were to procure the nitroglycerine. About twelve years ago he had occasion to supply some of the solution to a leading west end physician. He wrote to Nobel's Explosives Co., but they replied that they could not supply nitroglycerine without an order from the Board of Trade, and not even then in smaller quantities than a waggon load at a time. The chemist attached to the works, however, very courteously suggested to them to apply to the contractors for the Edinburgh Suburban Railway, which was then in course of construction. From them they obtained two cartridges of dynamite. Acting on Messrs. Nobel's instructions these were suspended in distilled water, when the nitroglycerine slowly separated from the kieselguhr and was collected and dissolved in rectified spirit in the proportion given in the official formula. He supposed this was probably the first occasion on which the liquor was prepared in Scotland. It would be very interesting to know what was the source of the nitroglycerine used in this preparation, and where and by whom the solution was prepared, and he should be glad if any gentleman could enlighten him on the point.

Mistura Olei Ricini.—There had been a good deal of misapprehension about this preparation. It had been constantly spoken of as an emulsion, but it was a mistake so to describe it, as it in reality only claimed to be a mixture. He showed four samples, showing that a very presentable mixture could be made. His assistant, Mr. Parker, was the first to show him how best to obtain a good mixture by following strictly the B.P. directions. He had found an American egg-switch of great service.

Seidlitz Powders.—He noticed that there was no mention of the so-called "double strong" seidlitz powders. These were much more frequently used than the "single," and a second formula would be an advantage. He also thought the well known "effervescing citrate of magnesia" might have been included in the 'Additions.'

Suppositoria Glycerini.—He thought it was a pity the formula did not specify the quantity of water to be used. For the last two years he had used the following formula:—

Take of—

Gelatine (Cox's)	1 ounce.
Distilled water	1½ ounces.
Glycerine	5½ „

Add the water to the gelatine, and allow to stand for two or three hours. Then melt on a water-bath, add the glycerine and pour into moulds. The above was very near the B.P. proportions, and he had used them very extensively, and with perfect satisfaction. It was an advantage to roll the pessaries in French chalk before sending them out.

Syrupus Ferri Subchloridi.—It was a pity the familiar name of "protochloride," given to this preparation by the chairman in his original papers on this subject, had not been adopted. He agreed with Mr. Hill that a definite statement of the iron strength of all these preparations should be included in the B.P. In his experience he found that this syrup was largely used of a strength of 5 grains in each fluid drachm.

Tinctura Strophanthi.—He had found that the seeds were exhausted by 10 ounces of rectified spirit, and he had been requested by Professor Fraser to adopt such a process as that now made official, on the ground that it gave a tincture representing the full physiological activity of the seeds. The seeds contained a very large quantity of fixed oil. He generally obtained from 3 to 4 ounces from 8 ounces of seed, and on a recent occasion he obtained fully 5 ounces by weight from 8 ounces of seed.

Mr. **Duncan** said he thought the 'Addendum' was about as perfect a production as they could reasonably expect. He was not sure that the boiling of the water in *liquor cocainæ hydrochloratis* was intended to sterilize it. It might be only to dissolve the salicylic acid. He had observed that salicylic acid decomposed cocaine with production of methyl salicylate.

Mr. **Dott** said that he could confirm Mr. Hill's observations as to the accuracy of the acetanilide reactions. With reference to the melting-point of *adeps lanæ*, he did not think it had been sufficiently noted that the substance was a mixture of compounds of different melting-points, and as it cannot be purified by the simple methods adopted in refining lard or tallow, the composition will perceptibly differ according to the method of purification employed. Consequently there must be some variation in the melting-point. While speaking of nitroglycerine, Mr. Hill had suggested that other nitrates might possibly be used in place of the less stable nitrites. Nitrate of ethyl and of amyl were both used to some extent, but as a good authority had declared that every purpose of a nitrite was perfectly answered either by nitrite of sodium or nitroglycerine, there could be no advantage in multiplying remedies of that class. It had been stated that the Pharmacopœia was wrong in giving the solubility of phenacetin as one in sixteen of rectified spirit, the true solubility being one in twenty-one. The Pharmacopœia, however, did not state a definite temperature, and in a warm room phenacetin dissolved readily and completely in sixteen "fluid parts" of rectified spirit. The vagueness of the Pharmacopœia solubilities had been commented on, and possibly it would be better to give them always at 60° F. when known. The "ordinary temperature" varied greatly throughout the year, with a corresponding variation in the solubility. It had been confidently asserted that the ignition test under *Sodii Benzoas* must be the result of theory, as in practice there is always more than the 3·68 grains of residue. That was not his experience. Of a salt (which lost less than 1 per cent. on drying at 120° C.) 10 grains left 3·66 grains on incineration in a platinum crucible with a good bunsen flame. The residue, when dissolved and neutralized with standard acid, was found equal to 3·68 grains Na_2CO_3.

Mr. **Macpherson** said Dr. Clark had cut the ground from his own argument as to solubility by referring to picrotoxin as an illustration of the difficulty met with in given definite proportions, because it so happened that this was the one substance in the 'Additions' the solubilities of which were most elaborately set forth. He did not expect them to be stated to a decimal point, but they might be stated approximately to the truth. With regard to melting points Dr. Clark asked what was to be regarded as the melting point? He should like to put that question to himself. In fixing the melting point of *Adeps Lanæ*, for instance, at from 100° F. to 112° F., in what condition was the substance? Was it quite fluid, or only partially melted, or just beginning to run down? Menthol plaster had been described by Mr. Mason, of Seabury and Johnson's, as an ointment and not a plaster. He, of course, admitted that it could be made sufficiently hard by too much heat and the avoidance of precautions to prevent undue loss of menthol. With regard to the statement by Squire as to acetanilide, pointed out by Mr. Hill, that might be due to the fact that the first issue of the 'Additions' did not contain the words "when cool," and probably Squire had got an advance copy.

The Chairman, in closing the discussion, said it had been thoroughly practical and very interesting. He had noted some points, but considering the lateness of the hour he thought it best not to occupy any further time.

The following communication was then read:—

Liquor Bismuthi et Ammonii Citratis.

BY DANIEL GORRIE.

The new liquor is a distinct advance on the old preparation in three respects and worse in two. The first reason of its superiority is, as is well known, the absence of a considerable quantity of nitrate of ammonium; the second reason is that the citrate, in common with other salts of bismuth, is made from a metal more thoroughly purified from arsenic, silver, lead, tellurium, selenium, copper and iron; and the third reason is the facility and rapidity with which the liquor can be made. One respect in which the new liquor falls short of the old is in its keeping qualities; the other, which is not quite so serious, is that of slight discoloration. I believe both objections may be overcome, and the precautions found necessary for that purpose I now lay before you.

To prevent the liquor from decomposing and becoming muddy from development of fungoid growth, working with B.P. quantities, make up to 19 ounces with the necessary water and solution of ammonia, and make the final ounce rectified spirit. In my experience this addition makes the liquor keep indefinitely. Chloroform water might answer the purpose, but it possesses a sweetness and odour which may be found objectionable.

In regard to the colour of the solution, it is undoubtedly generated by the heat of chemical combination on the addition of the ammonia in a large quantity at a time. Citric acid certainly more readily responds to the effects of heat than some other organic acids. It matters not whether one uses a moist precipitate or dry bismuth citrate. The lower the temperature at which the liquor is kept throughout, till all the ammonia is added, the greater will be its freedom from colour. The remedy here, also, is simple in the extreme. Add the necessary quantity of solution of ammonia in very small quantities at a time, waiting till the liquor is cool before a fresh addition is made. By attention to these points a practically perfect preparation can readily be made. When speaking of colour, it is only in a relative sense, as it is scarcely apparent when a 2 or 3 ounce bottle is filled. As I have never seen any objection taken to the colour, it must be concluded that it is not regarded as of serious importance.

The question naturally arises, Why did not the old preparation get discoloured? because the heat arising from the combination of nitric acid and ammonia is immensely greater. This may be due to the fact that in presence of the nitrate of ammonium the citrate of bismuth is not so readily altered. Though, looked at from a therapeutic point of view, the ammonium nitrate in the old formula was decidedly objectionable, it seems probable that it had the effect of preventing decomposition, and therefore the old liquor kept better than the new one. It is well known that organic salts, such as citrates, tartrates, and acetates, are liable to decomposition, especially in neutral solution. According to the Pharmacopœia this liquor should be a neutral or slightly alkaline solution of the double citrate of bismuth and ammonia, and hence its proneness to decompose and become muddy from the growth of fungi. By the addition of one ounce of rectified spirit to each pint, as I have suggested, I have found that this objection is removed and the liquor is rendered quite stable. If a moist precipitate of bismuth citrate is used a clear solution is at once obtained, but with the dry precipitate it is necessary to use litmus paper and filter the solution in order to get a clear liquor.

Mr. Hill showed six commercial samples possessing the following characters:—

	Specific Gravity.		
A . .	1·067	neutral.	colourless.
B . .	1·067	neutral.	yellowish brown.
C . .	1·076	nearly neutral.	pale straw.
D . .	1·080	slightly alkaline.	yellowish.
E . .	1·088	0·01 p.c. free AmHO.	colourless.
F . .	1·102	0·1 p.c. „ „	faint straw.

He pointed out that none of the samples corresponded to the official density 1·07. In sample F the sharp taste of caustic ammonia was very perceptible, and he thought it would not be a suitable remedy in gastritis or similar maladies. He showed also a sample which when prepared was perfectly bright, but had become muddy and showed a very distinct fungoid growth.

The Chairman said he had often been struck by the fact that freshly precipitated or freshly prepared chemicals and alkaloids dissolved with ease, whereas when they had been kept some time they become much less soluble. It would be interesting to have an explanation of this phenomenon.

Mr. Dott said with regard to acetate of morphine to which the Chairman referred, its insolubility after keeping for a time was due to liberation of the alkaloid by dissociation. It might also occur in solution; for instance, if a solution of a salt of narcotine were very much diluted the alkaloid would separate from the acid and fall out of solution. In the case of tartrate of morphine care must be taken to have the salt perfectly neutral. If there was any excess of tartaric acid the acid tartrate would be formed and it was comparatively a very insoluble salt.

Mr. Boa said he had had a good deal of experience with this liquor. He did not quite agree that a preservative was required, and he had not met with the difficulty as to keeping properties which many complained about. The remedy suggested by Mr. Gorrie was, however, a very simple one, and could be very easily tried. If distilled water, previously boiled, were used in making the liquor not much difficulty would be met with in the result. A slight excess of ammonia helped to keep the solution clear. This was noted by Squire, who recommended the addition of one ounce of liquor ammoniæ to each gallon. He was not sure that the presence of alcohol in such a preparation was desirable.

Mr. Macpherson said he had not met with any development of fungi in this liquor. The colour, he thought, might be derived from the calico filter on which the bismuth citrate had been collected. The insolubility of the commercial citrate of bismuth was probably due to a defect in the process of manufacture.

Mr. Duncan said that four years ago he had devoted some attention to this liquor with a view to devising some short method of preparing the citrate of bismuth. He had tried Wood's process, in which the liquor was prepared by dissolving bismuth oxide, but he had never found the process satisfactory. He then tried the plan of using freshly precipitated bismuth hydrate and got admirable results. He found, however, that the loss of bismuth during the process was so large as to preclude the adoption of such a method He thought Mr. Gorrie had probably correctly explained the cause of the coloration of the liquor, but it should also be remembered that one of the best of all methods for cleaning a dirty mortar was to prepare liquor bismuth in it. The quantity of rectified spirit suggested by Mr. Gorrie seemed rather small to have the desired effect as a preservative.

Mr. Arthur said the liquor should always be filtered through white filter paper. If the ordinary French grey filter paper was used the liquor would be coloured.

Mr. Hill suggested that the insolubility of citrate of bismuthi might be due to absorption of oxygen and formation of an oxy-salt.

Mr. Gorrie, in reply, said he did not think the small percentage of alcohol in a dose of the liquor could be very much objected to. Pepsine wine, which contained a much larger percentage, was used in the same cases as bismuth. He might say that he never used a mortar, but always a wide-mouthed bottle, in preparing the liquor.

On the motion of the Chairman votes of thanks were awarded to Mr. Gorrie and to Messrs. Coull and Hill, who opened the discussion on the 'Addendum.'

Owing to the lateness of the hour the description of the recent additions to the Museum was postponed.

EXAMINATIONS IN LONDON.

February 18, 19, 20, 25, *and* 26, 1891.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gerrard, Greenish, Holmes, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 18th on behalf of the Privy Council.

MAJOR EXAMINATION.

18*th*.—*Four* candidates were examined. *Three* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Adams, Arthur Edward.........Cleobury Mortimer.

19*th*.—*Four* candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Clarke, James ....Liverpool.
Goss, George ....Ipswich.
Robbins, Percy John ....London.

25*th*.—*Four* candidates were examined. *Three* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Wilson, William ....Nuneaton.

26*th*.—*Four* candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Rosewarne, Richard ....Falmouth.
Scott, James Hugill ... .Penrith.
Skinner, Gedwin John ....Seaton.

MINOR EXAMINATION.

18*th*. — *Twenty-eight* candidates were examined. *Seventeen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allen, Francis Joseph ....Plymouth.
Bell, Charles Bains...............Hull.
Blackman, Percy ....Southampton.
Blomfield, Francis Henry......Braintree.

Brown, Sidney Stuckey	South Molton.
Camm, Charles Percy	Wolverley.
Chalmers, Franklin	Devizes.
Chambers, John	Wisbech.
Cowley, Robert Charles	Douglas.
Davidge, Henry Norris	Langport.
Scott, William Robert	Harrogate.

19*th.*—*Twenty-six* candidates were examined. *Seventeen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

De Carle, George	Norwich.
Dow, Alfred Edward	King's Lynn.
Driver, Arthur Silvester	Elmesthorpe.
Egginton, John Tertius	Sedgley.
Fitch, Frederick William	Shalford.
Floyd, Joseph Arthur	Alcester.
Frith, Henry Edward	Colchester.
Garner, William Luscombe	London.
Lloyd, Benjamin Caradoc	Flint.

20*th.*—*Twenty-eight* candidates were examined. *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Eglington, Malkin de Kerdistone	Yarmouth.
Hale, Giles	London.
Harries, Arthur Hayward	Torquay.
Holmes, Bryan	Bentham.
Hornby, Arthur Smith	Easingwold.
Ison, Charles Edward	Atherstone.
Ladell, Richard Savory	Norwich.
Lancaster, Bernard	Chesterfield.
Litchfield, Ernest	Nottingham.

25*th.*—*Twenty-six* candidates were examined. *Fourteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brice, Ernest	Wirksworth.
Morgan, Henry Brunt	Liverpool.
Morris, Edward Ernest	Bristol.
Neville, Egbert	Banbury.
Overend, George William	Leeds.
Patrick, Herbert Waring	Kettering.
Perrett, Frederick James	Weston-super-Mare.
Phillips, Hugh Howell	Maenclochag.
Richards, William David	Aberystwith.
Rigden, Hubert	Faversham.
Sikes, Alfred Walter	Cork.
Thomas, Ernest Loydwick	St. Dogmells.

26*th.*—*Twenty-six* candidates were examined. *Sixteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Breese, Richard George	Merthyr Tydfil.
Morgan, William Ellis	London.
Skinner, Herbert	Nottingham.
Streatfield, Edward Henry	Maidstone.
Sursham, Frederick Thomas	London.
Taylor, Horace Dugdale	Stamford.
Tierney, Thomas	Marple.
West, Henry Thomas	Manchester.
Wilson, Charles Henry	Stockton.
Yates, Charles George	Brighton.

MODIFIED EXAMINATION.

19*th.*—The undermentioned was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Corbyn, Joseph Hartwell	London.

PRELIMINARY EXAMINATION.

26*th.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Bennett, Wm. Fredk. Cockayne	Sheffield.
Bolitho, William Henry	Penzance.
Comer, William Thomas	Birmingham.
Duncan, Hubert	Glasgow.
Eames, John	Llanerchymedd.
Holmes, Willmot	Liverpool.
Jones, Alfred Lancelot	Brynmawr.
Marfitt, George Edward	Leicester.
Reid, John L.	South Shields.
Roberts, Joseph	Kingsthorpe.
Sharman, Herbert Broughton	London.

Proceedings of Societies in London.

JUBILEE OF THE CHEMICAL SOCIETY.

The celebration of the fiftieth anniversary of the foundation of the Chemical Society of London has attracted universal attention from the scientific world during the past week. The Jubilee proceedings were inaugurated by an Afternoon Meeting of Fellows and their friends in the Theatre of the London University, Burlington Gardens, on Tuesday, the 24th inst., at 3 p.m., when speeches were delivered by the President and some of the original Fellows of the Society, and congratulatory addresses were presented from various English and Continental scientific corporations by their respective delegates. In the evening a Reception was held at the Goldsmiths' Hall, Foster Lane, by the President and Council of the Society, and was followed by a Soirée, at which an unique collection of apparatus and specimens, employed and prepared during the classical researches of English chemists, was exhibited. The final meeting was a Dinner at the Hotel Métropole on Wednesday evening, in honour of the visitors and delegates from the various learned societies.

SPECIAL MEETING OF THE SOCIETY.

The Afternoon Meeting, which was originally convened at the rooms of the Society of Arts, was held at Burlington Gardens, as above mentioned, on account of the large number of applications for admission tickets by Fellows and their friends, who signified their intention of being present. The actual attendance, owing to the prevalence of a dense fog at the hour of assembly, was perhaps not so large as might have been anticipated, but the theatre was nevertheless well filled, and amongst the gathering could be discerned such celebrities as Sir Frederick Abel, Professor Armstrong (Secretary), Professor Roberts-Austen, Dr. James Bell, Mr. William Crookes, Professor Dewar, Dr. Evans, Professor M. Foster, Professor Frankland, M. Gautier, of Paris, Dr. Gladstone, Sir William Grove, Professor Meldola, Dr. Müller, Professor Victor Meyer, of Heidelberg, Professor Odling, Dr. Perkins, Sir Lyon Playfair, Lord Rayleigh, Sir Henry Roscoe, Dr. Russell (President), Professor Thorpe, and Professor Will, of Berlin.

In an introductory speech the **PRESIDENT** (Dr. **RUSSELL**) said that the meeting had been convened to commemorate the existence of the Chemical Society for fifty years, a period that was equivalent to centuries of former ages if measured by the progress in the science of chemistry, but that was in reality so brief a space of time that they were able to welcome in their midst several who had been present at and taken an active part in the foundation of the Society. Of three original Fellows from whom they had expected to hear addresses during the afternoon Sir Lyon Playfair was present and Sir W. Grove might be still expected, but Dr. Longstaff had been compelled to relinquish his task on account of the bad weather. Their Society boasted the proud distinction of being the first association organized with the sole object of promoting the study of chemistry. According to the official records twenty-five gentlemen, desirous of uniting themselves for the purpose of forming a Chemical Society, met on February 23, 1841, in the rooms of the Society of Arts. At that meeting a provisional committee, of which Thomas Graham and Sir W. Grove were members and Mr. R. Warington secretary, was appointed for carrying this object into effect, and such was the energy displayed by the members of the committee that the first meeting of the Society took place only a month later. Thomas Graham was elected first President and Messrs. R. Warington and E. F. Teschmacher secretaries, and it is worthy of note that all the original resolutions have been carried into effect, with the exception of the establishment of a museum of chemical apparatus and preparations, which idea had to be abandoned. The Society could further congratulate itself that five of the seventy-seven Fellows who constituted the membership at its foundation are still living, and that the late Mr. Robert Warington, to whose activity the Society is indebted for its existence, is still represented by such an active member as his son.

At this juncture a slight interruption was caused by the entrance of Sir W. Grove, who was conducted to a seat on the left of the Chairman.

Dr. Russell then continued his address, and said that fifty years ago public laboratories for the systematic teaching of chemistry did not exist in London. The number of real students of chemistry was also very small, and they could only obtain instruction in manipulation and the setting up of apparatus in private laboratories. These students were generally regarded by their friends as eccentric youths who were likely to do no good. In Scotland scientific education was somewhat further advanced, for it is recorded that Dr. G. Rees delivered lectures on chemistry in Edinburgh as early as 1832. Shortly after the foundation of the Chemical Society, however, several public laboratories were erected in London. In 1845 the College of Chemistry was instituted, and both the University and King's Colleges subsequently provided chemical laboratories, whilst it must not be forgotten that in 1843 the Pharmaceutical Society had established a laboratory for the teaching amongst other things of practical chemistry. The period immediately preceding the formation of the Chemical Society was by no means a time of chemical activity in England. Graham, Kane, and Johnson of Durham were the leaders in scientific chemistry, and about this time Graham published his researches on the constitution of salts, which were afterwards awarded the gold medal of the Royal Society. Kane was also occupied in his investigations on archil and litmus, and Johnson contributed papers concerning several minerals, the constitution of resins, and various problems affecting agricultural chemistry. Faraday could hardly be claimed as a chemist at this time, as he was then occupied in prosecuting his long series of experimental researches on electricity, in connection with which subject it may be mentioned that in 1840 Smee's battery was exhibited at the Society of Arts. Another important branch of chemical science, photography, grew into prominence in 1840, when Sir J. Herschel published his investigations on the chemical activity of the rays of the solar spectrum, and demonstrated the effects produced by the ultra-red and ultraviolet rays. He also recognized hyposulphite of soda as the best reagent for the fixing of photographs. The present year is also the jubilee of Clarke's soap test for the hardness of water, and it was about fifty years ago that Robert Reade conducted his researches on fermentation, whilst at the same period a lingering touch of the alchemist was visible in the alleged conversion by S. M. Browne of carbon into silicon when cyanogen was heated at high temperatures, a communication which attracted sufficient attention to call forth a letter from Liebig to Dr. Lyon Playfair, stating that he had repeated Browne's experiments with negative results. At the beginning of the century chemistry had passed through a brilliant period of its existence in England. Dalton had published his atomic theory, Davy had decomposed potash and soda, and had demonstrated that chlorine was an element, Cavendish and Wollaston were still at work. Subsequently, however, a feeling appears to have been prevalent that the age of brilliant discoveries was over, that the resources of the chemical laboratory were at an end, and that nothing further could be accomplished than the preparation of a few new compounds and the determination of the percentage composition of those already known, although the demand for good text books indicated that much quiet study was still going on. When the Chemical Society was founded Thomas Graham was certainly the most distinguished chemist in England, and when he came to London in 1837 to succeed Edward Turner as professor of chemistry at University College he had already accomplished work of a high order. He was also at that time occupied in writing the book published by him in 1842, which furnished an admirable account of the chemistry of the time. Notwithstanding the slow progress of chemistry in England, the explanation of the success of the Chemical Society from its foundation was not hard to seek. In Germany Liebig was working at Giessen, his intimate friend Wöhler at Göttingen, Bunsen at Marburg, whilst in France Dumas, Laurent, Gerhardt, with a host of other distinguished and active chemists, were at their zenith, and Berzelius and Gay Lussac were still alive. The results of the investigations of continental chemists infiltrated but slowly into England, in fact, sometimes took years to become generally known, and there was a prevalent desire to gain a more intimate acquaintance with foreign work, in order to avoid vexatious repetitions. This increasing demand had been partly met by Messrs. Francis and Croft's abstracts from foreign journals, and further, in compliance with the request of the British Association, Liebig wrote the two pamphlets on "Chemistry and its Application to Agriculture," and "Chemistry and its Application to Physiology and Pathology," that so accurately describe the views of the age. Liebig was indeed extending the knowledge of organic chemistry in every direction, and on the continent generally the time was one of wonderful activity. Chemistry was every day becoming more of a true science, and the constitution, as well as the composition, of bodies was being actively discussed and investigated. Liebig was clearly the immediate cause of this sudden increase of chemical activity in England, and, if the older men in this country did not put their trust in him, the younger men flocked to his laboratory, there to become inoculated with his enthusiasm for the study of chemistry and to learn how scientific investigation was to be carried on. Having thus described the conditions obtaining at the period of the foundation of the Society, Dr. Russell said his task was accomplished. His part had been to deliver the prologue, and he would now leave it to others to trace the developments of chemistry.

Sir Lyon Playfair, as one of the original Fellows of the Society, then gave a short address, distinguished by terse and pithy descriptions of the persons and characters of the illustrious chemists of fifty years ago, to whom he and many other students had been indebted for much kindness, much hospitality, and much encouragement. Like the previous speaker, he also mentioned the great influence that Liebig had exerted in the extension of the science of chemistry throughout Europe. After awarding to him the position of *facile princeps* as chemist, he referred to the preeminence of some of his pupils, as Hofmann and Bunsen. Sir Lyon Playfair further rapidly sketched the habits and modes of work of other distinguished chemists, among whom Wöhler, Mitscherlich, and Rammelsberg figured. Dumas was described as the Kepler of chemistry, and reference was also made to the lately deceased Chevreul, who was a veteran resting on his laurels fifty years ago. The science of chemistry commenced, the speaker said, with the first speculations with regard to the composition of common objects, and he supported his statement with a cursory review of the different theories of ancient philosophers, mentioning the recognition of the four so-called elements, "earth, air, fire, and water," by Aristotle, as one of the greatest advances in chemical knowledge. After this review of the past, Sir Lyon Playfair pictured the future of chemistry as a struggle to ascertain the nature of the elements. He considered that the recognition of the properties of the elements as a periodic function of their atomic weights had brought chemists to a borderland, which it required a chemical Newton to lead them across. In fifty years time he himself would not be among the living, but he had no doubt that the younger members present who might celebrate the centenary of the Chemical Society would see still greater advances and more wonderful discoveries than had been made in the past half century.

Sir **William Grove** said that, although he had been called upon as one of the original Fellows of the Society to address the meeting, he believed the only qualification he possessed was that of old age. His position was that of the survival of the unfittest. Old age was not to be envied, on account of accompanying physicial infirmities, and the failure of memory must be included in this catalogue. He had thought that he knew most of the facts connected with the foundation of the Chemical Society until he had lately referred to the official records, but he then found his memory had failed so far that he only recognized the names of his friend Sir Lyon Playfair, Faraday, Thomas Graham and a few more of the original members. A few reminiscences of the early days of the Society still however occurred to him. No one he believed ever knew who really initiated the idea of the Society, but he recollected clearly the discussions as to who should be made their first President. He himself had approached Faraday on the subject, but Faraday had declined this honour, like many others profferred to him, with the characteristic remark that he could serve the interests of science better in carrying out experimental researches than in performing the duties of President. Other suggestions were also made concerning the filling of the post, and ultimately they decided to trust to the calm head and strong hand of Graham, and a better first President they could not have had. One name, however, that he was surprised to find omitted from all records, was that of Jacob Bell, whom he had held in high esteem. Several meetings had been held in Bell's rooms in Oxford Street, and in memory of one who sold "good real drugs that were what they pretended to be" he was even yet in the habit of expending at least one shilling per annum in the shop that still bears his name. People who took up the study of chemistry did so for different purposes. Some cared only about prying into the mysteries of nature and endeavouring to recognize the laws by which she governed the universe, whilst others cared only to apply what was known to the wants of industries. He himself had been blamed by some critics for his withdrawal from the active scientific world, but they ignored the fact that he was originally a barrister, and that he only turned to science when he had nothing else to do. At a later period he had been encumbered with a large family, and every chemist knew that science was not a good paymaster. He hoped his present profession was an honourable one, but if he had had the choice there would have been no hesitation on his part with respect to his course. In conclusion, Sir William Grove referred to the advances made in the science of chemistry and knowledge of the universe. To him it appeared that the infinitely small was as incomprehensible to mankind as the infinitely great. Sir W. Thomson had brought atoms within the realms of measurement, though not of measurement with rule and compass. Physicists considered the atoms to be impenetrable by any other substance and therefore not divisible, but he thought that the term was an ill-chosen one. The word "minim" might have better conveyed the sense, but it was too late now to rectify this mistake.

Mr. R. **Warington** then presented to the Chemical Society, in commemoration of the jubilee, an album containing portraits of original Fellows and letters relating to the formation of the Society. He explained that his father had carefully preserved the correspondence that had passed through his hands with reference to the foundation of the Society, and he had thus been enabled to hand the Society forty-four portraits of the seventy-seven original Fellows and seventy letters containing promises of support that had been received in response to the circular issued by the Provisional Committee. Of the seventy-seven original Fellows forty were resident in London, fourteen in Scotland, and eight of these in Glasgow, five in Lancashire, and the remainder in various provincial towns.

Dr. Russell, having suitably thanked Mr. Warington in the name of the Society for his interesting present, then called upon Professor Odling to deliver his address on "The Development of Chemical Theory since the Foundation of the Society."

Dr. **Odling** said that in chemistry doctrine and application go hand in hand, and that although the chemical industries had to thank scientists for their existence, they had amply repaid the debt with the ready and bounteous supply of fresh material that they had placed in the hands of the investigator. Chemists of to-day reap the advantage of the labours of those who, like Black, considered the study of the phenomena of heat and mixture to be a means for the furtherance of the arts and the knowledge of nature. The most fruitful period of advance in organic synthesis commenced in 1854, and was indissolubly connected with the name of Berthelot. He need only refer to the production of oil of winter-green, madder and indigo by synthetical means as instances in which it was difficult to distinguish between the products of nature and those of the laboratory. The most recent advances were represented by the brilliant researches of Emil Fischer. All these evidences have long since cleared away any adherence to the theory that organic bodies are the products of vital force, so that in the theory of synthesis there has not only been a large development but also an entire revulsion. The phenomena of dissociation, first made comprehensible by the aid of Ampère's and Avogadro's theories, were carefully investigated by Faraday, Graham, and Grove, who contributed largely to the knowledge of the laws of diffusion, electrolysis, and osmosis. Later research has developed the study of the state of matter at high temperature and also in the extended or tenuous forms observed in solutions. One of the greatest advances during the last half century has been the introduction of spectrum analysis by Bunsen and Kirchhoff in 1879, which has promoted chemistry from the position of a terrestrial to that of a cosmical science, and revealed fresh fields of research as to the composition of elements and their modes of evolution. It was characteristic of chemistry that the progress of every other science depended upon its advance. From the time of Laurent and Gerhardt, Avogadro and Ampère and Cannizzaro and Würtz, the reacting units of chemical substances have been regarded as identical with the molecular weights, and the atomic weights have therefore been a frequent subject of revision, whilst the recognition of the relations existing between the weight of the least particles of elements that enter into reactions and the weight of the physical molecules of their compounds has led to a classification of the elements into monads, diads, etc., or in other words, to the theories of desmicity and valency. Pre-eminent amongst other experimental investigations in this direction must be mentioned Frankland's researches into the constitution of organo-metallic compounds. From these conceptions grew the theory, first formulated by Newlands, subsequently in more detail by Mendeljeff, that the properties of the elements are a periodic function of their atomic weights. In the domain of organic chemistry during the same period, Kekulé's studies of the paraffins, olefines and benzenes had rendered the phenomena of isomerism comprehensible, and so far has this branch of research advanced that what at first was considered a kind of accident has now been accepted as a fundamental doctrine. Of his numerous apostles Le Bel and van t'Hoff have discovered a form of isomerism that, owing to the behaviour of the isomeric products towards polarized light, may be regarded as the most interesting development of chemistry during recent years.

Presentation of Addresses.

At the conclusion of Dr. Odling's address the President called upon the delegates to present the addresses of congratulation from their respective Societies.

The Royal Society was represented by the Treasurer, Dr. Evans, and the two Secretaries, Professor Michael Foster and Lord Rayleigh. Dr. Evans, acting as spokesman, apologized for the enforced absence of their President, Sir William Thomson, and said that the deputation had not brought a written address, as it was felt by the members of the Royal Society that their interest in the welfare of their offspring could be better expressed "face to face" than in a more formal manner. He said that the parent learned society, founded in the time of Charles II., wished most heartily to congratulate one of its younger daughters on attaining her jubilee after a most successful career. The Chemical Society had fulfilled its mission, both with regard to the extension of chemistry in its scientific aspects and in the adaption of its laws to the welfare of the human race.

Dr. Russell having acknowledged the tributes to the success of the Chemical Society, and thanked the Royal Society for its felicitations, next received the deputation from the Pharmaceutical Society, consisting of Messrs. Carteighe, Bottle and Hampson. The President read the following address and presented it upon an embossed scroll to the Chemical Society:—

"We, the President, Vice-President, Council and Professors of the Pharmaceutical Society of Great Britain, most heartily congratulate the Chemical Society of London on the completion of the fiftieth year of its existence. The pleasure with which we offer our congratulations is enhanced by the circumstance that the Pharmaceutical Society of Great Britain likewise celebrates its Jubilee this year, the Pharmaceutical Society having been founded on April 15, 1841, under the presidency of William Allen, F.R.S. We also recall with satisfaction the fact that some of the most valued members and officers of the Pharmaceutical Society have been members and officers of the Chemical Society.

"The promotion of the science of chemistry, especially in its applications to pharmacy, has ever been an important duty of the Pharmaceutical Society, its Royal Charter having been granted to it in the year 1843, for, among other purposes, that of 'advancing chemistry.' The year after its foundation the Society inaugurated a chair of chemistry, to which Dr. Fownes, then the assistant of Thomas Graham, first President of the Chemical Society, was elected as the Society's first Professor of Chemistry. Professor Fownes was succeeded by Dr. Redwood, who successively filled the offices of Secretary, Treasurer and Vice-President of the Chemical Society.

"Not only has the Pharmaceutical Society insisted on the possession by those who practise pharmacy of a competent knowledge of chemistry, but it has recently equipped a special laboratory for researches in chemistry more particularly in its relation to pharmacology.

"We are fully cognisant of the powerful influence exerted by the progress of chemistry on the arts and manufactures, and we recognize with pride the large share which the Chemical Society of London has taken in the advancement and dissemination of chemical science.

"Finally we would express the hope that the spirit of co-operation which has so long animated the members of the two Societies may long continue, and thus promote, to the advantage of mankind, the extension of chemical knowledge."

Signed for the Council.

MICHAEL CARTEIGHE, *President.*
ALEXANDER BOTTLE, *Vice-President.*
ROBERT HAMPSON, *Treasurer.*
T. REDWOOD,
Emeritus Professor of Chemistry.
JOHN ATTFIELD,
Professor of Practical Chemistry.
WYNDHAM R. DUNSTAN,
Professor of Chemistry.
RICHARD BREMRIDGE, *Registrar.*

Seal.

Dr. Russell said that the Chemical Society received with peculiar pleasure the congratulations of a sister society which also contributed to the advance of chemistry, though in a somewhat different direction. He hoped that the friendly intercourse between the members of the two Societies would be maintained.

Next in order of seniority came the Société Chimique de Paris, which sent a deputation consisting of the President, M. Gautier, M. Combes, M. Haller and M. de Clermont. M. Gautier expressed the congratulations of his fellow members at the successful course of the Chemical Society during the first fifty years of its existence, and referred to the excellence of the Society's journal, and the appreciation it met with on the continent. He had also been requested to convey the personal congratulations of M. Pasteur, M. Berthelot and many others.

Dr. Russell suitably responded, and requested the deputation to convey the thanks of the Chemical Society to their own body, and also to the individual members whose congratulations had been received.

Die deutsche chemische Gesellschaft sent a handsomely bound and illuminated address, which Dr. Will (Berlin) said he had been deputed to present to the Society. The illumination on the first page consisted of a female figure, representing England, leaning on a bust of Thomas Graham, draped with the British flag, and accepting a laurel wreath bearing the German colours, from a second kneeling female and her attendant sprite. The lengthy address, read by Dr. Will, was signed by A. W. v. Hofmann (President) and A. Pinner (Secretary), and conveyed the congratulations of the German Society and expressions of the admiration of its members for the body of scientists and their friends, who with T. Graham "am spitze," had founded the Chemical Society of London. It also referred to the completeness of the Society's library and the excellence of the journal.

In reply Dr. Russell said that he was sorry that Professor v. Hofmann had been unable to attend the meeting, as among other points of interest between the two Societies, could be reckoned that the President of the Berlin Society was some time President of the London Society.

Dr. Holtz, representing the Verein zur Wahrung chemischer Industrie, then addressed a few words to the meeting expressive of the respect of German chemists for the high position held by England in the chemical industries, and said that the unvarying hospitality and kindness of English chemists to foreigners visiting their country would never be forgotten in Germany. He hoped that the friendly relations with Burlington House, whence they often derived help and advice, would be continued.

Finally, Dr. Armstrong read a translation accompanying the address sent by the Russian Physico-Chemical Society, which was signed by Mendelejeff and Menschutskin. It expressed the hope that England would continue foremost in the science of chemistry.

A few telegrams from the Continent, including one from Mendelejeff and another from A. v. Baeyer and the Munich Chemical Society, were then read, but the number of congratulatory letters was so great that they could not be gone through. The proceedings were, therefore, adjourned until the evening.

RECEPTION IN GOLDSMITHS' HALL.

A brilliant assemblage met at the Soirée in the Goldsmiths' Hall, Foster Lane, lent by the Company for the occasion. The feature of the evening consisted in the exhibition of a collection of apparatus and specimens which for interest and value has never been equalled and probably will never be brought together from the various sources again. Only a mere catalogue of a few objects that attracted special attention can be attempted here, but the exhibition afforded material for days of careful examination and study. Of historical interest were the cupellation furnace, said to have been used by Sir Isaac Newton when master of the Mint; the pocket balance given by Scheele to his pupil Orfila, and the balances used respectively by Cavendish, and Davy and Young in their investigations. Davy's specimens illustrating the experimental development of the miner's safety lamp, and Daniell's original pyrometer were also exhibited. Amongst the electrical apparatus may be mentioned the galvanic battery used by Davy in the discovery of potassium and sodium, a cell of Daniell's original battery, specimen cells of the great battery of 15,000 cells used by De la Rue and Müller in their researches on the electrical discharge in gases, and the original copper-zinc couple and original air battery of Gladstone and Tribe. The simple and even rude character of the collection of apparatus employed by John Dalton in his classical researches, and made with his own hands, well illustrated the resources of the genius which with so insignificant and incomplete an experimental equipment was able to produce such great results. The apparatus used by Faraday in the earliest experiments on the liquefaction of gases and by Graham in the discovery of important facts and laws relating to diffusion were also characterised by the same simplicity. To these the magnificent collection of apparatus employed by Mr. W. Crookes in his researches on the phenomena of radiation formed a marked contrast. In this collection might have been observed the apparatus employed to investigate the repulsion resulting from radiation, various types of radiometers from the earliest forms to those of most recent construction, and apparatus for the study of molecular physics, electrical resistance and phosphorescence in high vacua. The apparatus employed by Brodie in his researches on ozone and the action of electricity on gases, as well as that used by Andrews in his researches on ozone and the liquefaction of gases, was also exhibited. Among the specimens of chemical bodies occurred Faraday's original specimens of benzene and carbon tetrachloride, and the furfurol or oil of bran of Fownes, the first Professor of Chemistry to the Pharmaceutical Society. Of pharmaceutical history was also the specimen of phosphorus prepared by Ambrose Godfrey Hanckwitz when assistant in Robert Boyle's laboratory, and which remained in possession of the firm of Godfrey and Cooke until presented to the Museum of the Pharmaceutical Society in 1876; whilst engravings of Robert Boyle's laboratory, lent by Mr. Joseph Ince, showed the furnaces and retorts used in the preparation of phosphorus at the commencement of the eighteenth century. Some organo-metallic compounds, prepared by Dr. Frankland and also by Frankland and Duppa, as well as the synthetic acids of the latter chemists, were shown, together with a specimen of hydrate of turpentine prepared by Dr. Gladstone in 1846. Sir Frederick Abel exhibited various specimens of guncotton and cordite, the new smokeless powder, and also some of the earlier apparatus in the researches on explosions, whilst a collection of some seventy specimens of vanadium compounds appeared under Sir Henry Roscoe's name. Mr. W. Crookes again appeared as exhibitor of precious stones that exhibit phosphorescence in high vacua, a collection of Cape diamonds with blue phosphorescence, of Brazilian diamonds with red, orange, blue, and yellow phosphorescence, and of Australian diamonds with yellow, blue, and green phosphorescence being especially remarkable. The same investigator also exhibited specimens of the seleniocyanides, of thallium and its compounds, and of rare earths like ceria, didymia, erbia, lanthana, niobic acid, tantalic acid, thoria, ytterbia, yttria and zirconia and their salts. Mr. George Matthey showed some platinum and platinum articles, together with specimens of the six metals of the platinium group. Organic chemistry was best represented by the magnificent collection of Dr. Perkin of about 150 specimens, and also by a collection of indigo derivatives by Dr. Schunck. The application of chemistry to agriculture was recalled by the exhibit of apparatus, photographs, drawings, and documents relating to the Rothamstead investigations by Dr. Gilbert, whilst the South Kensington Museum model of Weldon's plant for the chlorine process represented the application of chemistry to the arts. The earliest photographs on glass by Sir John Herschel and a collection of early photographs exhibited by Mr. Spiller, remain to be noticed, as well as the collection of photographs of past presidents of the Chemical Society.

THE DINNER.

On Wednesday evening the Fellows of the Chemical Society and their friends dined together at the Hotel Métropole. The President, Dr. W. J. Russell, was in the chair, and there were present the Marquis of Salisbury, the Attorney-General, Sir Lyon Playfair, M.P., the Prime Warden of the Goldsmiths' Company, Professor Frankland, Professor Odling, Dr. Will, representing the Deutsche chemische Gesellschaft, Dr. J. H. Gladstone, M. A. Gautier, M. A. Combes, M. de Clermont, M. A. Haller, representing the Société Chimique de Paris, Sir F. Abel, Sir H. Roscoe, M.P., Professor Victor Meyer, Dr. Hugo Müller, Dr. J. F. Holtz, Professor T. M. Thompson, Dr. H. E. Armstrong, Professor T. E. Thorpe, Sir Douglas Galton, the Presidents of the Physical Society, the Pharmaceutical Society, the Institution of Electrical Engineers, the Institute of Chemistry, the Society of Chemical Industry, and some two hundred other gentlemen.

The loyal toasts having been heartily received,

The PRESIDENT proposed a health in honour of the Society's jubilee. He said they claimed to be the oldest chemical society. Following their example Germany, France, America and Russia had established similar societies. The activity of the earlier members of the Society was in great measure attributable to

Liebig's work at Giessen. Through the influence of his school a scientific revolution occurred in England, and foremost amongst those who took part in it was a student named Lyon Playfair, who went to the north of England and told the calico printers of Manchester they did not understand their business, that they wasted their colours, and that economy of material and brilliancy of colour would be assured by their studying Dalton's atomic theory. In 1845 the College of Chemistry was founded and became a small Giessen in Oxford Street. Chemistry thenceforth was vigorously studied and the number of investigations largely increased. The chemist might now well be proud of the power he had gained over nature, for his careful study of the constitution of bodies had enabled him to build them up from their constituent parts. In 1841 so little progress had synthetical chemistry made that vital force was still considered as necessary for the formation of all true animal and vegetable bodies. But now there hardly remained a single class of organic compounds which was not represented by bodies which were purely laboratory products; and even the chemical manufacturer competed with nature and distanced her in cheap and rapid production of new compounds. This synthetical branch of the science supplied a striking answer to the question, What had the chemist done during the last half century? How little could the twenty-five chemists who founded that Society fifty years ago have imagined what the knowledge of to-day would be! To-day they were equally unable to predict the chemistry of fifty years hence, but what they could with certainty predict was that, great and rapid as the progress of their science had been during the last half century, still more important and still more rapid would be its progress in the time to come.

The MARQUIS OF SALISBURY, who was received with loud cheering, said: Mr. President and gentlemen,—I have been, though most unworthy, selected to propose the next toast—namely, "Prosperity to the Chemical Society." I pleaded that it would have been better placed in the hands of somebody who knows something about it, but those with whom I pleaded were hard-hearted and would hear no excuse. I must, therefore, proceed with my task, hoping that my distinguished friend Sir Lyon Playfair will supply that element of knowledge which perhaps you may find lacking in me on the present occasion. What naturally strikes me is the importance, the enormous importance, of the science you cultivate to the community as a whole. Some hundred years ago, the president of a very celebrated tribunal, who was a man of rather advanced opinions, informed Lavoisier that a republic had no need of chemists. But, though a man of advanced opinions, he was behind the age. It was the beginning of the time when chemistry more and more, as each decade rolled by, asserted its vital importance to every class and every interest in every community in the world. I thought—if it is possible to pass any criticism upon the learned and able and most interesting discourse to which we have just listened—I thought that our President was a little too apologetic for chemistry in the early part of the century. Annals which contain the names of Davy and Faraday have no reason to be ashamed. But from my point of view, from the social point of view, chemistry undoubtedly has this claim—that it is one of the most powerful agents that have moved the world. But that is a mere commonplace; there is no need for me to tell you now what Roger Bacon and Volta have done in the education of the world. But it seems to me that, as an educational instrument upon the minds of the community, chemistry is one of the most valuable we possess, because more than any other science it is brought into close communion with pure, real fact. Science is a word that is elastic in our days. We hear many definitions given of it. We hear of the scientific imagination, a most valuable quality which I should be the last to depreciate, only I think that, like many valuable and concentrated essences, it ought to be indulged in in small quantities. There is a proportion in its admixture similar to that which Falstaff observed in his mixture of bread and sack; you feel a desire for more of the solid nutriment and less of the stimulating spirit. Now, chemistry has an enormous amount of the bread and very little of the sack; it has an enormous amount of solid fact and very little of the scientific imagination, because the chemist can always be certain of the discoveries that he makes. All that he has got to do, if he is in doubt, is to repeat his experiment, and thus he can make sure of the effect of his discovery. But of course when a man discovers what happpened fifty millions of years ago it is not so easy to be exactly accurate as to the nature of his discovery, and when a man discovers what is going on fifty billions of miles away, although the discovery may be probable, it certainly has not the character of certainty that attaches to the discovery of a man who can go back to his laboratory and repeat his experiments. I should say that astronomy is largely composed of the science of things as they probably are and that geology consists mainly of the science of things that probably were a long time ago, and chemistry is the science of things as they actually are at the present time. Now, the application of a science of that kind to the national mind by constant familiarity with its teaching, by constant knowledge of its achievements, is of the very highest human value. It teaches the mind the immortal difference between guessing and knowing, and the further chemistry goes, and the more it asserts the superiority of its laws and canons in all departments of human thought, so far we shall drive guessing to a distance and be satisfied with knowing what we can know. But my task is to say something about the Chemical Society, and perhaps the most suitable course I can take, following your distinguished chairman, is to take the other side from that which he took; because that will give at least variety to our proceedings, and will give you an opportunity of testing, no doubt, the superior value of his remarks. Now, he dwelt much and dwelt most fairly and justly upon the enormous value, from the material point of view, which chemistry has been to society in the rapid development that has marked the present reign. I am far from disputing its splendid services to the people of all Europe during that period, but I do not think it is for the purpose of securing those services that the Chemical Society exists. My right hon. friend (Sir Lyon Playfair) did quite right to go down to Manchester to stir them up and show them their business. But when that impulse has been once given you must trust to the self-interest of mankind to keep themselves up to the mark, and you may be sure that the material interests of chemistry will not suffer in the cause. There are higher aspects of chemistry which it is the function of societies such as this to remember. It is your duty to keep up its intellectual spirit—to teach that not only those things which are demanded by the interests and industries of this country ought to be cultivated, but also those things which carry us nearer to the essence of truth. I am not going to carry that pretension too far. We are beings of mixed character, and our pursuits must bear the trace of the mixture which we give to them. I am not going to imitate the Oxford professor of my youth, who said that the one thing he valued in the system of quaternions was that he was perfectly certain that it could never be defiled by any utilitarian application. Still, you will observe that the industrial part of chemistry has been that which has received the highest development. Our distinguished president gave us a touching and pathetic history of what I may call the lowest vicissitudes of benzene. Why is it that benzene is famous? Why is it that she has been lifted up among so many of her compeers in the chemical lists with formulæ quite as imposing and histories quite as difficult to follow? It is because the products that have been drawn from benzene, or at least from coal tar, have had the good fortune to produce colours which engage the female eye, and therefore it is that benzene is famous. But I plead for her humbler sisters who have produced no colours, but the study of whom may yet lead up by steps to the discovery of mighty laws and phenomena which will interest the world; and this, in my humble judgment, is one of the advantages of a society such as this, that it tends, by bringing men of different research and pursuits and of different intellectual qualifications together, to prevent the science from becoming, as it has been called, the "mere handmaid of industry," and secures that its higher claims shall receive a perpetual recognition from its votaries. And now I must say a word about the future. Our distinguished president has prophesied great things as to the future that awaits us. I believe that there is plenty of room for discovery in the future, and that our fathers have by no means monopolized or exhausted the glories our descendants yet may win; and I have the feeling, perhaps of an outsider, that, looking at what science is and what science has achieved, it is rather like an Alpine prospect in the early morning, when you see, here and there, a few peaks bathed in light, but separated from each other by depths and chasms of the unknown. That is what we all of us feel who look with very little skill or very superficially at the history of science in our own day. It seems evident to me that chemistry is entering upon a new state, in which it may win splendid victories and produce results of which our forefathers never dreamed. Perhaps it would be best to describe the difference between chemistry now and chemistry as it was when I was a young man by saying that in those days the atom reigned supreme, but that now the atom has been dethroned and the bacillus reigns in its stead. But that means that you approach, with more and more chance of solving it, the vast problem which separates organic and inorganic nature. Your President has claimed that nature has no longer the monopoly of creating organic substances. That is true, but nature still does many things which none of you can do, and still less can you tell me the reason of the vast difference between organic and inorganic nature. You are, all of you, familiar with the tremendous vegetable poisons which produce the most fearful and astounding effects upon the human frame; but if I asked you to explain their effects you could only show me the formulæ of most vulgar and commonplace elements, which give no explanation whatever of the tremendous powers those poisons have. I am an agriculturist, under the guidance of Dr. Gilbert and others, and we compass sea and land in order to bring manure to make our products grow. What is manure? Why, it is an impure form of the carbon and nitrogen in which those products are bathed in the circumambient air every day of their lives. I trust that the chemistry of the future will tell us why we have to go to Chili for these things, and why we cannot take them from the air around us. I believe that these and other problems are now approaching nearer to their solution than they have ever approached before, because we have seen chemistry grapple more closely with the mysteries that separate organic and inorganic life. I believe that in the future, some fifty years hence it may be, in this or in some other room, the President of the Chemical Society of that day will congratulate the associates on victories, on achievements of which we now cannot even dream, and I am quite sure that when he does so he will attribute no small share of the progress to the labours and existence of the Chemical Society.

Sir LYON PLAYFAIR, replying to the toast, said he was sure that the Society would fully appreciate the honour done to it by the presence of the noble Marquis, and by having him as the mover of the toast. He had many and great cares as Prime-Minister of this country; and it showed a high sense of his appreciation of science that he had found time to come among them on the celebration of the jubilee. If the education of our upper classes had a greater infusion of science, the presence of the noble marquis would not be so phenomenal. There were hereditary talents among our noble families constantly devoted to the service of the State, though rarely applied to the advancement of science. They all recollected with gratitude the immense services rendered by the author of the 'Sceptical Chemist.' They all recollected the illustrious philosopher, Boyle, whom someone once christened "the father of chemistry and brother of the Earl of Cork." Another man of noble family held a high place in the roll of distinguished chemists; he alluded to Cavendish, who discovered the composition of water, and founded the methods of accurate investigations by weight and measure. During the fifty years of the existence of the Chemical Society, what vast changes had occurred in our views concerning the elements! Of course, our main object was to study under the name of chemical affinity, the relations and the loves of the elements. They had classified them into families, and then studied their behaviour. When he taught chemistry fifty years ago they used to say that oxygen was a sort of universal lover among the elements, but that nitrogen was a quiet, confirmed bachelor. Oxygen turns out to be a respectable bigamist that only married two elements at a time; while the indifferent nitrogen, which behaved so meekly in our atmosphere, whenever it got out of it, was so polygamous that it generally required three conjugates, and sometimes took five at a time. In fact Hofmann and Perkins had corrupted altogether the morality of the nitrogen of his youth. Lately Curtius and Radenhausen had been trying to restrict its conjugal tendencies by giving only one conjugate of hydrogen to three of nitrogen in the curious body azoimide. Nitrogen was not thus to be restrained, and a few grains of this unnatural conjugate exploded with such violence as to shatter every glass vessel in the laboratory and to seriously injure Radenhausen who had controlled its desires. In fact, the quiet, respectable nitrogen of his youth had been converted by modern chemists into a most profligate element. As to carbon, how different their knowledge now from that which they had in 1841, even though Liebig had founded organic chemistry. Of course they knew then that it was a constituent of most organic bodies, but they had no notion how to perplex and puzzle their students by those graphic or digrammatic complications which showed the atomic connections of compounds. He believed if old Cullen, who was the inventor of chemical diagrams, could come to life again and see the modern use of graphic methods he would go back to his grave as a place of rest. If there were two bodies of which he supposed he had a knowledge in his professional days, they were carbon monoxide and dioxide, or, in old nomenclature, carbonic oxide and carbonic acid. But Ludwig Mond had upset all his conceit by inducing the former to run away with such a respectable stable metal as nickel, actually carrying it off in the form of a gas, and then when followed in hot pursuit by a mere elevation of a few degrees of temperature to drop it again like a hot potato. But there are innumerable facts in modern chemistry wonderful to our old chemistry of 1841. He had been chaffing in an after-dinner speech, but he fully appreciated all the splendid results which had followed from the valency of the elements. The Chemical Society had studied this important subject with wonderful success, and in the future great progress would result. As an original member of the Society he trusted that the next fifty years would produce as great results as those which had been attained since it was founded.

The ATTORNEY-GENERAL, as Chairman of the Society of Arts, proposed the toast of "Science and Industry," coupled with the name of Sir H. Roscoe, who, he said, had shown that he could devote himself to original research and yet bring his great knowledge to bear upon such useful practical subjects as education. Sir H. Roscoe, he had reason to know, had not finished his scientific career. In fact, he was about to undertake an investigation of the greatest interest and involving some danger. Attempts had recently been made to exclude the fog of London from the House of Commons—he wished at times it was only the fog of London that ought to be excluded. But during the researches that had been made with a view to discover the best means of excluding the fog he was told that a very remarkable collection of microbes had been found, threatening danger to the members of the House of Commons. To the peculiarities of these microbes and the best way to prevent them from entering the House Sir H. Roscoe was about to devote his personal attention.

Sir H. ROSCOE, M.P., in responding, said his task was a somewhat formidable one, as it might entail a discourse on the progress of civilization during the last half century. Had not science even during that brief span remodelled almost every condition of life? But man himself remains unchanged, for we read that Horace, when advised by his physician to take the waters of Cuisium, wrote (as any dyspeptic patient might now do) to ask about the water-supply of the place. Had not Science annihilated time and space as far as communication between man and man was concerned? How insignificant did political changes appear when compared with the revolutions which science brought about, not only between individuals but between nations. There was not an industry great or small which did not owe its success, nay its very existence to the application of scientific principles. For after all science was only organized common sense. Chemists were proud to know that the benefits they had conferred upon industry were widely acknowledged, and that as years rolled on the part which chemistry would play in advancing industry and human intelligence would become greater. This union of science and industry, of theory and practice, could only be made still more fruitful by a widespread and thorough system of scientific instruction. England had happily at last become aware of this necessary condition of her industrial supremacy. Technical education was the question of the day. Public opinion had yet to be awakened to the importance of fostering and stimulating the higher stages of scientific education. That the master should be thoroughly abreast of the progress of the science upon which his trade depended was even more important than that the workman should know the principles on which his handicraft was founded. It was the pride of such Societies as this to develop the highest scientific training by the encouragement of original investigation. To enlarge the boundaries of a knowledge of nature was the first step towards rendering the application of that knowledge available for the practical benefit of man. Where would the chemical industry be if Dalton's laws of combining proportions had not been given to the world? if Liebig had not pointed out the principles upon which organic chemistry was founded? Could Perkins have established the coal tar colour industry; could Graebe and Liebermann have discovered artificial alizarin, Baeyer artificial indigo, or Fischer prepared sugar in his laboratory, if it had not been that the ground was prepared for them by their predecessors? Well aware that the progress of chemical industry, so important to our national prosperity, depended upon the advances made in the regions of pure science, the Fellows of the Society, in whose name he might be allowed to speak, looked back with satisfaction to the work which had been done and with confidence to that which still lay before them.

Other toasts followed, including "The Delegates of Foreign Chemical Societies," to which M. Gautier and Dr. Will responded; "Our Foreign Members and our Visitors," to which Professor Victor Meyer and the Prime Warden of the Goldsmiths' Company replied; and "The Presidents Past and Present," proposed by Mr. Michael Carteighe and responded to by Dr. Russell.

Provincial Transactions.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the second session of this Association was held in Lockhart's Café, St. Nicholas Square, on Wednesday evening, February 18, at a quarter past eight o'clock, Mr. F. Park, President, occupying the chair. There was a good attendance.

The minutes of previous meeting having been read and adopted, the Chairman introduced to the meeting Mr. Charles Rankin, F.C.S., pharmaceutical chemist, of Sunderland, who had kindly promised to read a few "Botanical Notes," and illustrate the same by photo-slides in the lantern. Mr. Ranken, in commencing, apologized for the disjointed nature of the facts he intended drawing attention to, but hoped that the notes would not be altogether devoid of interest to his hearers. With several photographic lantern slides, shown on a screen by the oxy-hydrogen lantern, embracing various hedgerow scenes on the upper reaches of the Tyne and in other parts of the county of Northumberland as a basis, the author picked out the various plants possessing organs or having peculiarities of interest to the pharmaceutical botanist, illustrating the interesting parts by means of blackboard diagrams and photo reproductions of microscopic slides which were shown in the lantern. The chief points were, the sting of the common nettle, reproductive organs of ferns, butterworts, the sundew and other mischievous plants. Speaking of the digestive fluid which was secreted by certain plants for the purpose of assimilating their food, the author suggested as a subject for research the properties of the fluid, and whether any analogy existed between it and the animal digestive agents, pepsin, etc., and papain. The process of fertilization was also ably and lucidly explained in connection with digitalis, arum, primulus, etc., the blackboard being freely used.

The President in proposing a vote of thanks to Mr. Ranken, expressed the great pleasure he had experienced in listening to the paper, and

Mr. T. M. Clague, in seconding the motion, called attention to the fact that the material had been all collected locally, which gave an enhanced interest to the paper. The lantern scenes, he remarked, carried him back to the time when the author of the paper and himself had made their botanical excursions to Epping Forest in their student days.

Some further discussion having taken place the meeting closed.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

At the ordinary meeting of this Association, on Wednesday evening, the 18th inst., Mr. David Watson read a short paper on "The Pros and Cons of Counter Prescribing." After referring to recent judicial interpretation of the law on the subject, he pointed out the difficulty which the chemist would have in divesting himself of this part of his business. The public believe that one who is constantly handling medicines must have some knowledge of their uses. To refuse the benefit of his knowledge to his customers would be attributed to a disobliging disposition or induce a belief in his general incapacity with probably unfortunate results to his ordinary business. The essayist contended for the reasonableness of the chemist being allowed to prescribe when "the man in the street" was not forbidden to do so. As in all other departments of the chemists' business, common sense was eminently necessary and would produce beneficial results to both parties. In prescribing care should be taken to treat only the simpler ailments, and by the simplest means, principally by way of "first aid," accompanied by advice to call medical aid should relief be delayed. The essayist animadverted on the immunity enjoyed by the maker of patent medicines, as compared with chemists, when the results of these recommendations were untoward. He also advised more acquaintance on the part of the counter prescriber with the organs of the human body and their functions.

In the conversation which followed the members approved generally of the way in which Mr. Watson had treated the subject, the general opinion being that counter prescribing should not be pushed. The dispensing doctor met with an unfavourable reception, as did also the authors of "Family Physicians," in which patients were encouraged to prescribe for themselves, perhaps the worst of all form of prescribing.

The usual vote of thanks to the essayist concluded the meeting.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held on Thursday evening, February 19, Mr. George Little, Vice-President, in the chair. The evening was devoted to the reading of "Short Papers." These included a note by Mr. C. T. Duncan, on "The Position and Prospects of the Pharmaceutical Chemist;" "Mistura Olei Ricini," by Mr. James A. Kinnear; a Literary Extract by Mr. James Davidson; and short papers on "Salicylic Acid"—a *resumé* of recent work—and on "Kola, the New Dietetic," by Mr. William Mair. Specimens of the different varieties of the natural and artificial salicylic acids were exhibited, which, together with some fine specimens of Kola nuts, were obtained from the Pharmaceutical Society's Museum, Edinburgh, through the courtesy of Mr. J. Rutherford Hill.

Parliamentary and Law Proceedings.

MILK OF SULPHUR PROSECUTION.

The hearing of the summons taken out by the St. James' Vestry, Westminster, charging Mr. Frederick Hall with a contravention of the Sale of Food and Drugs Act, 1875, was resumed before Mr. Hannay at the Marlborough Street Police Court, on Wednesday last.

The case came before the court originally on the 4th inst., and after evidence in support of the prosecution had been given, it was adjourned until last Wednesday, in order to give the magistrate an opportunity of considering the effect of a decision in a similar case at the Runcorn Petty Sessions in 1887.

The Magistrate: Of course, if this case goes on I shall probably hear the same evidence, or the same class of evidence, as that laid before the magistrates in Cheshire. There have been, at all events, three distinct prosecutions which have come to my knowledge, and all with the same result. In the first prosecution there was a conviction, no doubt, but that was quashed by the quarter sessions. I do not think you can expect me to fly in the face of these decisions, nor would my decision, suppose it were given in favour of the prosecution, be of any influence in settling the matter finally. If it were possible to raise a question of law out of it I would go on with the case on some future day, but I do not see how a question of law can be made out of such a question as: "What does an ordinary man expect to get when he asks for milk of sulphur?" It seems to me to be a question of fact in this way: is there such a thing as milk of sulphur known to the public which is different in its composition from precipitated sulphur? The magistrates in the Runcorn case decided that there was; and it was a very strong bench of magistrates because they had a legal Chairman, and I observe that the present Lord Chancellor, then Solicitor General, was on the bench on that occasion. If you can suggest, or some legal gentleman can suggest any way by which I could, whichever way I decided, leave the case to be finally settled by a superior court, then I would entertain the question; but it seems to me that it would be a waste of time to go on now, as no doubt you are prepared with the same class of evidence as was given in the Runcorn case. I do not know which course would be preferable, but of course I cannot dismiss the summons when I have only heard one side. There is no doubt some weight in what has been said on behalf of the prosecution, but I cannot take upon myself to decide in a contrary sense to the decisions previously given. I was going to suggest this—if you do not like to withdraw the summons, let the case be adjourned *sine die*, and you might be able then, if you thought it worth while, to consult some legal authority as to whether there is any possibility of making a law question out of it, and then it could be re-inserted in the list. At present I think it would be a great waste of time to go on with the case and hear the defence, when probably I should decide against you. I have read the whole of the case at Runcorn, and it appears upon the evidence of chemists, analysts and so on, that in addition to precipitated sulphur there is an article known to commerce as milk of sulphur that contains sulphate of lime, and, further, that it is preferred by many people, and recommended by certain medical men, inasmuch as that when used as a purgative it is less irritant than the other. There is evidence of that. The course I should propose to take is not to shut you out altogether, but to adjourn the summons *sine die*, and, if some way can be suggested by any member of the bar of treating this as a question of law, then I would re-insert it in the list, and we would go on with it.

Mr. Wilkinson (for the prosecution): Of course I was in some difficulty in taking up this case, because I was not aware of the decision of the Knutsford Quarter Sessions. It is not a reported case.

The Magistrate: But still, no one can doubt that the case actually took place. I dare say your opponent could produce someone who was present.

Mr. Pattinson (for Mr. Hall): I dare say I could, sir, but I should not to-day. There is this point to be considered, that if we sold precipitated sulphur when asked for milk of sulphur we should probably be just as much liable to prosecution in that respect. I think the proper way would be for my friend to withdraw from this prosecution, and I would suggest that an application should be made to the Medical Council to put the term "milk of sulphur" as a synonym for precipitated sulphur.

The Magistrate: It cannot be said to be unwholesome, but that question does not arise here. The question is what does a man expect to get when he asks for milk of sulphur—is he entitled to have the pure sulphur, or may he have this other preparation, which some people prefer? Everybody is agreed about this, that if a man asked for precipitated sulphur he should get the pure sulphur; then why should he ask for milk of sulphur—unless it is in ignorance—if he wants pure sulphur?

Mr. Wilkinson: Milk of sulphur is admittedly prepared by precipitation, therefore it should be prepared according to the British Pharmacopœia.

The Magistrate: First of all in some of the dictionaries the two terms are treated as synonymous, relating to one and the same thing; but inthe latest edition of the Pharmacopœia all those other synonymous terms are left out, and all you have is "precipitated sulphur." The matter having been decided over and over again my decision would carry no weight whatever.

Mr. Williamson: Does your worship feel bound by the Knutsford decision?

The Magistrate: I am not actually bound by it; but if I were to decide contrary to the three previous cases my decision would carry no weight. The thing is, can you get it so arranged as to make it a point of law? If you can it would be better. I think you would probably hear no more of it if it is adjourned *sine die*; but my view is that it is impossible to make it a question of law. Unless you can go the length of saying that a chemist may not sell any article which is not in the Pharmacopœia, I do not see how you can get a conviction.

Mr. Wilkinson: I am not prepared at this moment to say whether we could state a case on a point of law.

The Magistrate: Then the best plan would be to adjourn the summons *sine die*.

Mr. Pattinson; I have brought a great many witnesses here to defend myself, and I should ask that the summons be dismissed, or, at any rate, that I should have my costs.

The Magistrate: I cannot dismiss the case as it stands now. If I did I should be doing so in the teeth of the evidence that has been given. I cannot make an order as to costs.

ALLEGED POISONING BY ARSENIC.

The trial in the High Court of Justiciary, Edinburgh last week, of a man named Webster, the keeper of an hotel at Kerriemuir, upon a charge of having murdered his wife by poisoning, presented some unusual features, especially the fact that no evidence was offered connecting the prisoner with obtaining or being in possession of poison at any time. The trial lasted three days, when it resulted in an acquittal, and the principal points relating to the finding and supposed administration of the poison may be summarized as follows.

The deceased seems to have been taken ill on the night of Thursday, July 31, the principal symptoms being vomiting, which continued more or less until her death. On Sunday, a medical man was called in who prescribed subnitrate of bismuth powders, which were made up by the local chemist; but on Monday, not finding her better, he gave her oxalate of cerium, which he dispensed himself. Death occurred however on the same day. A certificate of death from gastritis was given and burial took place. It was not until the end of November, after proceedings had been taken by the husband to enforce the payment of a policy of insurance for £1000 on the joint lives of himself and wife, that the body was exhumed, and as a result of an examination the husband was arrested on a charge of murder.

A *post-mortem* examination conducted by Dr. Clark, who had attended the deceased, in conjunction with Dr. Littlejohn, Medical Officer of Edinburgh, revealed no sufficient cause of death in the state of the organs; certain portions of the body were therefore removed for the purpose of analysis, which was conducted by Dr. Littlejohn in conjunction with Mr. J. Falconer King. The report presented by these experts stated that in the stomach arsenic was readily detected and that a quantity was obtained from a portion operated upon which calculated to the weight of the entire organ was estimated at not less than nearly 5 grains of arsenic trioxide. The weight of the portion operated upon was stated as roughly 0·06 pound and the distillate measured 8 ounces, 6 ounces of which was said to have yielded 0·7 grain, calculated as trioxide. Arsenic was also detected in the intestines, duodenum, spleen, kidney, liver and lung, in smaller quantity than in the stomach, decreasing in the order in which the parts are named. The process employed for the detection of the arsenic is described as "an extension and modification of the well-known process of Reinsch; while that made use of for the estimation of the arsenic consisted first in carefully drying the organ at a low temperature, then distilling it with hydrochloric acid and precipitating the arsenic as the trisulphide, in which form, after careful purification, it was weighed." It was brought out in examination by the counsel for the Crown that after sending in this report, a second experiment, made for the purpose of verification, had shown that the quantity of arsenic stated in it as having been found was too high, and that instead of 0·7 grain it should have been given as 0·4 grain. The explanation of the discrepancy given by Dr. Littlejohn in cross-examination was in respect to the first operation, "that something peculiar in this stomach was carried over which I never saw or met with before, and that we weighed as arsenic in the first case something that was not arsenic." Dr. Littlejohn mentioned certain appearances observed in some of the organs, as well as the good state of preservation, as indications of arsenical poisoning, and expressed the opinion that the arsenic had been administered in solution. Professor Crum-Brown also gave evidence as to the result of examination of portions of the organs entrusted to him. He stated that he had found arsenic in the stomach, intestine, kidney, spleen, liver, lung, and duodendum, the total quantity weighed by him being 0·273 grain. The stomach yielded the largest proportion, and on the basis of his results he estimated the quantity in the whole stomach at 1·764 grains. Evidence was also given as to the examination of the contents of certain bottles, and some subnitrate of bismuth taken from the stock used in dispensing the powders given to deceased, but in no case was arsenic found.

The cross-examination tended to suggest that the deceased had been under treatment for a functional disorder and that some time before her death, whilst separated from her husband, she suffered from vomiting at a time when she was taking a medicine similar in appearance to Fowler's solution. It was argued therefore that she might have had some such medicine in her possession, and either by accident or intention took an overdose. But no arsenical preparation was traced to her possession or that of her husband.

POISONING BY CARBOLIC ACID.

On Tuesday, Mr. Carttar, Coroner, held an inquest at Brockley, on the body of Leonard Hyde Astley, aged a year and nine months. The evidence showed that about four months ago, by medical advice, Mrs.

Astley sent for a bottle of pure carbolic acid to be used as a lotion. It was sold in a common bottle, there was no label "Poison" upon it, and no one in the house appeared to have known that it was a deadly poison. It was administered to the child by mistake, and he died shortly afterwards.

The Coroner having remarked strongly upon such a deadly poison being sold without any intimation of its nature, the jury returned a verdict "That the child died from shock and inflammation of the air passages through taking carbolic acid by misadventure."

Review.

NATIONAL HEALTH. Abridged from "The Health of Nations." A Review of the Works of Sir Edwin Chadwick, K.C.B. By BENJAMIN WARD RICHARDSON, M.D., F.R.S.*

The publication of this volume from the pen of so ardent a sanitarian as Dr. Richardson acquires distinct significance from the recent death of Sir Edwin Chadwick, the author of that epoch-marking work "The Health of Nations." The Nestor of hygienists has passed away at the ripe age of ninety. In the form of an introduction a brief *resumé* of his life is given. A young disciple of Jeremy Bentham in 1829, when sanitary science was almost unknown, and England was yet to suffer from the fearful ravages of cholera in 1832, in 1885 we find Chadwick president of a body of men, the Association of Public Inspectors of Great Britain, whose official existence he was the main instrument in calling into being. In his eventful life he saw this country pass from a state of national filth to its present state, where it now enjoys the reputation of being the most healthy community in Europe, and it is no disparagement to other workers in the same direction to say that to Sir E. Chadwick must be ascribed the honour of being the first and greatest worker in a field of vital importance to the present generation and of having sown seeds of knowledge which will yet bear good fruit for the benefit of others yet unborn.

Dr. Richardson's facile pen has given us a charming book, and more, one which will well repay all thinking people to study. Nowadays, the current question is how to reach the masses, and great efforts are being made to ameliorate their condition and to "enable the people to live happily;" we cannot but be convinced that this book gives us the key-note to the whole question. To put it in a few pregnant words, "If we would live happily, then we must live healthily."

It is most conclusively shown that the two desiderata are inseparable. What avails it to instil moral precepts into a man when he has a dung-heap at his door and the stench of a cess-pool ever in his nostrils?

The introduction is a short biography of Sir Edwin Chadwick, and those who admire patience, pluck, and versatility of gifts will read it with avidity. Casting round, so to speak, for a life's work worthy of his energies, he became early imbued with the fact that sanitation must be his special calling. If the sanitary idea could be carried out, "death which was the cause of all death, before the appointed time for natural death, would itself die." He pressed forward poor law reform; the half-time system of education will always be associated with his name; the choice of the Commissioners for the First Sanitary Commission lay in his hands; to him we owe the system of registration of the causes of death; he laboured hard in the cause of temperance and its aid as a preventive of crime; the questions of intramural interments, and the condition of the working classes were made specially his own. In 1890 he was the recipient of the honours of knighthood, a reward unsought, and tardily bestowed. But the greater reward was his in seeing the toilsome years of his vigorous life crowned with such great results.

The volume is divided into four parts. Part I. treats of "Health in the Dwelling House," or "Domestic Health," and is especially emphatic on the "Better Housing of the Poor." A valuable test of the sanitary condition of tenements is the rate of zymotic diseases and of infantile mortality in them. By means of such standards the true condition of houses can be estimated. Speaking generally of sanitation, in addition to free circulation of pure air, one great point is freedom from damp, and "it is now well recognized that nine months is the period during which it is unsafe to occupy even first-class houses in London." The use of non-absorbing material is advocated, since a single brick is capable of absorbing one pint of water. Let those who would venture into new houses note this fact well. The advantage of the use of dry material is strikingly shown by the great difference in the death rate of passengers sent to Australia in a ship constructed of old and dry, or new and green timber. Early in the history of emigration this truth was recognized, and shippers in their own interest employed medical men to look after the health of the passengers.

In this part also the essential points of good drainage, together with efficient removal of sewage, are treated of in a masterly manner, and a humorous illustration is given on page 64 of the value of detached houses. It is said that if doorways are contiguous "the women meet for constant idle gossip, and the children to quarrel and fight more often."

The true economy of good dwellings for the poorer classes is very succinctly argued out; a better class of dwelling induces habits of cleanliness and thrift, which redound with much profit to the owner of the houses, especially if he be also the employer of the tenantry.

Part II. is on "Health in the School," and should be submitted for the consideration of certain educational boards in London whenever they meet for the propounding of those wise and far-reaching schemes which have obtained for them so great a reputation. They would do well to observe that "the capacity for attention of very young children does not exceed two or three minutes; and at the age of ten but fifteen or twenty minutes." How then reconcile the pernicious system of keeping young children with their exuberant vitality penned up for several hours at a time, and with somewhat older ones, enforcing in addition the system of home-lessons. Chadwick insisted that three hours' schooling daily was amply sufficient; and that "the general average school time is in excess full double of the psychological (and we would add the physiological) limits of the capacity of young children for lessons requiring mental effort."

The physical effects of the present system are too well known to medical men; stunted growth, pale faces, headache, sleeplessness, curvature of the spine, St. Vitus' dance are the more common. On the moral side is the craft engendered in the minds of the young by seeking to evade the master's eye and to escape from the penalties of idleness or want of attention. On the minds of educationalists the cardinal principle of "fast and then learn" must be indelibly fixed.

Part III. deals with the "Health of the Community." Much has been done, but more remains. The chief points are emphasized in successive chapters. We are interested to know that the author is not a cremationist, but rather an advocate of the "earth to earth system of burial." A statistical chapter is "Health versus War." We spend millions on huge ships, 110-ton guns and other deadly weapons for destroying life. But it is here shown that the cost of a single large war-ship would suffice for the efficient sanitation of over 66,000 houses, or the improvement of the lives of over 300,000 people. Every possible opportunity of enforcing the truths set forth in this small volume on "National Health" must be taken advantage of if we would not sink into national corruption and bankruptcy.

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* London: Longmans, Green, and Co. 1890. 8vo. Pp. 320.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Pharmacy Bill.

Sir,—Now that the Pharmaceutical Council has finally decided on the scope of the proposed Pharmacy Acts Amendments Bill, it cannot reasonably be looked for that clauses dealing with the subjects which they have decided to exclude shall be introduced on their initiative. That these subjects will therefore be quite ignored is however not to be concluded. Attempts will doubtless be made during the passage of the Bill through Parliament to deal with them, and it is to be feared injudicious proposals may be made and crude and ill-thought out provisions even passed into law. It would therefore seem to have been better for the Council to have yielded a little to the demands which have been made, and to have gone boldly forward for the little which could reasonably be obtained than to have refused to do so because it could not hope to get all that has been clamoured for. A clause providing for the restriction of the titles to registered persons would have gone far to disarm much of the opposition which exists to the Bill, and which will make itself felt notwithstanding the apparent apathy of some or seeming approval of others. It would have been an indication that the Council was prepared to take advantage of the first favourable opportunity to have the principle of the 1868 Act re-established in its entirety. No adequate reason has yet been given for declining to deal with the question of titles. Hitherto this has been evaded by questioning if they were worth contending for alone. This excuse has now been departed from, and we are told that there does not appear to be sufficient ground for appealing to Parliament on this matter, because some chemists fail to see or show little regard for the obligations which the titles involve; a most inconsequent argument in this instance, but a most powerful one had it been used to show that the Council was lax in applying the existing law. A stock argument, used to combat the demand for something to be done to protect trade interests, was that chemists were as much protected as medical practitioners, dentists, solicitors, etc., inasmuch as their titles were secured to them. When that contention was seen to be untenable, it was said that the titles alone were not worth contending for, and now a glimmering having appeared of this also being a mistake, it is sought to be got rid of by saying that the real question is, whether under existing conditions the title of "chemist and druggist" can be contended for with any prospect of success. This statement raises a false issue, for it is not the protection of the title of chemist and druggist alone that is asked for, but also that of "pharmaceutical chemist;" for although the former only has as yet been assailed the latter also is in jeopardy, and the assumption of it is only a question of time and expediency. The argument and decision which allow of corporations assuming the one title are equally applicable to allow them to assume the other, though this does not seem to be realized by many chemists, even including members of the Council itself. As to the prospect of success in obtaining what is desired, that is a matter of opinion, and it lies with those who think there is little or none, to show on what basis their opinions are founded, and also by whom the granting of the request is likely to be opposed with any show of reason. In this instance they will not gain much consolation from the *piece de resistance* of late occasions, the abortive Poisons Bill, 1885. Referring to the means of protecting trade interests already possessed by registered persons (by the way, with all deference, it is not quite effectual to protect *titles*), this, though only recently officially discovered, is nothing new, and it would be quite utopian to expect anything from it in the present condition of affairs. C. A. Macpherson.

Edinburgh.

The Benevolent Fund.—A Suggestion.

Sir,—Happening to notice your announcement of a special issue of the *Pharmaceutical Journal* to call attention to the claims of the Benevolent Fund, an idea struck me which is perhaps worthy of finding expression in your columns. All chemists in business are frequently called upon by customers to supply copies of prescriptions entered upon the registers of their pharmacies, and it has always seemed to me that a fee might fairly be charged for the service rendered, which requires for its performance special technical knowledge and is also of a responsible character. I would suggest, then, that for every copy of a prescription given a nominal fee of sixpence should be charged, and the money so obtained remitted to the Treasurers of the Benevolent Fund. Customers could hardly object when informed that the money was devoted to charitable purposes, and at the end of the year the Benevolent Fund would be substantially benefited.

Florence. Will. J. Patey.

Tinct. Quinin. Ammon.

Sir,—Permit me to explain, in connection with the meeting of the Midland Counties Chemists' Association, at which this subject was discussed, that my proposal to substitute carbonate for solution of ammonia was not made with the view of rendering the making of this preparation more easily accomplished. Though the method of manipulation proposed by Mr. Adcock would doubtless facilitate the rapid solution of the quinine, the tincture would still be far less miscible with water, much less palatable, and on account of the action of the ammonio-hydrate in colouring most spirits, greatly less elegant than the carbonated solution proposed by me.

As a matter of fact heat is necessary for the solution made with the carbonate, so that whatever the "Review of the Year" implied, an easier mode of preparation was not thought of. George Lunan.

20, Queensferry Street, Edinburgh.

Sir,—With respect to tinct. quin. am. I should like to say that since the publication of a short note on this preparation in the *Pharmaceutical Journal*, Oct. 10, 1874, contributed by Mr. J. F. Brown, I have made large quantities of it by the method then advised, and with uniform satisfactory results.

"Diffuse the quinine through half the quantity of the proof spirit, mix the liq. amm. with the other half, lastly mix the two portions together, when complete solution is effected," without any rubbing down or application of heat. J. C. Hyslop.

West Marylebone.

Standardization of Tinctures.

Sir,—In an article on "Pharmacopœia Tinctures," published in last issue, the author suggests the standardizing of tinctures such as aconite, belladonna and hyoscyamus.

I should like to state that I am at present working on those tinctures with that end in view, and hope to lay a report before an evening meeting when my experiments are completed. John Findlay.

78, Queen Street, Edinburgh.

Chemist.—In the event you refer to persons of the class mentioned will be in precisely the same position they are now, and will continue subject to the present disadvantage of not being registered. There is, however, no reason for supposing that any intention exists of debarring them from getting a living; but as the Pharmacy Act, 1868, is now construed by the courts, unregistered persons will continue, as they are now, legally unqualified for performing certain functions which the existing Act restricts to those who are legally qualified.

Communications, Letters, etc., have been received from Messrs. Lunan, Russell, Secoombe, Harrington and Sons, Grierson, Gerrard, Robinson, Chemist.

BENEVOLENT FUND.

STATEMENT OF RELIEF GRANTED DURING 1890.

ANNUITANTS.

					£	s.	d.	£	s.	d.
36	Annuitants	@ £35 per annum		... ...	1260	0	0			
6	do.	@ £30	„	... ...	180	0	0			
1	do.	@ £35	„	(three quarters)	26	5	0			
1	do.	@ £30	„	(three quarters)	22	10	0			
1	do.	@ £35	„	(two quarters)	17	10	0			
1	do.	@ £30	„	(two quarters)	15	0	0			
4	do.	@ £35	„	(one quarter)	35	0	0			
								1556	**5**	**0**

Total number of Annuitants during the year ... **50**

TEMPORARY GRANTS.

	£	s.	d.
Amount granted in **40** cases after investigation by the Committee... ...	**362**	**0**	**0**
Total amount of Relief granted during 1890 ...	**£1918**	**5**	**0**

ABSTRACT OF RULES IN REFERENCE TO VOTES AT THE ELECTIONS OF ANNUITANTS.

Annual Subscribers of—
Half-a-crown are entitled at each election of Annuitants to ONE Vote.
Five Shillings ... ... TWO Votes.
Half-a-guinea ... ... FIVE Votes.
One Guinea ... ... TEN Votes.
And to increase in the same proportion.

Donors of—
Five Guineas are entitled to ... ... FIVE Votes for life.
Ten Guineas ... ... TEN Votes for life.
And to increase in the same proportion.

Should any Subscriber or Donor, or the widow of any Subscriber or Donor, become a Candidate for an annuity, such number of votes shall be placed to his or her credit, at the first succeeding election, as shall be represented by the whole amount of subscriptions or donations to the Benevolent Fund he or she (or, in the case of a widow, her husband) may have contributed.

BENEVOLENT FUND.

LOCAL LIST OF SUBSCRIPTIONS & DONATIONS

RECEIVED DURING 1890.

	£	s.	d.
Aberavon.			
Loveluck, G. D.	0	2	6
Aberdare.			
Jones, D. W.	0	5	0
Smith, Morgan	0	2	6
Aberdeen.			
Coutts, C.	0	5	0
Cruickshank, Geo. P.	0	5	0
Davidson, Charles	1	1	0
Giles, William	0	5	0
Glover, W. K.	0	5	0
Gordon, William	0	5	0
Johnston, John	0	5	0
Kay, James P.	0	10	6
Kemp, James	0	2	6
Paterson and Sons	0	10	6
Sangster, W. (New Machar)	0	5	0
Strachan, Alexander	0	5	0
Aberfeldy.			
Macnaughton, H. B.	1	1	0
Abergavenny.			
Pryer, Henry	0	5	0
Rosser, W. M.	0	5	0
Aberystwith.			
Davies, David J.	0	2	6
Ellis, Robert	0	2	6
Thomas, John	0	2	6
Wynne, Edward P.	0	10	6
Abingdon.			
Lacey, R.	0	5	0
Smith, William	0	5	0
Smith, William F.	0	5	0
Aboyne.			
Petrie, James J.	0	5	0
Accrington.			
Stanley, Thomas	0	2	6
Addiscombe.			
Townsend, Charles	0	10	6
Alcester.			
Adcock, H. D.	0	10	6
Heath, Josiah W.	0	5	0
Overbury, Henry	0	5	0
Aldershot.			
Williams, James	0	10	6
Alexandria (N.B.).			
McFarlane, Peter	0	5	0
Alfreton.			
Evison, Alfred	0	2	6
Robinson, Joseph S.	0	10	6
Alnwick.			
Newbigin, James L.	0	10	6
Newbigin, Lesslie	0	5	0
Alresford.			
Richardson, J. H.	0	2	6
Willis, William	0	5	0
Altrincham.			
Clarke, J. T.	0	5	0
Unsworth, J. W.	0	5	0

	£	s.	d.
Ambleside.			
Herd, Henry W.	0	2	6
Amersham.			
King, E. T.	0	2	6
Ammanford (Carmarthenshire).			
Evans, Evan	0	10	6
Ampthill.			
Allen, George	1	1	0
Andover.			
Bienvenu, John	0	10	0
Gradidge, W. T.	0	5	0
Angmering.			
Freeland, H. W.	0	2	6
Arbroath.			
Burn, David H.	0	5	0
Naysmith, Andrew	0	5	0
Robertson, John	0	5	0
Shield, Mill and Jack	0	5	0
Ashbourne.			
Bradley, Edwin Sylvester	0	10	6
Greaves, Frederick W.	0	5	0
Osborne, James	0	5	0
Reckless, A. H.	0	5	0
Ashby-de-la-Zouch.			
Bullen, George W.	1	1	0
Ashford (Kent).			
Brothers, John	1	1	0
Forth, W. P.	0	5	0
Ingall, Joseph	1	1	0
White, Charles Thomas	0	5	0
Ashton-under-Lyne.			
Belfield, William	0	5	0
Bostock, J. W.	0	5	0
Bostock, William	0	5	0
Phillips, J. J.	0	5	0
Potts, R.	0	5	0
Sharp, S.	0	5	0
Thatcher, T.	0	2	6
Ashwell.			
Harrison, G. W.	0	5	0
Atherstone.			
Orme, William	0	10	6
Atherton.			
Fletcher, Ellis	0	5	0
Heywood, John H.	0	10	6
Aylesbury.			
Dickins, Rowland	0	10	6
Palmer, Edwin T.	0	5	0
Wood, J.	0	5	0
Bacup.			
Hill, J.	0	5	0
Bakewell.			
Carrington, Edward G.	0	5	0
Baldock.			
Bally, Edward F.	0	5	0

	£	s.	d.
Banbury.			
Ball, George V.	0	10	6
Bartlett, H.	0	5	0
Gilkes, Fredk. G.	0	5	0
Watts, W.	0	5	0
Banchory.			
Lunan, Alexander	0	5	0
Banff.			
Alexander, W.	0	5	0
Bangor.			
Jones, Owen	0	5	0
Webster, Thomas	0	5	0
Barnsley.			
Mitchell, J. S.	0	5	0
Barnstaple.			
Britton, Wm. B.	0	5	0
Goss, Samuel	0	5	0
Partridge, James	0	5	0
Pratt, Edward	0	5	0
Barrow-in-Furness.			
Chapman, L. P.	0	5	0
Sansom, E.	0	5	0
Taylor, S.	0	5	0
Barton-on-Humber.			
Smith, Richard F.	0	5	0
Bath.			
Alcock, Henry	0	5	0
Appleby, E. J.	0	10	6
Blagg, Eli	0	2	6
Bright, W.	0	5	0
Capper, Edmund	0	5	0
Clarke, B. G.	0	2	6
Collis, C. B.	0	5	0
Dunn, Richard	0	10	6
Griffin, Alfred W.	0	5	0
Harding, R. O.	0	5	0
Marsh, John H.	0	10	0
Masters, Henry James	0	5	0
Merrikin, John B.	0	10	6
Partington, J. J.	0	5	0
Potts and Co.	1	1	0
Sharp, Benjamin	2	2	0
Snow, A. L.	0	2	6
Thomas, Henry J.	0	10	6
Thring, E. J. H. (Monkton Combe)	0	10	6
Tilsley, George	0	10	6
Whiston and Co.	0	10	6
Williams, J. H.	0	5	0
Williams, Mrs. Sophia	0	10	6
Wilson, Joseph	0	10	6
Beaminster.			
Collie, J. C.	0	2	6
Beaumaris.			
Slater, John	1	1	0
Bebington (Cheshire).			
Fawcett, J.	0	10	0
Beccles.			
Flower, William	0	2	6
Beckenham (Kent).			
Bright, Frederick	0	5	0
Waring, A. W.	0	5	0

Bedale.

	£	s.	d.
Pratt, William (West Burton)	0	5	0
Swinbank, J.	0	5	0

Bedford.

Anthony and Biss	0	10	0
Cameron, William Alexander	0	5	0
Corrie, A. A.	0	2	6
Corrie, Isabella A.	0	5	0
Ekins, John	0	10	6
Hester, Charles	0	5	0
Mountford, Maurice	0	2	6
Norman, Joseph S.	0	5	0
Taylor, J. B.	0	5	0
Thompson, H.	0	5	0

Bedlington.

Foggan, George	0	10	0

Belfast.

Green, Thomas	0	5	0
Leslie, J.	1	0	0
McNaught, A. (Donation)	10	10	0
Yoxall, Henry	0	5	0

Belper.

Calvert, James	0	5	0

Bengal.

Leslie, R. A. P.	0	4	6

Berkhamsted.

Bosher, Alexander	0	2	6

Berkeley.

Osborne, G. C.	0	5	0

Beverley.

Fields, T. W.	0	5	0

Bexhill.

Brisley, George	0	5	0

Bexley Heath.

Mason, Alfred J.	0	5	0

Bicester.

Bates, John	0	5	0
Coleman, T.	0	10	6

Bideford.

Griffits, John A.	0	5	0
Hogg, Mrs. Mary	0	5	0

Biggar.

Eunson, J.	0	2	6

Biggleswade.

Evans, John	0	5	0
Spong, D. M.	0	5	0

Bilston.

Gray, Charles	0	5	0
Kearnes, Robert H.	0	5	0
Rogers, W.	0	5	0

Bingley.

Skirrow, William E.	0	10	6

Birkenhead.

Barber, George	0	10	6
Brookes, A. F.	0	2	6
Dutton, John	0	10	6
Ellithorne, A. H.	0	10	0
Field, H. E. (Executors of)	0	5	0
Kemp, W. C.	0	5	0
Stewart, J.	0	10	6
Woolliscroft, H.	0	5	0

Birmingham.

Adam, Frederick	0	2	6
Arblaster and Churchill	1	1	0
Asten, W.	0	2	6
Barker, Thomas	0	10	6
Bayley, R.	0	5	0
Bellamy and Wakefield	1	1	0
Bird, Alfred	1	1	0
Brady, B. F.	0	10	6
Chase, Thomas, jun.	1	1	0
Clark, T. P.	0	5	0
Clayton, Francis Corder	1	1	0
Cornforth, Edwin	0	2	6
Cripps, R. A.	0	10	0
Evans, J. C.	0	2	6
Foster, Alfred H.	0	5	0
Foster, James Alfred	0	5	0
Frobisher, F.	0	5	0
Gibson, F.	0	10	6

Birmingham—continued.

	£	s.	d.
Greatrex, H.	0	5	0
Lowther, T. W.	0	5	0
Mantell, Charles	0	10	6
Mantell, Charles, jun.	0	10	6
Mott, John C.	0	5	0
Naish, C. E.	0	10	6
Onion, J.	0	2	6
Page, C.	0	5	0
Pegg, Herbert	1	1	0
Perry, George E.	0	5	0
Perry, William Henry	0	5	0
Prosser, Frank H.	0	10	6
Radford, J. A.	0	2	6
Southall Bros. and Barclay	1	1	0
Thompson, Charles	0	5	0
Thompson, William	0	5	0
Twivey, A.	0	5	0
Wilcox, George	0	5	0

Bishop Auckland.

Dobinson, Thomas	0	5	0
Harburn, Alfred	0	5	0
Townend, Thomas F.	0	5	0

Bishop's Stortford.

Hardy, John	0	5	0
Speechly, George	0	10	6

Blackburn.

Ainsworth, Clayton and Jowett	0	10	6
Butterfield, William	0	5	0
Critchley, T.	0	5	0
Farnworth, Walter	0	10	6
Farnworth, William	1	1	0
Garland, A. P.	0	5	0
Grimshaw, W. H.	0	2	6
Harrison, J.	0	2	6
Hindle, H.	0	5	0
Hindle, James	0	2	6
Hindle, Joseph	0	5	0
Paffard, Frank	0	10	0
Pickup, W.	0	5	0

Blackpool.

Jackson, Joseph	0	5	0
Laurie, John	0	5	0

Blagdon.

Dudden, R. M.	0	5	0

Blandford.

Groves, Richard H.	1	1	0
Humby, L. W.	0	5	0

Bognor.

Long, Alfred T.	0	10	6

Bolton.

Blain, William	0	10	6
Blain, W. R.	0	5	0
Dearden, W.	0	10	6
Fawthorp, Joah	0	5	0
Forbes, James W.	0	10	6
Hart, James	0	10	6
Liddell, Mrs. H.	0	1	0
Mather, James	0	10	6
Teebay, J.	0	5	0

Bombay (India).

Prebble, John G.	0	10	0

Bonnyrigg.

Hutcheon, W.	0	5	0

Boston (Lincs.).

Grimble, Albert	0	5	0
Haller, F. W.	0	5	0
Kent, B. J.	0	5	0

Boulogne-sur-Mer.

Parsons, J. Vincett	0	5	0

Bourne (Lincs.).

Mills, Robert M.	0	10	6

Bournemouth.

Beale, J. H. T.	0	5	0
Bilson, F. E.	0	10	6
Bridge, G. E.	1	1	0
Duncan, Alexander	1	1	0
Endle, Frederick	0	10	6
Hardwick, Stewart	0	10	6
Haynes, J. A.	0	5	0
Hazard, James D.	0	10	6
Jones, William	0	10	6
Shipman, John J.	0	5	0
Spinney, Frank	0	10	6
Taylor, George	0	5	0
Toone, J. A.	0	10	6
Worth, Edwin	1	1	0

Bourton-on-the-Water.

	£	s.	d.
Miles, George	0	2	6

Bowness-on-Windermere.

Birkett, Charles	0	5	0

Bracknell.

Sandwith, W. H.	0	5	0

Bradford (Lancs.).

Lambert, Thomas	0	5	0

Bradford (Yorks.).

Blackburn, Bailey	2	2	0
Cocker, Justus J.	0	5	0
Harrison, Parkinson and Co.	2	2	0
Ingle, George	0	5	0
Kay, Hy.	0	10	6
Lister, Simeon (Great Horton)	0	10	6
Rimmington and Son	1	1	0
Stephenson, Robert	0	5	0
Watts, John	0	10	6

Bradford-on-Avon.

Cooper, Albert H.	0	10	6

Brading (I.W.).

Bonn, J. E. J.	0	5	0

Braintree.

Row, George C.	0	5	0

Branscombe.

Cooper, George	0	10	6

Braughing.

Franklyn, Thomas	0	5	0

Brecon.

Edwards, R. W.	0	2	6
Hodgeton, D.	0	5	0
Meredith, John	0	10	0
Morris, J. C. B.	0	5	0
Tudor, W. T.	0	10	6

Bridgend.

Jenkins, D.	0	5	0

Bridgnorth.

Cooper, H. S.	0	2	6
Hughes, Hubert	0	5	0

Bridgwater.

Basker, J. A	0	5	0

Bridlington.

Dewing, J. E.	0	5	0
Gatenby, Robert	0	5	0
Wrack, F. G.	0	2	6

Bridlington Quay.

Dickins, Mary	0	5	0
Jackson, Henry J.	0	5	0

Bridport.

Beach and Barnicott	1	1	0
Beach, James	0	10	6
Beach, Thomas E.	0	5	0

Brightlingsea.

Cooper, George B.	0	5	0

Brighton.

Adams, George	1	1	0
Addis, T. J.	0	2	6
Arnold, J.	0	2	6
Ashton, C. S.	0	5	0
Barton, Charles	0	10	6
Barton, Henry	0	10	6
Bathe, R. S.	0	10	6
Chambers, Herbert	0	5	0
Chemists' Ball, per Mr. J. Williamson	5	0	0
Colby, Mrs. G.	1	1	0
Collett, W. J.	0	2	6
Cox, Arthur H.	1	1	0
Damant, Arthur A.	0	5	0
Edwards, J.	0	5	0
Else, William	0	10	6
Gibson, W. H.	0	7	6
Glaisyer, E.	0	10	6
Glaisyer, Thomas	0	10	6
Guy, Frederick	0	10	6
Gwatkin, James Ross	0	10	6
Hardcastle, S. B.	0	10	6
Harris, E. R.	0	5	0
Hickley, G.	0	10	6
Hornsby, George G.	0	10	6

Brighton—continued.

	£	s.	d.
Jeeves, Thomas	0	10	6
Kemp, John	0	10	6
Leigh, Marshall	1	1	0
Levett, H.	0	5	0
Llewellyn, Peter H.	0	5	0
Marten, J. R.	0	2	6
Metherell, K.	1	1	0
Mills, C. T.	0	2	6
Muston, G. G.	0	5	0
Padwick, John	0	10	6
Parris, T. W.	0	5	0
Pears, H. W. K.	0	10	6
Pears, Kilby	0	10	6
Perress, J. C.	0	5	0
Robson, Thomas	0	10	6
Rogers, J.	0	10	6
Salmon, F. W. (Executors of)	1	1	0
Savage and Son	1	1	0
Smith, Walter Henry	1	1	0
Smithson, J.	0	10	6
Stableforth, J. W.	0	5	0
Sussex Drug Company	1	1	0
Thomas, H.	1	1	0
Vizer, Edwin B.	0	10	6
Walton, F. M.	0	5	0
Watts and Co.	1	1	0
Weston, G.	0	2	6
Williamson, J.	0	5	0
Yates, C. G.	0	2	6

Brill (Bucks).

Tottenham and Holmes	0	10	6

Bristol.

Ackerman, Theophilus	0	5	0
Allen, Benjamin	0	10	6
Barton, J. B. (Kingswood)	0	5	0
Bennett, Joseph	0	5	0
Berry, William	0	10	6
Boucher, John	1	1	0
Butler, Samuel	1	1	0
Cuff, Robert C.	0	5	0
Dibble, J. W.	0	10	6
Fardon, A. E.	0	10	6
Freestone, R. H.	0	5	0
Freestone, Thomas M.	0	10	6
Hemmons, John	0	5	0
Hodder, Henry	0	5	0
Howell, H.	0	5	0
Humpage, Miss	1	1	0
Isaac, G. W.	0	10	6
Jeffery, Henry	0	10	6
Jennings, T. H.	0	5	0
Jones, William W.	1	1	0
Keen, Benjamin	0	10	6
LaTrobe, Henry	0	5	0
Llewellyn, David	0	2	6
Long, John T.	0	10	6
Moore, J. E.	0	5	0
Newman, Robert	0	10	6
Pitchford, William	0	10	6
Pitman, John	1	1	0
Plumley, James G.	0	5	0
Presley, Edward	0	5	0
Schacht, G. F.	1	1	0
Smith, Sidney	0	2	6
Spill, Thomas	0	10	6
Stroud, John	1	1	0
Towerzey, Alexander	0	10	6
Townsend, Charles	1	1	0
Townsend, Henry H.	0	10	6
Troake, R. J.	0	10	6
Turner, George T.	0	10	6
Wade, Thomas T.	0	2	6
Warner, G. O.	0	5	0
Warren, Algernon	1	1	0
Watson, E. M.	1	1	0
Weeks, A.	0	5	0
Whineray, Edward	0	5	0
White, James W.	0	10	6

Briton Ferry.

Olive, W. T.	0	5	0

Bromley (Kent).

Goulden, Herbert	0	5	0
Shillcock, G.	0	5	0
Skinner, Richard	0	10	6

Bromyard.

Jones, Charles	0	5	0

Broughty Ferry.

Fleming, E.	0	5	0
Park, William	0	5	0

Brynmawr.

	£	s.	d.
Evans, Alfred E.	0	5	0
Jones, Alfred M.	0	10	6

Buckingham.

Kingerlee, George	1	1	0

Burnham (Bucks).

Heald, Alfred J.	0	10	6

Burnham Market.

Spencer, William Henry	0	5	0

Burnley.

Barlow, Joseph A.	0	2	6
Cowgill, Brian H.	0	10	6
Evans, Thomas	0	5	0
Francis, Mrs.	0	5	0
Heaton, Martha	0	2	6
Hitchin, Robert	0	5	0
Holden, John	0	5	0
Munn, Robert	0	5	0
Parkinson, I.	0	5	0
Parkinson, William	0	5	0
Walker, Sandford	0	5	0
Wright, John W.	0	2	6

Burntisland.

Bisset, James	0	2	6
Pringle, G.	0	2	6

Burry Port.

Thomas, T. Rees	0	5	0

Burslem.

Blackshaw, Thomas	0	10	6
Hewitt, J. F.	0	2	6
Leicester, Thomas	0	10	6
Oldham, William	0	10	6
Smith, E.	0	2	6
Wardle, Thomas	0	2	6

Burton-on-Trent.

Ottey, Thomas	0	5	0
Wright, George	0	10	6

Bury.

Crompton, Alfred	0	5	0
Crompton, H.	0	10	6

Bury St. Edmunds.

Brain, F. S.	0	5	0
Clark, Owen A.	0	5	0
Crassweller, W. E.	0	5	0
Hardwicke, J. E.	0	5	0
Kirkham, Thomas	0	2	6
Last, A. J.	0	2	6
Portway, John	0	2	6
Summers, Frank	0	5	0
Summers, Thos. D.	0	5	0
Youngman, Edward	0	5	0

Buxton (Derbyshire).

Wright, Robert	0	10	6

Cambridge.

Beall, George	0	5	0
Beall, Samuel S.	0	5	0
Church, H. J.	1	1	0
Cook, H. F.	0	5	0
Deck, Arthur	0	10	0
Field, Ebenezer	0	5	0
Greenwood, D.	0	5	0
Hutchin, L. A. J.	0	5	0
Ivatt, Albert	0	5	0
Pain, Percy	0	5	0
Pain, Walter E.	0	5	0
Parson, H. J.	0	2	6
Sturton, Richard	1	1	0
Yeomans, John	0	5	0

Campbeltown.

Cairnie, R.	0	5	0

Canterbury.

Amos, Daniel	0	10	6
Biggleston, E. R.	0	5	0
Bing, Charles	0	10	6
Bing, Edwin	0	10	6
Fowler, W. H.	0	10	6
Harris, F. R.	0	10	6

Cape Town.

Tebb, Henry	1	1	0

Cardiff.

	£	s.	d
Anthony, David	0	10	6
Bennett, A.	0	5	0
Clark, C.	0	5	0
Coleman, Alfred	0	10	6
Coleman, E. J.	0	10	6
Coleman, J. D.	0	5	0
Dovey, —	0	5	0
Drane, Robert	1	1	0
Duck, W. G.	0	5	0
Evans, A. J.	0	2	6
Fargher, C.	0	2	6
Foster, J. E.	0	2	6
Furnival, William	0	5	0
Gerhold, H. A.	0	2	6
Greaves, John	0	5	0
Hagon, Albert	0	5	0
Hancock, Mrs.	0	2	6
Harries, D.	0	5	0
Hicks, W. T.	0	5	0
Hopkins, W. R.	0	2	6
Howell, Thomas	0	5	0
Hughes, J.	0	5	0
Jenkins, T. M.	0	2	6
Jones, D.	0	2	6
Jones, J. A.	0	5	0
Jones, John T.	0	5	0
Joseph, L.	0	2	6
Kernick and Son	0	10	6
Lewis, James	0	5	0
Lloyd, David	0	5	0
Mumford, Richard	0	5	0
Munday, John	0	10	6
Prosser, H. H.	0	2	6
Prust, Richard	0	5	0
Rees, John	0	5	0
Robb, John	0	5	0
Sanders, W. J.	0	5	0
Treharne, F. G.	0	5	0
Walklate, J. T.	0	5	0
Williams, R. E.	0	5	0
Williams, W. Jesse	0	5	0
Williams, Thomas	0	10	6
Williamson, Mrs.	0	5	0
Yorath, T. V.	0	5	0

Carlisle.

Bell, John	0	5	0
Fisher, Catherine Hodgson	0	5	0
Foster, James	0	5	0
Hallaway, John	0	5	0
Nichol, A.	1	1	0
Parker, Edward J.	0	5	0
Parker, William	0	5	0
Penny, John (Great Broughton)	0	10	6
Robson, John	0	5	0
Thompson, Andrew	0	10	6

Carluke.

Hinksman, John	0	5	0

Carmarthen.

Davies, C. E.	0	5	0
Lloyd, Walter	0	5	0

Carnarvon.

Francis, James	0	2	6
Jones, David	0	5	0
Jones, John	0	5	0
Lloyd, William	0	5	0
Owen, G. C. R.	0	2	6

Carshalton.

Carter, Francis	0	10	6

Castle Cary.

Moore, Francis S.	0	10	0

Castle Douglas.

Veitch, A.	0	5	0

Chapel Allerton.

Saville, William	0	5	0

Chard.

Churchouse, C. H.	0	10	0

Charlestown-of-Aberlour.

Smith, John	0	2	6

Chatham.

Crofts, Holmes C.	0	10	6
French, Miss E.	0	5	0
Lamb, Thomas C.	0	5	0
Morgan, Alfred W.	0	5	0

Cheddar.

Allen, Samuel	0	5	0

Chelmsford.	£	s.	d.
Metcalfe, Wilson	0	10	6
Thresh, Dr. J. C.	1	1	0
Tomlinson, James	0	10	6
Warren, F.	0	7	6
Wright, W.	0	10	6
Cheltenham.			
Balcomb, John	1	1	0
Barron, William	0	10	6
Beetham and Son	1	1	0
Burrow, E. J.	0	2	6
Butcher, Thomas	1	1	0
Codling, A. J.	0	10	6
Davies, R. E.	0	2	6
Davy, T. J.	0	2	6
Dolman, Mrs.	0	5	0
Down, F. W.	0	2	6
Fletcher and Palmer	1	1	0
Fletcher, John	1	1	0
Glover, T. I.	0	5	0
Hands, William	0	5	0
Hill, Arthur	0	5	0
Hodgkinson, T.	0	2	6
Jeffrey, Thomas A.	0	10	6
Joyner, E. E.	0	2	6
Morris, D. A.	0	2	6
Mowatt, J. R.	0	5	0
Organ, E.	0	5	0
Pattison, Thomas	1	1	0
Perry, H. W.	0	2	6
Power, J. H.	0	5	0
Prockter and Forth	1	1	0
Purnell, Mrs.	0	5	0
Robinson, C. E.	0	5	0
Saxby, A. C.	0	5	0
Smith, Nathaniel and Co.	1	1	0
Stewart, James	1	1	0
Thomas, J. A. and J. P.	0	10	6
Walters, John	0	10	6
Wood, Frederick	0	10	6
Chertsey.			
Ashton, Frederick William	0	5	0
Boyce, George	0	5	0
Chester.			
Baker, W. H.	0	10	6
Baxter, George	0	10	6
Baxter, G. M.	0	2	6
Bowers, James D.	0	5	0
Caldecott, Clement G.	0	5	0
Chester Chemists' Association (Committee of)	1	12	0
Davidson, W.	0	5	0
Donald, A.	0	2	6
Hincks, J. W.	0	5	0
Hodges, W.	0	5	0
Huke, James W.	0	5	0
Logan, F.	0	5	0
Mills, John	0	5	0
Prince, B.	0	5	0
Roberts, R. M.	0	5	0
Sanderson, William	0	2	6
Shrubsole, G. W.	0	5	0
Spencer, J. H.	0	5	0
Williams, W. L.	0	2	6
Chesterfield.			
Barfoot, J. R. D.	0	5	0
Booth, George	0	10	6
Elliott, Thomas	0	5	0
Furness, Thomas	0	5	0
Greaves, A. W.	0	5	0
Knighton, T. W.	0	5	0
Lancaster, Wm. G.	0	5	0
Sampson, George	0	5	0
Whitlamsmith, W.	0	5	0
Windle, John T.	0	5	0
Wright, G.	0	5	0
Chester-le-Street.			
Greenwell, Richard Henry	0	5	0
Chew-Magna.			
Milton, Thomas	0	5	0
Chichester.			
Baker and Son	0	10	6
Everard, A. G.	0	2	6
Chippenham.			
Coles, John C.	0	10	6
Turpin, A. B.	0	5	0
Chipping Ongar.			
Ward, David	0	10	6

Chipping Sodbury.	£	s.	d.
Jones, Richard	0	10	6
Chorley.			
Dorning, H. R.	0	2	6
Hill, William	0	5	0
Oakes, G.	0	5	0
Christchurch.			
Green, John	0	5	0
Chulmleigh.			
Joint, Robert James	0	6	0
Cirencester.			
Griffiths, Waldron	0	10	6
Kinch, Edward	0	10	6
Paternoster, J.	0	10	6
Clacton-on-Sea.			
Mann, William	0	5	0
Clare (Suffolk).			
Stokoe, T.	0	2	6
Claycross.			
Lloyd, Robert	0	10	6
Smith, John	0	5	0
Clevedon.			
Trickey, R. H.	0	5	0
Clun.			
Darroll, William	1	1	0
Coalville.			
Brunt, F.	0	5	0
Cockermouth.			
Bowerbank, Joseph	1	1	0
Brown, R. F.	0	2	6
Cooper, F. A.	0	2	6
Douglass, J.	0	2	6
Robinson, William	0	5	0
Codnor (near Derby).			
Farnsworth, Thomas	0	5	0
Colchester.			
Barritt, E. H.	0	10	6
Bates, Thomas W.	0	5	0
Cordley, W. B.	0	5	0
Davies, Rees	0	5	0
Dewing, Chas.	0	5	0
Everitt, W. E.	0	5	0
Jopling, W.	0	5	0
Prosser, Mrs.	0	5	0
Shenstone, J. C.	0	5	0
Smith, W.	0	5	0
Weddell, Arthur	0	5	0
Coldstream.			
Elliot, W. M.	0	10	0
Coningsby.			
Brown, Leonard H.	0	5	0
Heathcotte, Miss	0	2	6
Wright, Mrs.	0	2	6
Wright, Rev. Canon	0	2	6
Consett.			
Milner, T.	0	2	6
Constantinople.			
Bateman, J. M.	1	1	0
Cork.			
Selkirk, James	0	10	6
Corwen.			
Jones, William	0	10	6
Coventry.			
Axford, J. W.	0	10	6
Bampton, G. F.	0	2	6
Bird, Frederick	0	5	0
Brown, John	0	5	0
Clarke, William	0	2	6
Evans, E. M.	0	5	0
Glover, Henry	0	2	6
Hinds, James	0	10	6
Jelly, George William	0	5	0
Mason, D.	0	2	6
Morris, John	0	2	6
Newton, Alfred H.	0	2	6
Sellors, Thomas	0	2	6
Wyleys and Co.	1	1	0

Cowbridge.	£	s.	d.
Thomas, John	0	5	0
Cowes (Isle of Wight).			
Beaven, George A.	0	10	6
Fennings, Alfred	1	1	0
ditto (donation)	5	5	0
Cranbrook.			
Turner, John	0	5	0
Crawley.			
Leach, John	0	5	0
Webb, W. J.	0	5	0
Weedon, Joseph	0	5	0
Crediton.			
Jackson and Sons	1	1	0
Crewe.			
Bayley, William	0	10	6
Crewkerne.			
Catford, O. W.	0	5	0
Criccieth.			
Bowen, Joseph W.	0	2	6
Cromer.			
Davison, D.	0	5	0
Hoare, W. P.	0	5	0
Croydon.			
Barritt, George	0	10	6
Chapman, J.	0	2	6
Clarke, Josiah	1	1	0
Culverwell, John S.	0	5	0
Dixon, W. R.	0	5	0
Faraday, George	0	2	6
Grimwade, E. H.	0	10	6
Long, Henry	0	10	6
Neve, F. C.	0	10	6
Nicholls, A. F.	0	2	6
Padwick, W. G.	0	5	0
Roberts, D. P.	0	10	6
Cullen (N.B.).			
Buchanan, John	0	2	6
Seivwright, George	0	10	6
Dalton-in-Furness.			
Preston, William L.	0	5	0
Dareaston.			
Smith, A. L.	0	5	0
Darlington.			
Cranston, John	0	5	0
Nicholson, Richard	0	5	0
Raw, James H.	0	5	0
Robinson, James	0	5	0
Swenden, James	0	10	6
Walton, Frederick G.	0	2	6
Dartford.			
Cann, James	0	5	0
Goff, W. E.	1	1	0
Horrell, A. E.	0	5	0
Dartmouth.			
Hadfield, H. M.	0	5	0
Humphry, H.	0	10	0
Rees, Colin A.	0	5	0
Rees, William H.	0	10	0
Darwen.			
Shorrock, R.	0	5	0
Datchet.			
Willcocks, A. S.	0	5	0
Deal.			
Dunn, George S.	0	5	0
Fitt, F. E.	0	5	0
Green, John	0	10	6
Johns, T.	0	5	0
Denton (Lancs.).			
Arrandale, William	0	10	6
Derby.			
Ashley, William	0	5	0
Blunt, Walter B.	0	2	6
Clifton, Frederick	0	5	0
Cope, J. A.	0	10	6
Frost, George	0	10	6
Hefford, Charles	0	2	6
Hoare, C. F.	0	2	6
Hughes, John S.	0	2	6
Machon, Edward	0	5	0
Monkhouse, Henry	0	5	0

Derby—continued.

	£	s.	d.
Nicklinson, Thomas	0	5	0
Ordish, Thomas	0	2	6
Scholes, J. S.	0	5	0
Sherwin, Samuel	0	2	6
Stevenson, Richard W.	0	5	0

Devizes.

Cripps, E. H.	0	2	6
Edwards, T. R.	0	2	6

Devonport.

Breeze, George	0	5	0
Codd, Francis	0	5	0
Lamble, John A.	0	2	6
Rendle, R. H.	0	5	0

Didsbury.

Bates, John F.	0	5	0
Richardson, Allen	0	5	0

Diss.

Cupiss, Mrs. E.	0	10	6
Gostling, T. P.	0	10	6
Whitrod, H. F.	0	5	0

Doncaster.

Atkinson, Stephen (Arksey)	0	10	6
Connor, Thomas H.	0	10	6
Goldthorpe, A.	0	5	0
Hasselby, T. J.	0	5	0
Howorth, James	0	10	6
Jaques, George	0	10	6
Loxley, C. H.	0	2	6
Parkin, Charles	0	5	0
Stiles, M. H.	0	10	6

Dorchester.

Durden, H.	0	5	0
Pearce, William L.	0	5	0

Dorking.

Doubleday, F. W.	0	10	0

Douglas (Isle of Man).

Aspell, J. S.	0	5	0
Brearey, A. W.	1	0	0
Gore, J. R. A.	0	5	0
Greensill and Son	1	1	0
Halton, W. H.	0	2	6
Radcliffe, J. C.	0	5	0
Richardson, J. W.	0	5	0
Wilson, I.	0	2	6
Young, John	0	5	0

Dover.

Barnes, William James	0	5	0
Bottle, Alexander	1	1	0
Brown, Joseph Fred.	1	1	0
Clarke, Herbert	0	10	6
Dickeson, Sir Richard	1	1	0
Ewell, Richard M.	0	5	0
Forster, Robert Henry	0	10	6
Hambrook, E. O.	0	5	0
Hambrook, John Barber	0	5	0
Leigh, H. M.	0	2	6
Peake, Henry	1	1	0
Stevens, E. W.	0	5	0
Thompson, Edward	0	10	6
Wyles, William	1	1	0

Downton.

Dunmore, G. H.	0	10	6

Driffield.

Bordass, James	0	5	0
Parkinson, Thomas	0	5	0

Droylsden.

Scanlan, C.	1	1	0

Dublin.

Bowles, Charles A.	0	10	6

Dudley.

Thompson, John W. (Sedgeley)	0	10	6

Dufftown (N.B.).

MacPherson, W.	0	5	0

Dumbarton.

Babtie, John	0	5	0
Campbell, Colin	0	5	0

Dumfries.

Allan, William	0	5	0

Dundee.

	£	s.	d.
Hardie, James	0	10	6
Hardie, James M.	0	10	6
McMillan, James	0	10	6

Dunfermline.

Fisher, J. H.	0	5	0
Gilmour, David	0	5	0
Seath, Alexander	0	10	6
Tocher, J.	0	5	0

Dunkeld.

McDonald, Kenneth	0	10	6

Dunstable.

Herington, J. H.	0	5	0

Durham.

Burdon, John	1	1	0
Leighton, Mrs.	0	5	0
Palmer, John G.	0	2	6
Rollin, John G.	0	10	6
Sarsfield, John	0	2	6
Sarsfield, William	0	10	6
Scawin and Burn	0	10	6
Wise, Joseph N.	0	5	0

Dursley.

Perodeau, E. G. (Uley)	0	5	0

Ealing.

Curtis, Fred. G.	0	10	6
Dyson, A.	0	5	0
Hayles Brothers	1	1	0
Phillips, J. E.	0	10	6
Thomas, Richard	0	10	6

Earlstown.

Peake, Arthur	0	5	0

Eastbourne.

Andrews, H. T.	0	10	6
Andrews, J. F.	0	10	6
Bayley, E. G.	0	5	0
Browne, Henry R.	1	1	0
Crook, Herbert	1	1	0
Earnshaw, B. K.	0	10	6
Gibbs, Joseph	1	1	0
Gibbs, S.	0	5	0
Hall, Samuel	1	1	0
Neve, Miss Mary E. B.	0	5	0
Price, W.	0	5	0
Ray, C.	0	2	6
Routly, J.	0	5	0
Senior, J.	0	5	0
Tearle, W.	0	5	0
Wilkes, T. J.	0	5	0

East Dereham.

Peck, Edward	0	10	6

East Grinstead.

Dixon, W. H.	0	2	6
Tully, John	0	2	6

East Molesey.

Parrott, John	0	10	6

Eccles.

Blackburn, A. E. H.	0	5	0
Bomford, A. C.	0	5	0
Howie, W. L.	0	10	6
Oldfield, F.	0	5	0
R. T. H.	0	10	6
Scholes, W. I.	0	2	6

Eccleshall.

Smith, Edgar R.	0	10	6

Edinburgh.

Ainslie, Wm. W.	0	2	6
Aitken, James	0	5	0
Arthur, Charles	0	5	0
Baildon, H. C. and Son	1	1	0
Baker, W. C.	0	5	0
Blenkiron, J.	0	2	6
Boa, Peter	0	5	0
Bruce, Alexander G.	0	5	0
Buchanan, James	1	1	0
Burley, William	0	5	0
Center, J. A.	0	5	0
Chemists' Assistants and Apprentices' Association	1	1	0
Chemists' Ball, per Mr. J. Thomson	1	1	0
Clark, Andrew	0	5	0
Clark, Dr. William Inglis	0	10	6
Coats, J. T.	0	7	6

Edinburgh—continued.

	£	s.	d.
Cowie, George	0	5	0
Dewar, F. L.	0	5	0
Dick, Robert	1	1	0
Dott, David B.	0	10	6
Duncan, William	0	5	0
Ewing, James L.	0	10	6
Findlay, J.	0	2	6
Fleming, J.	0	2	6
Forret, John A.	0	5	0
Fraser, Alexander	0	5	0
Fraser, J. I.	0	5	0
Gamley, David	0	5	0
Gardner and Ainslie	1	1	0
Gibson, Adam	0	10	6
Gilmour, William	1	1	0
Hendry, R. L.	0	5	0
Henry, C. F.	0	5	0
Heron, James	1	1	0
Hill, John R.	0	5	0
Hutchinson, M. H.	0	5	0
Keith, Sydney	0	5	0
Laird, G. H.	0	5	0
Laurie, J. M.	0	5	0
Lockerbie, James	0	5	0
MacAlley, Robert	0	5	0
MacDonald, D. F.	0	2	6
Macdonald, John	0	5	0
Macfarlan and Co.	2	2	0
McGlashan, J.	0	5	0
MacLaren, David	0	10	0
Macnair, R. H.	0	2	6
McPherson, Colin A.	0	5	0
Middleton, D.	0	2	6
Mitchell, W. K.	0	2	6
Morison, John	0	10	6
Noble, Alexander	1	1	0
Pinkerton, William	0	10	6
Purves, Samuel	0	5	0
Raimes, Clark and Co.	2	2	0
Robertson, G.	0	5	0
Robertson, James and Co.	1	1	0
Robertson, John	0	5	0
Scobie, James	0	5	0
Scott, James	0	10	6
Smiles, J.	0	10	0
Smith, A. L.	0	5	0
Smith, Thomas	1	1	0
Smith, William	0	5	0
Spence, William	0	5	0
Stephenson, J. B.	1	1	0
Stewart, A. K.	0	5	0
Symington, Thomas	0	10	6
Thomson, Isaac W.	0	5	0
Wilson, J. M.	0	5	0
Wylie, David N.	0	5	0
Young, J. R., junr.	0	5	0

Egham.

Bartholomew, William	0	10	6

Elgin.

Robertson, William	0	5	0
Thomson, Robert	0	5	0

Eltham (Kent).

Rawlinson, Ralph	1	1	0

Ely.

Ellis, H. A.	0	2	6
Gulliver, G. E.	0	5	0
Lincoln, William	0	10	6

Enfield.

Gange, George	0	5	0

Epping.

Rowland, Thos.	0	10	6
Rowland, T. W.	0	5	0

Epsom.

Oxley, Frederic	0	5	0
Tottle, Henry John	0	5	0

Evesham.

Dingley, R. L.	0	5	0
Pumphrey, J. H.	0	5	0

Exeter.

Bard, Jane	0	2	6
Bartleet, John	0	5	0
Botting, Charles	0	5	0
Bulley, William H.	0	2	6
Fouraker, Thomas E.	0	5	0
Gadd, Henry	0	10	6
Lake, John H.	1	1	0
Lemmon, Eric	0	5	0
Milton, Thomas C.	0	10	6

Exeter—continued.

	£	s.	d.
Napier, George L.	0	5	0
Pasmore, George	0	5	0
Stocker, George	0	10	6
Tighe, Henry W.	0	10	6
Townsend, J.	0	10	6
Wearing, W. H.	0	5	0
Webber, J. W.	0	5	0
Wright, Robert F.	0	5	0

Exmouth.

Toone, A. H.	0	5	0

Eye.

Bishop, Robert	0	10	6
Flowerdew, R.	0	10	6

Eynsham.

Howe, Henry A.	0	5	0

Fakenham.

Searle, Mrs. M.	0	10	0

Falkirk.

Lyon, Thomas	0	7	6
Murdoch, David	0	10	6

Falmouth.

Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6

Fareham.

Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	10	6

Faringdon.

Cook, W. R.	0	5	0

Farnham.

Cullingford, L. J.	1	1	0
Griffith, J.	0	10	6

Fenton.

Knight, Jesse	0	5	0
Massey, Stephen	0	5	0

Ferry Hill.

Hunter, H.	0	2	6

Flint.

Jones, O. W.	0	5	0

Florence.

Patey, W. J.	0	7	6

Folkestone.

Bishop, E. J.	0	10	6
Goodliffe, George	0	10	6
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6

Folkingham.

Carter, Mrs.	0	2	6

Forfar.

Fowler, G. R.	0	5	0
Ranken, John	0	5	0

Fort William.

MacFarlane, P.	0	5	0

Foulsham.

Maddison, Mary	0	5	0

Fraserburgh.

Burnett, Robert	0	5	0

Frome.

Hodder, G. W.	0	5	0

Gainsborough.

Forrest, Richard Wm.	0	10	6

Garstang.

Thomas, J. J.	0	5	0

Gateshead-on-Tyne.

Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0

Glasgow.

Brodie, Robert	0	5	0
Clarke, Joseph A.	0	5	0
Conacher, D.	0	5	0
Currie, John (Eglinton Street)	0	5	0
Currie, John (Sauchiehall Street)	0	5	0
Currie, W. L.	0	5	0

Glasgow—continued.

	£	s.	d.
Dickie, James	0	5	0
Duncan, J.	0	10	6
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Foster, John	0	10	6
Frazer, Daniel	1	1	0
Garry, George	0	2	6
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	1	1	0
Lambie, Hugh	0	5	0
Laurence, John	0	10	6
McMillan, John	1	1	0
Neil, J.	0	5	0
Peacock, J. R.	0	5	0
Rose, Alexander	0	10	6
Thomson, William	0	5	0
Wallace, W.	0	10	6
Whitelaw, James	1	1	0

Gloucester.

Foulkes, W. H.	0	10	6
Franklin, James	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Ward, Joseph	0	10	6

Gosforth.

Gaitskell, James	0	5	0

Gosport.

French, Benjamin	0	5	0
Houghton, R. W.	0	5	0
Mumby, Chas. and Co.	1	1	0

Govan.

Skinner, John	0	5	0

Grantham.

Bishop, William	0	2	6
Fisher, F. D.	0	5	0
Gamble, Arthur	0	5	0
Hall, R. Arnold	0	10	6
Hunt, Thomas	0	5	0
Welborn, George	0	2	6
Whysall, William	0	10	6

Grantown.

Duncan, W.	0	2	6

Gravesend.

Clarke, Richard F.	1	1	0
Reid, C. Stuart	0	2	6
Sharman, C. R.	0	5	0
Wiseman, E.	0	2	6

Great Bedwyn.

Gerard, George R.	0	10	6

Great Grimsby.

Barker, William	0	5	0
Cook, Robert, jun.	0	5	0
Mason, William D.	0	2	6
Robinson, Jonathan Scott	0	5	0
White, J. C.	0	2	6
Willey, W.	0	5	0

Guernsey.

Nickolls, J. B.	0	5	0

Guildford.

Herbert, H. W.	0	5	0
Inman, T. L.	0	5	0
Jeffries, Henry	1	1	0
Long, A. J. T.	0	5	0
Snoxell, S.	0	2	6
Thompson, Thomas	0	5	0
Wheeler, Frederick	0	5	0

Guisborough.

Fairburn, Robert W.	0	5	0

Haddington.

Gardiner, D.	0	5	0
Watt, James and J.	0	10	6

Halesworth.

Gostling, John H.	0	5	0
Johnson, F. E.	0	5	0

Halifax.

	£	s.	d.
Brook, Robert	0	10	6
Dyer, William	0	5	0
Haigh, W.	0	5	0
Jessop, Jonathan	0	5	0
Seely, H. W.	0	5	0
Swire, Jabez	0	5	0

Halstead.

Marlar, John F.	0	2	6

Hambledon.

Wedge, G. D.	0	2	6

Hampton Wick.

Miller, C. S.	0	5	0

Hanley.

Cornwell, T. C.	0	5	0
Furnival, John D.	0	10	6
Hassall, S.	0	2	6
Insull, E. S.	0	5	0
Jones, E.	0	5	0
Moore, John William	0	5	0
Parr, F. R.	0	2	6
Tirrell, J.	0	5	0
Waldron, J. H.	0	10	6

Hanwell.

Kirkham, Frank	0	2	6

Harleston.

Fisher, W. H.	0	5	0
Woods, Charles	0	5	0

Harrogate.

Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Potter, Charles	0	5	0
Reynolds, Freshfield	0	10	6
Shaw, B.	0	10	6
Wilson and Son	1	1	0
Wood, A. W.	0	5	0

Harwich.

Bevan, Charles F.	0	10	6
Harding, Joseph	0	10	6
Worts, Augustine	0	5	0

Haslingden.

Blayney, Joseph J.	0	5	0

Hastings and St. Leonards.

Beck, Albert N.	0	5	0
Bolton, Thomas	0	5	0
Brooker, Algernon	0	5	0
Brooks, Frederick	0	5	0
Chapman, F.	0	10	6
Crisford, F. J.	0	2	6
Croasdale, J. C.	0	2	6
Curtis, H. E.	0	5	0
Feaver, John	0	10	6
Greenhill, S. O.	0	5	0
Hasselby, E. H.	0	5	0
Jameson, W. E.	1	1	0
Jenner, H. A.	0	5	0
Keyworth G. A.	0	10	0
Lemmon, G. F.	0	2	6
MacKenzie, C. A.	0	2	6
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	6
Rossiter, Frederick	0	10	6
Smith, A.	0	5	0
Snowdon, Robert	0	5	0
Tharle, C. A.	0	10	6
Vint, Thomas D.	0	5	0

Haverfordwest.

Jenkins, Jabez (Lysyfrân)	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6

Hawick.

Craig, John	0	5	0
Kennedy, D.	0	10	6
Maben, Thomas	1	1	0
Turnbull, W. S.	0	5	0

Hay.

Davies, John Lutwyche	0	5	0

Heaton Chapel.

Thorp, John	1	1	0

Hebden Bridge.

Hey, David	0	10	6
Hey, Thomas K.	0	10	6

Heckington.

	£	s.	d.
Sumners, Michael Cole	0	5	0

Heckmondwike.

Booth, John	1	1	0
Stead, Walter	0	5	0

Helensburgh.

Harvie, George	0	5	0
McMurray, J.	0	5	0

Helmsley.

Allenby, W.	0	7	6

Helston.

Wakeham, Charles	0	5	0

Henley-on-Thames.

Batchelor, C. J. H.	0	5	0

Hereford.

Guy, E.	0	5	0
Haines, W. E.	0	5	0
Jackson, J. J.	0	10	6
Pearmund, H. S.	0	5	0
Walker, John	0	10	6
Williams, W. and H. B.	0	10	6

Herne Bay.

Usher, A. M.	0	2	6

Hertford.

Durrant, G. R.	0	10	6

Hexham.

Gibson, J. P.	1	1	0
Richardson, George	0	5	0
Riddle, W. R.	0	5	0

Heywood.

Beckett, William	0	10	6

High Barnet.

Whittle, Elias C. C.	0	5	0

Highworth (Wilts).

Ballard, Edwin	0	5	0

Hitchin.

Kent, T. W.	0	5	0
Perks and Llewellyn	1	1	0
Ransom and Son	1	1	0

Holyhead.

Roberts, T. J.	0	5	0

Hong Kong (China).

Crow, W. E.	1	1	0
Lucas, E. W.	0	5	0
Watson, W. M.	0	5	0

Honley.

Broadbent, John B.	0	10	6

Horncastle.

Betts, William	0	5	0

Horwich (Lancs.).

Phillips, S.	0	5	0
Varley, W. M.	0	10	6

Houghton-le-Spring.

Rowell, R. H.	0	5	0

Hounslow.

Bowering, John	0	5	0
Cull, Joseph	0	10	6

Howden (Yorks.).

Loam, J. G.	0	5	0

Huddersfield.

Dickinson, J. H.	0	5	0
King, William	0	10	6
Needham, T.	0	5	0
Wheatley, Charles	0	10	0

Hull.

Allison, E. and H.	1	1	0
Bell, Charles B.	1	1	0
Bousfield, W. M.	0	5	0
Campbell, Charles	0	5	0
Chapman, E. J.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0

Hull—continued.

	£	s.	d.
Dobson, J. B.	0	5	0
Dunlop, John	0	5	0
Dyson, George	0	5	0
Earle, E. H.	0	10	6
Gibson, C. P. (Trustees of)	0	5	0
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Kenny, Thomas	0	5	0
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Oldham, James	0	5	0
Raynor, A.	0	5	0
Shaw, Ward	0	5	0
Sheffield, A. J.	0	5	0
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Stoakes, Benjamin M.	0	5	0
Thyer, J.	0	5	0

Hunstanton.

Twiss, Wm.	0	10	6

Huntingdon.

Baxter, Robert	0	10	6
Beck, J. W.	0	5	0
Cooper, A.	0	2	6
Provost, J. P.	0	2	6

Huntly (N.B.).

Chalmers, G.	0	2	6

Hurstpierpoint.

Hudson, Alfred W.	0	2	6

Hyde.

Oldfield, Henry	0	10	6

Hyères (France).

Powell, Walter A.	0	5	0

Hythe.

Lemmon, R. A.	1	1	0

Ilford.

Beal, E. J.	1	1	0

Ilfracombe.

Crang, Walter	0	10	6
Wheeler, James	0	5	0

Ilkeston.

Potts, Charles	1	1	0

Ilkley.

Worfolk, G. W.	0	10	6

Inverness.

Allan, Alexander	0	5	0
Bethune, W. J.	0	2	6
Fraser, John	0	5	0
Galloway and Son	0	5	0
MacLeod, L.	0	2	6
MacRitchie, D.	0	5	0
Mitchell, H.	0	5	0

Ipswich.

Anness, Samuel R.	0	10	6
Chapman and Pain	1	1	0
Clifton, F. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	10	6
Crassweller, W. E.	0	5	0
Eyre, H. R.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Marsh, W. H.	0	5	0
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Nunn, C. G.	0	5	0
Palmer, F. H.	0	2	6
Spurgeon, Fredk. J.	0	5	0
Wigg, L. N.	0	5	0
Wiggin, J. C.	0	10	6

Irvine.

Gillespie, James	0	2	6

Isleworth.

Reece, James	0	5	0

Jarrow-on-Tyne.

Hooper, Richard	0	2	6

Jedburgh.

	£	s.	d.
Walker, A.	0	5	0

Jersey.

Baker, John T.	0	5	0
Cole, George	1	1	0
Ereaut, John	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Poingdestre, C. R.	0	10	6

Keighley.

Midgley, Walter	0	5	0
Riddiough, F.	0	5	0

Kendal.

Bateson, Thomas	1	1	0
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Rigg, G. F.	0	10	0
Severs, Joseph	1	1	0

Kenilworth.

Barton, Henry Emlyn	0	10	6

Keswick.

Townley, Thomas W.	0	10	6

Kettering.

Gray, A. U.	0	2	6
Thursfield, John F.	0	10	6
Thursfield, J. H.	0	2	6

Kew.

Edwards, J. E.	0	10	6

Kidsgrove.

Griffiths, Edwin H.	0	10	6

Kilmarnock.

Borland, John	1	1	0
Borland, John, jun.	0	10	6

King's Lynn.

Atmore, George	0	5	0
Cocher, John A.	0	5	0
Count, Sidney	0	5	0

Kingston-on-Thames.

Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	0	10	6

Kirkcaldy.

Storrar, David	0	10	6

Knaresborough.

Lawrence, W. P.	0	5	0
Thompson, George	0	10	6

Knutsford.

Jackson, William	0	5	0
Silvester, Henry T.	0	5	0

Lancaster.

Arkle, William	0	5	0
Briggs, W.	0	5	0
Troughton, Henry	0	5	0
Vince, James	0	5	0
Wyatt, W.	0	5	0

Landport.

Gall, Frederic	0	2	6
Perfect, George	0	5	0

Langholm.

Beattie, Thomas	0	5	0

Largs (N.B.).

Barr, Bryce	0	5	0

Launceston.

Downing, Frederick	0	5	0
Wise, William	0	5	0

Leamington.

Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Davis, Benjamin	0	10	6
Davis, C.	0	2	6
Eynon, D. J.	0	10	6
Hutton, H.	0	2	6
Lamplough, J. W.	0	10	6
Price, J.	0	2	6
Pullin, William H.	1	1	0
Robinson, J. J.	0	5	0
Sansom, Henry	0	2	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	1	1	0
Stanley, Herbert	0	10	6

Lechlade.

	£	s.	d.
Davis, G. A.	0	5	0

Ledbury.

Freeman, Ernest	0	10	6

Leeds.

Bilbrough, A.	1	1	0
Branson, F. W.	0	10	6
Briggs, George	0	5	0
Brown, Edward	0	5	0
Catterall, C. G.	0	5	0
Cole, E. H.	1	1	0
Exley, John	0	5	0
Fawthorp, James	0	5	0
Fox, W. A.	0	2	6
Goodall, Backhouse and Co.	2	2	0
Greasley, M. F.	0	10	6
Hardcastle, J.	0	10	0
Harvey, William (Headingley)	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	5	0
Holmes, Francis	0	5	0
Horsfield, E.	0	5	0
Jefferson, P.	0	5	0
Ratherham, W.	0	5	0
Reynolds, Richard	1	1	0
Reynolds, Richard F.	0	5	0
Robinson, W.	0	5	0
Smith, R. H.	0	2	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0
Thompson, E.	0	10	0

Leicester.

Berridge, Alfred	0	5	0
Broof, R.	0	10	6
Burford, S. F.	0	10	6
Butler, T. E.	0	5	0
Cadoux, S. H.	0	5	0
Carr, William	0	10	6
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	10	6
Freeland, A. J. (Kibworth)	0	2	6
Harvey, William R.	1	1	0
Kelly, J. G.	0	5	0
Lloyd, T. H.	1	1	0
Pickering, Henry	0	5	0
Rowe, W.	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0

Leigh (Lancs).

Haddock, J.	0	5	0

Leighton Buzzard.

Herington, H. E.	0	5	0
Herington, Joseph	1	1	0

Leith.

Anderson, J. C.	0	2	6
Bowman, J.	0	5	0
Crichton, Alexander	0	5	0
Duncan, Flockhart Powell and Co.	0	10	6
Finlayson, Thomas	0	5	0
McDougall, R. I.	0	5	0
Mair, Alexander	0	5	0
Robertson, R.	0	2	6

Lenton.

Wilson, Thomas	0	5	0

Lenzie (N.B.).

Pettigrew, J. W.	0	4	0

Leominster.

Davis, David F.	1	1	0
Ellwood, M. J.	0	10	6
Sandiland, Robert B.	0	5	0

Lerwick.

Laing, A. L.	0	5	0
Porteous, Arthur A.	0	2	6

Leven.

Hogg, A.	0	5	0

Lewes.

Briscoe, Charles (West Firle)	0	5	0
Head, John T.	0	10	6

Leytonstone.

	£	s.	d.
Andrews, C. W.	0	2	6
Bennett, C.	0	2	6
Matthews, J. H.	0	5	0
Wilson, J.	0	5	0

Lincoln.

Battle, Son and Maltby	0	10	6
Elmitt, W.	0	5	0
Houfe, R. W.	0	5	0
Tomlinson, Charles K.	0	10	6

Liskeard.

Ough, Lewis	0	5	0

Littleborough.

Hall, Samuel	0	5	0

Little Chishill.

Jefferson, Thomas	0	10	6

Littlehampton.

Longman, J. H.	0	2	6
Smart, C. F.	1	1	0

Liverpool.

Abraham, Alfred Clay	1	1	0
Abraham, Thomas Fell	1	1	0
Adams, Thomas E.	0	10	6
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	6
Alexander, John	0	10	6
Allan, James H.	1	1	0
Aris, G. H.	0	2	6
Ayrton and Saunders	0	10	6
Bain, John	0	5	0
Barrett, A. A.	0	2	6
Blabey, J. J. (Woolton)	1	1	0
Blabey, J. R. (Woolton)	0	2	6
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	6
Brown, Edwin	0	5	0
Brown, Joseph	0	2	6
Buck, Richard C.	0	5	0
Clay, Dod and Co.	1	1	0
Coley, James	0	5	0
Dickins, B.	0	10	6
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Evans, Sons and Co.	5	5	0
Fergusson, W. and J.	0	10	6
Field, C.	0	10	6
Fleming, Mrs. Agnes	0	5	0
Furniss, Thomas	0	5	0
Greenall, Alfred	1	1	0
Hackett, Thomas	0	10	0
Hawood, Charles	0	5	0
Hocken, Joshua	0	10	6
Hodges, E. G.	0	5	0
Hodgson, T. S.	0	5	0
Hughes, T. J.	0	5	0
Jackson, H.	0	10	6
James, John	0	5	0
Johnson, J. H. and S.	2	2	0
Jones, R. H.	0	5	0
Jordan, J. A.	0	5	0
Kirk, W. P.	0	5	0
Lee, Samuel W.	1	1	0
Lett, Arthur J.	0	5	0
McGuffie and Co.	1	1	0
Midgley, John E.	0	2	6
Moore, J.	0	5	0
Morgan, H. B.	0	5	0
Parkinson, Richard	0	10	6
Parry, R.	0	5	0
Pearson, W.	0	10	6
Pheysey, Richard (Waterloo)	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Sawden, Alfred	0	10	6
Smith, J. J. (Walton-on-the-Hill)	0	10	6
Smith, R. G.	0	5	0
Symes, Charles	2	2	0
Thomas, Robert	0	10	6
Thompson, John	1	1	0
Thompson and Capper	1	1	0
Tollitt, W.	0	2	6
Troughton, Christopher	0	10	6
Ward, J. S.	0	5	0
Warhurst, Mrs. A.	2	2	0
Williams, William	0	5	0
Wokes, T. S.	0	5	0
Woodhead, H. C.	0	10	6
Wright, William	0	5	0
Wyatt, H.	0	5	0
Wyatt, H., junr.	0	5	0

Llandilo.

	£	s.	d.
Hughes, T.	1	1	0
Williams, W. J.	0	2	6

Llandudno.

Burton, Joseph	1	1	0
Pierce, R. W. C.	0	5	0
Sinclair, Mrs. M. A.	0	10	6

Llanelly.

Evans, Gwilym	1	1	0

Llangollen.

Jones, Humphrey	0	5	0

Llanidloes.

Jones, Thomas Pryce	—		

Loddon.

Ellis, T. W.	0	10	6

London.

Allden, John	1	1	0
Allen, Charles B.	3	3	0
Amoore, Lewis P.	0	10	6
Andrews, Frederick	0	10	6
Applegate, Edwin	0	10	6
Arkinstall, William	1	1	0
Ashford, H. S.	0	5	0
Atkinson, James	0	5	0
Atkinson, John G.	1	1	0
Attwood, Henry E.	1	1	0
Aukland, W. H.	0	2	6
Austin, Henry Felix	1	1	0
Babb, James	0	5	0
Bacon, Henry J.	0	2	6
Baines, Wm. H.	0	10	6
Baker, Alfred P.	0	10	6
Ball, The Chemists', per Mr. W. H. Francis	21	0	0
Ball, The Junior Pharmacy, per Mr. W. H. Kerr	10	10	0
Banbury, Richard	0	5	0
Barnard, A. P.	0	5	0
Barnard, John	1	1	0
Barnes, James Benjamin	1	1	0
Barnes, James Burden	0	5	0
Barret, Edward Louis	1	1	0
Barry, Frederic	0	5	0
Bartle, W. F.	0	5	0
Bartlett, G. F. H.	0	5	0
Bartley, George A.	0	10	6
Bascombe, Frederick	0	10	6
Bascombe, William	0	5	0
Bate, Henry	1	1	0
Bateman, T. H.	1	1	0
Beasley, Frederick	0	5	0
Beddard, John	1	1	0
Bedford, C.	0	10	6
Bell, J. A.	0	10	6
Bell, Matthew W.	1	1	0
Bell, William H.	1	1	0
Bennett, George	0	5	0
Bennett, Thomas	0	5	0
Bently, William Jas.	0	10	6
Bessell, J. W.	0	5	0
Best, James	0	10	6
Bevan, William	0	10	6
Bigg, Thomas	1	1	0
Bindloss, G. F.	0	10	6
Bingley, Richard	0	10	6
Birch, Henry C.	1	1	0
Bird, Augustus	2	2	0
Bird and Storey	1	1	0
Bird, F. C. J.	0	5	0
Bird, G.	1	1	0
Bird, Robert	0	10	6
Bishop, W. M.	0	2	6
Blake, Charles A.	1	1	0
Bland, John	0	10	6
Bletsoe, F. F.	0	10	6
Blyth, Utton	0	5	0
Boothby, H. N.	0	5	0
Botterill, W.	0	5	0
Bourdas, Isaiah	1	1	0
Boutelle, H.	0	5	0
Bowen, John T	0	10	6
Bowen, John W.	1	1	0
Bowles, W. J.	0	5	0
Brand and Co.	1	1	0
Branford, A. J.	0	5	0
Bridges, C. W.	0	10	6
Brodribb, J. B.	0	10	6
Brookes, Samuel	0	10	6
Brooks, J.	0	2	6
Broumpton, F. R.	0	2	6
Brown, Alfred James	0	10	6
Brown, Edgar M.	0	2	6
Bull, E. John	0	5	0

London—continued.	£	s.	d.
Bullock, J. Lloyd and Co.	2	2	0
Bunker, C. J. G.	0	2	6
Bunker, James	0	2	6
Burden, C. H. B.	0	5	0
Burgoyne, Burbidges, Cyriax and Farries	2	2	0
Burn, Henry	0	5	0
Burton, Percy H.	0	5	0
Bush, Arthur	0	5	0
Butt, Edward Northway	10	10	0
Butterworth, John	0	10	0
Cadman, Daniel C.	1	1	0
Cammack, J. F. J.	0	5	0
Campbell, E. K.	0	5	0
Carteighe, Michael	1	1	0
Caseley, Thomas	0	5	0
Casewell, J. P.	0	5	0
Cawdell, George	0	10	6
Chapman, Joseph J.	0	10	6
Charity, William	0	10	6
Chemist and Druggist (Proprietors of)	5	5	0
Churchill, J. and A.	1	1	0
Churchyard, R. L.	0	5	0
Clapp, Edward F.	0	10	6
Clark, J. A.	0	10	6
Clarke, W. E.	0	2	6
Clarke, W. L.	0	5	0
Cocker, R. B.	0	5	0
Colchester, William M.	0	5	0
Cole, A. C.	1	1	0
Coleman, J.	0	5	0
Coles, Ferdinand	0	10	6
Coles, J. W.	0	10	6
Collett, Chas. B.	0	5	0
Collier, Henry	0	10	6
Constance, Edward	0	10	6
Constance, Herbert E.	0	10	6
Constance, Sidney W.	1	1	0
Cooper, Albert	1	1	0
Cooper, Henry	0	10	6
Cooper, H. H.	1	1	0
Cooper, Wm. Henry	0	10	6
Cooper, William Temple	0	10	6
Cooper, W. W. R.	0	10	6
Corbyn, Stacey and Co.	1	1	0
Cory, James T. H.	0	10	6
Cosway, Edwin C.	1	1	0
Cottrill, John W.	0	10	6
Coulson, Thomas	0	2	6
Cox, F. H.	0	2	6
Cracknell, Herbert	0	10	6
Cresswell, Frederick	0	10	6
Crosby, John	0	2	6
Crow, E. L.	0	10	6
Crowden, S. G.	0	10	6
Cryer, Henry	0	5	0
Cugnoni. A. H. D.	0	5	0
Cullen, Harry H.	0	5	0
Curtis and Co.	1	1	0
Dampney, Richard S.	0	10	6
Darby and Gosden	2	2	0
Dart, W.	0	2	6
Davenport, Horace	2	2	0
Davenport, J. T.	2	2	0
Davidson, P.	1	1	0
Davies, H.	0	5	0
Davies, Llewelyn	0	2	6
Davies, Robert H.	1	1	0
Davis, F.	0	2	6
Davis, H. S. E.	0	10	6
Davy, Yates and Routledge	2	2	0
Dean, S.	0	5	0
De Peare, John Thomas	0	5	0
Dewar, Mrs. Mary Ann	0	10	6
Dinneford and Co.	2	2	0
Dixon, Herbert	0	5	0
Dodd, W. R.	0	10	6
Dolling, A.	0	5	0
Douglas, J. W.	0	5	0
Doulton and Co.	1	1	0
Dowdeswell, J.	0	5	0
Drury, Sydney	0	5	0
Dukes, H.	0	2	6
Dunstan, J. F.	0	2	6
Dymond, T. S.	0	5	0
Dymott, Francis	0	5	0
Dyson, William B.	1	1	0
Eade, George	0	10	6
Eade, James	0	10	6
Eastman, J. E.	0	10	6
Edwards, Charles	1	1	0
Edwards, James	0	5	0
Edwards, William Staples	0	5	0
Elliott, W.	0	5	0
Ellwood, T. A.	0	5	0
Elvey, Mrs. M. A.	1	1	0

London—continued.	£	s.	d.
Emsley, J.	0	10	0
Emson, William N.	0	5	0
Epps, James	1	1	0
Evans, Lescher and Webb	1	1	0
Evershed, G. S.	0	5	0
Farmer, John	0	10	6
Fawssett, T.	0	5	0
Fentiman, C. H.	0	2	6
Fitch, Robert Owen	0	10	6
Foot, F. I.	0	2	6
Francis, G. Bult	1	1	0
Francis, George Baggett	1	1	0
Francis, Matthew R.	0	10	6
Francis, W. H.	0	10	6
Freeman, Frank	0	2	6
Frith, E. J.	0	5	0
Froom, William Henry	1	1	0
Frost, John H.	0	5	0
Frost, W. T.	0	10	6
Fryer, C. H.	0	10	6
,, (donation)	5	5	0
Fuge, H. D.	0	5	0
Gadd, Charles	0	10	6
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Garman, C. E.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Gaskin, J. H.	0	2	6
Gater, J.	0	5	0
Gaunt, Rann Dolphin H.	1	1	0
Gerrard, A. W.	1	1	0
Glew, F. H.	0	5	0
Goddard, G. E.	0	5	0
Godfrey and Cooke	1	1	0
Godfrey, H. E.	0	5	0
Godolphin, G. F. A.	0	5	0
Goff, Richard	0	5	0
Goldby, F.	0	5	0
Golding, J. F.	1	1	0
Golds, L. G.	0	10	6
Goodall, W. A.	0	5	0
Goodchild, Alfred C.	0	5	0
Goodwin, John	1	1	0
Gordelier, F. H.	0	15	0
Gorton and Sons	0	10	6
Gould, J.	1	1	0
Gradidge, James H.	0	10	6
Graham, Henry	0	5	0
Granger, Edwin John	1	1	0
Greaves, J. E.	0	5	0
Green, Samuel	0	5	0
Green, W. J.	0	10	6
Greenish, H. G.	0	10	6
Greenish, Thomas	1	1	0
Greenish, T. Edward	0	10	6
Greig, W.	0	2	6
Gristock and Co.	1	1	0
Gudgen, Frederick G.	1	0	0
Gulliver, William	1	1	0
Gulliver, W. F.	0	5	0
Haden, W. E.	0	5	0
Hairsine, H. S.	1	1	0
Hall, A. W.	0	5	0
Hall, Ralph	1	1	0
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hannah, Charles	0	10	6
Hardy, Samuel C.	1	1	0
Harley, E. T.	1	1	0
Harris, Frank William	0	5	0
Hart, A.	0	2	6
Hart, J. C.	0	5	0
Hart, Thomas	0	5	0
Hartridge, J. H.	0	5	0
Harvey, Edward	1	1	0
Harvey, John William	0	2	6
Harvey, William	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	10	6
Haward, G. R.	1	1	0
Hawkins, Thomas	0	10	6
Hearn, John	0	5	0
Hearn, F. D.	0	5	0
Hebbeler, K.	0	10	6
Henty, Henry Martin	0	5	0
Heppell, J.	0	5	0
Herbert, William	0	5	0
Hern, W. H.	0	5	0
Hewlett, J. C.	1	1	0
Hick, John	0	5	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Hicks, Alexander D.	0	3	0
Higgins, James	0	10	6
Hill, Arthur B.	1	1	

London—continued.	£	s.	d.
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hillen, John	0	10	6
Hills, Thomas Hyde	10	10	0
Hills, Walter	2	2	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Treacher and Clarke	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Hogwood, E.	1	1	0
Holding, J.	0	5	0
Holford, T. Constantine	0	10	6
Holl, Edmund	0	5	0
Holloway, J.	0	2	6
Holmes, A. J.	0	10	6
Holmes, Walter M.	0	10	6
Holroyd, A.	0	2	6
Hopkin and Williams	2	2	0
Hopkin, William King	2	2	0
Horne, John	0	5	0
Horsley, T. W.	0	5	0
Horton, H. W.	0	2	6
Howard, E.	0	5	0
Howell, Maurice	0	10	6
Howlett, Samuel	1	1	0
Howse, W. F.	0	5	0
Hucklebridge, P. and W.	1	1	0
Hudson, T. F.	0	5	0
Huggins, Richard	0	10	6
Hughes, Evan	0	10	6
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Humble, J. B.	0	5	0
Humphreys, G. R.	0	5	0
Humphrey, N. C.	0	5	0
Humphreys, Richard	1	1	0
Hunt, Charles	1	1	0
Huskisson, Henry Owen	1	1	0
Hyne, Harry	0	5	0
Hyslop, John Cahill	1	1	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ince, Joseph	1	1	0
Ingham, John	0	2	6
Ingram and Royle	1	1	0
Islip, C. C.	0	5	0
Ive, William	1	1	0
ditto (donation)	10	10	0
Izod and Son	1	1	0
Jacks, D. R.	0	5	0
Jackson, Charles	0	10	6
Jackson, Christopher	0	10	6
Jackson and Co., John	0	10	6
Jarvis, John S.	0	10	6
Jenkins, Henry	1	1	0
Jenkins, Thomas	0	10	6
Jobson, Thomas	0	10	6
Johnson, L.	0	2	6
Johnston, W.	0	2	6
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, T. P.	0	10	6
Jones, W. A.	0	2	6
Jones, William	0	10	6
Jones, William	0	5	0
Jozeau, G.	1	1	0
Keeling, A. G.	0	5	0
Keer, Isabella S. Clarke	0	10	6
Keer, Thomas H.	0	10	6
Kent, Thomas Ramsey	0	10	6
Kerr, T.	0	5	0
King, Mrs. E. B.	0	10	6
King, Henry	0	10	0
King, J. H.	0	5	0
Kingan, D.	0	10	6
Kingsford, Frederick	1	1	0
Kirk, Snowden	0	10	6
Kitchin, J.	0	5	0
Langley, Frank C.	0	5	0
Laws, John	0	10	6
Layng, R. C.	0	5	0
Leake, Thomas W.	0	10	6
Legg, H. A.	0	10	6
Lenfestey, W. G.	0	5	0
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Lewis, D. J.	0	5	0
Lewis, T.	0	5	0
Lidwell, J. E.	0	10	6
Lister, W. B.	1	1	0
Littlejohn, A.	0	5	0
Llewhelin, Ivor V.	0	2	6

London—continued.	£	s.	d.
Lloyd, Isaac T.	0	5	0
Lockyer, J. E.	0	2	6
Long, Henry	1	1	0
Long, Herbert H.	0	5	0
Long, S. G. H.	0	2	6
Lorimer and Co.	1	1	0
Lowe, William E.	2	2	0
Luxmoore, C. M.	0	10	6
Lyon, James	0	10	6
MacCrindle, Thomas	1	1	0
McDiarmid, F.	0	10	6
Macdonald, Alexander	0	10	6
McDougall, James	0	2	6
MacEwan, Peter	0	10	6
MacGeorge, William	0	10	6
Maitland, P. C.	0	10	6
Maizey, E.	0	10	6
Mallett, T. J.	0	10	6
Manley, W. F.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marsh, W. H.	0	5	0
Marshall, J. D.	0	10	6
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martin, T. C. W.	0	10	6
Martindale, William	1	1	0
Mathews, Henry	1	1	0
Mathews, J. H.	1	1	0
Matterson, J. K.	1	1	0
Matthews, C. W.	1	1	6
Matthews, E. S.	0	10	0
Matthias, J. J.	1	1	0
Maw, Charles	1	1	0
Maw, C. Trentham	1	1	0
Maw, Son and Thompson	2	2	6
Maxwell, P. H.	0	10	0
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Michie, Charles C.	0	5	0
Miles, C. J.	0	10	6
Miller, Cecil B.	0	5	0
Miller, W. P. F.	0	5	0
Millhouse, H. H.	0	5	0
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Morrell, Thomas	0	5	0
Morris, C. G.	0	10	6
Morris, T. J.	0	2	6
Morrison, J. W. T.	0	10	6
Moss, John and Co.	1	1	0
Moss, Thomas A.	0	2	6
Mundy, Alfred O.	0	10	6
Mutch, John Pratt	0	5	0
Myers, William	0	10	6
Naylor, W. A. H.	0	10	6
Neale, J.	0	5	0
Neame, A. J.	0	5	0
Nettle, W. R. P.	0	5	0
Newton, T. A. C.	1	1	0
Newzam, Henry Samuel	0	10	6
Nicholls, Reginald E.	0	10	6
Nicholson, Thomas T.	0	5	0
Nind, George	0	10	6
Ninnis, T. M.	0	5	0
Ord, Septimus W.	0	5	0
Page, R. S.	0	5	0
Palmer, Francis	0	10	6
Palmer, F. T.	0	5	0
Parker, F. P.	0	10	6
Parker, Robert Henry	1	1	0
Parker, W. H.	0	5	0
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Pasco, G. S.	0	2	6
Pasmore, W. F.	0	10	0
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Pattison, S.	0	5	0
Peacock, George	0	5	0
Peat, Joseph	0	5	0
Peel, Alfred	0	10	6
Pellew, A.	0	10	6
Penrose, A. W.	1	1	0
Peters, D.	0	5	0
Pettinger, Elmer	0	5	0
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	5	0
Philpott, F. W.	0	5	0
Pickard, William	2	2	0
Pinchen, W. J.	0	10	6
Pinyon, William	0	10	6

London—continued.	£	s.	d.
Plaister, W. J.	1	1	0
Poll, G. J.	0	5	0
Pond, B. C.	0	5	0
Pond, G. P.	0	10	6
Ponting, F. H.	0	5	0
Portway, A. C.	0	5	0
Portway, J. B.	0	10	6
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	0	10	6
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, J. T.	0	2	6
Price, Robert John	0	2	6
Prichard, Edward	1	1	0
Prime, Thomas R.	0	10	6
Procter, R.	0	5	0
Puckey, W.	0	5	0
Radermacher, C. J.	0	10	6
Ragg, William	1	1	0
Ragg, W. W.	0	10	0
Ramsey, W.	0	10	6
Reed, Charles W.	0	10	6
Rees, Harding	1	1	0
Rees-Williams, J. J.	0	5	0
Reynolds, R. J.	1	1	0
Richardson, John	0	5	0
Ridley, C. H.	0	5	0
Rigden, George	0	2	6
Roach, H. W.	1	1	0
Roach, Pope	1	1	0
Robertson, George	0	10	6
Robeson, C. B.	0	5	0
Robinson, J.	0	5	0
Robinson, R. A.	0	10	6
Robinson, H. G.	0	2	6
Robinson, William P.	0	10	6
Rose, Alfred	1	1	0
Rouse, F. W.	0	10	6
Rowland, E. E.	0	10	6
Rowntree, Thomas	0	10	6
Rundle, C.	0	5	0
Rutter, John	0	10	0
Sadler, William	0	10	6
Sadler, William, jun.	0	10	6
Sainsbury, S.	1	1	0
Salter, W. A.	0	5	0
Sanders, Francis T.	0	5	0
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sanford, H. R.	0	2	6
Sanger and Sons	2	2	0
Sangster, Arthur	1	1	0
Saul, J. E.	1	1	0
Saunders, C.	0	10	6
Savory and Moore	3	3	0
Sayers, W. C.	0	10	6
Scoley, Thomas E.	0	10	6
Seccombe, C. W.	0	2	6
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Sewell, T. A. W.	0	5	0
Shacklock, J. H.	0	10	6
Shapcott, W. H. P.	0	5	0
Sharman, Wm.	0	10	6
Shaw, E. H.	0	2	6
Shaw, J. W.	0	10	6
Shephard, Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherburn, Thomas	0	10	6
Sherwood, N.	0	10	6
Shields, R. H.	0	5	0
Shirley, S. S.	1	1	0
Sibthorp, S. J. K.	0	2	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Skinner, G. J.	0	5	0
Slack, Josiah W.	0	10	6
Slator, Henry	0	5	0
Smart, W.	0	10	6
Smith, Fuller	0	10	6
Smith, Harry J.	0	5	0
Smith, James W.	0	7	6
Smith, John Ord	1	1	0
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Snell, Charles H.	0	10	6
Snell, Mrs. F. E. E. H.	0	2	6
Snell, Miss Marie de Vere	0	2	6
Snow, G. F.	0	2	6
Spurling, W.	0	10	6
Spyer, Newton	0	10	6
Squire and Sons	3	3	0
Stacy, Frederick	0	5	0

London—continued.	£	s.	d.
Stacey, Samuel Lloyd	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stickland, W. H.	1	1	0
Stoneham, Philip	0	10	6
Stratton, William	0	2	6
Streater, James H.	0	10	6
Strongitharm, W. G.	0	5	0
Strother, C. J.	0	10	6
Styles, J. W.	0	10	6
Sugden, W. A.	0	5	0
Summers, James R.	0	10	6
Swift, Francis	0	5	0
Symons, William H.	1	1	0
Tanner, A. E.	1	1	0
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, Edward	0	2	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, Jno. J.	0	2	6
Taylor, John	0	10	6
Taylor, Peter	0	5	0
Taylor, W. (Woolwich)	0	2	6
Tebbutt, Edwin	1	1	0
Tench, S. E.	0	5	0
Thatcher, R.	0	2	6
Thomas, Harry A.	1	1	0
Thomas, R.	0	10	0
Thompson, Arthur S.	0	5	0
Thompson, Henry	0	10	6
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thompson, R. W.	0	5	0
Thorn, John James	1	1	0
Thrower, E. A.	0	2	6
Tijou, Tom	0	2	6
Tingle, Miss Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Tompsett, Leighton S.	0	5	0
Toon, Lionel E.	0	5	0
Trask, Thomas	1	1	0
Trick, William B.	0	10	6
Troke, Charles	1	1	0
Trotman, Alfred C.	0	10	6
Truman, F. W.	1	1	0
Truman, H. V.	0	10	6
Tudor, W.	0	2	6
Tugwell, Ernest H.	0	10	6
Tugwell, William H.	0	10	6
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Turner, Thomas	0	5	0
Tustin, Chas. D.	13	2	6
Tyrer, Peter	0	10	6
Van, Frederick W. S.	0	5	0
Vaughan, J.	0	2	6
Vialls, J. B.	1	1	0
Vincent, P.	1	1	0
Walker, Byatt A.	0	5	0
Walker, Charles	0	5	0
Walker, C. J.	0	5	0
Wallbridge, H. A.	0	5	0
Wallis, G.	0	5	0
Wallis, John T. W.	0	10	6
Wallis, Owen	0	10	6
Want, W. P.	0	5	0
Warrell, H. B.	0	2	6
Warren, F. W.	0	10	6
Warren, William	0	10	6
Warrick Brothers	1	1	0
Wastie, Francis	1	1	0
Watson, William	0	10	6
Watts, Edward	0	5	0
Watts, W. M. (donation)	5	5	0
Wavell, Edward	1	1	0
Wegg, W. N.	0	5	0
Wells, Thomas	0	5	0
West, Charles	0	10	6
Weston, Samuel John	1	1	0
Westrup, Joseph B.	0	10	6
Whiffen, Thomas	5	5	0
Whigham, Robert L.	0	5	0
White, Charles	1	1	0
White, Charles E.	0	5	0
Widgery, John	0	5	0
Wiggins, Henry	0	10	6
Wigginton, Alfred	0	10	6
Wilkinson, Benjamin John	0	10	6
Wilkinson, William	0	10	6
Will, William W.	0	5	0
Willats, Richard	0	5	0
Williams, Alfred	0	5	0
Williams, Henry	2	2	0

London—continued.

	£	s.	d.
Williams, Hugh	0	5	0
Williams, J.	0	5	0
Williams, J. W.	1	1	0
Williams, T. H.	0	10	6
Williams, T. R.	0	2	6
Williams, Stephen	0	5	0
Willows, Francis and Butler	3	3	0
Wilson, James	1	1	0
Wilson, Thomas W.	0	10	6
Wing, A. J.	0	5	0
Wink, J. A.	1	1	0
Wisken, Robert	0	10	6
Wodderspoon and Co.	1	1	0
Wood, C. H.	0	10	6
Wood, Jacob	1	1	0
Woodland, John	1	1	0
Woollings, Frank	0	2	6
Wooster, J. R.	1	1	0
Wootton, Alfred C.	2	2	0
Worsley, A. G.	0	5	0
Wretts, J. R.	1	1	0
Wright, Alfred	0	10	6
Wright, Layman and Umney	2	2	0
Wyatt, Francis J.	0	10	6
Wybrant, A.	0	5	0
Wylde, George	0	10	6
Yates, Robert	1	1	0
Yates, Samuel P.	0	5	0
Yeatman, F. J.	0	2	6
Young, George	0	5	0

Long Bennington.

Bemrose, John	0	10	6

Long Eaton.

White, J. T.	0	5	0

Longton.

Hemming, G. T.	0	5	0
Prince, Arthur G.	0	10	0

Looe (Cornwall).

Poad, John	0	2	6

Lossiemouth.

Bremner, James	0	5	0

Lostwithiel.

Cuthbertson, T.	0	5	0

Loughborough.

Baldwin, G. J.	0	2	6
Jones, C.	0	2	6
Scrase, Richard	0	5	0

Loughton.

Harrison, J.	0	5	0

Louth.

Moody, S. W.	0	5	0
Street, W. C.	0	2	6

Lowestoft.

Chaston, Anna Maria	0	10	6
Moverley, Robert	0	10	6

Ludlow.

Marston, Alfred	0	5	0
Nickson, James	0	5	0
Smith, F. W.	0	5	0
Woodhouse, George	0	5	0

Luton.

Chantler, R. P.	0	5	0
Duberly, G. S.	0	5	0
Hall, E.	0	5	0
Webb, John H.	0	5	0

Lutterworth.

Brown, Thomas	0	10	6

Lyme Regis.

Henley, George	0	5	0

Lymington.

Allen, Adam U.	0	5	0
Badcock, Henry	0	5	0

Lymm.

Henshall, James	0	5	0

Lytham.

Hartley, John	0	7	6

Macclesfield.

Charge, A. W.	0	5	0
Cooper, Thomas	0	5	0
Leach, I.	0	2	6
Wood, Richard	0	10	0
Wright, J.	0	10	6

Macduff.

	£	s.	d.
McMurtrie, John	0	5	0

Machynlleth.

Rees, E.	0	5	0

Maidenhead.

Barry, Thomas S.	0	10	6
Cottingham, Joseph J.	0	5	0
Upson, A.	0	5	0
Walton, Ralph	0	10	6

Maidstone.

Anning, A.	0	5	0
Chesterfield, T. M.	0	5	0
Corfe, Alfred	0	5	0
Rogers, William	0	5	0
Simpson, John W. G.	0	10	6
Stonham, Thomas G.	0	10	6

Maldon (Essex).

Crick, George E.	0	10	6
Elsey, Charles	0	5	0
Wallworth, David	0	10	6

Malton (Yorks).

Buckle, James	0	5	0
Harrison, William	0	10	6
Laverack, W. H.	0	5	0

Malvern.

Coldwell, David B.	0	10	6
Fox, T.	0	5	0
Need, J.	0	10	6
Price, W. W.	0	2	6

Malvern Wells.

Clark, Edward J.	0	5	0
Fowler, G.	0	5	0
Wakefield, Cecil H.	1	1	0

Manchester.

Balmforth, A.	1	1	0
Barnett, G.	0	2	6
Bates, Frederic W.	0	5	0
Beard, J.	1	1	0
Bell, James	0	5	0
Bell, Joseph	0	5	0
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Billington, John	0	2	6
Blain, Alfred L.	0	5	0
Blyton, John	0	10	6
Boor, Frederick	0	10	6
Booth, William G.	0	10	6
Bransby, C. K.	0	2	6
Breadner, C. G.	0	2	6
Brooks, Joseph	1	1	0
Broughton, Thomas	0	2	6
Brown, William Scott	1	1	0
Bullock, A. H. (Salford)	0	2	6
Bullock, H. (Salford)	0	2	6
Bushby, Thomas	0	5	0
Carruthers, Annie	0	2	6
Carter, William	0	10	6
Coulding, J. J.	0	2	6
Cowpe, M.	0	2	6
Dale, John	0	5	0
Darling, William	1	1	0
Dawson, Robert	0	5	0
Denton, J. (Salford)	0	5	0
Edwards, G.	0	5	0
Evans, T.	0	5	0
Fairbrother, D.	0	5	0
Fawcitt, T. C.	0	5	0
Gardner, E. (Salford)	0	2	6
Gavin, J.	0	5	0
Gavin, Thomas	0	10	6
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Robert	1	1	0
Glanville, R.	0	5	0
Gourlay, H. H.	0	2	6
Gourlay, R. G.	0	2	6
Hall, Henry Stacey	0	5	0
Harding, E.	0	5	0
Harrop, J. H.	0	5	0
Hart, James	1	1	0
Hedley, J.	0	2	6
Hilditch, Mrs. M. A.	0	5	0
Holt, H. C.	0	2	6
Holt, John	0	10	0
Hughes, Evan G.	0	10	0
Hughes, T. W.	0	2	6
Inglis, H.	0	5	0
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Jeans, Alfred	0	5	0

Manchester—continued.

	£	s.	d.
Johnson, W. H. (Salford)	0	10	
Johnstone, F. S.	0	5	
Jones, John (Salford)	0	5	
Jones, John J.	0	2	
Jones, Joseph	0	2	
Kemp, Harry	0	5	
Knight, R.	0	5	
Lane, William	0	5	
Leech, Robert	0	5	
McCormick, F. H.	0	5	
Marsden, Thomas B. (Withington)	0	10	
Marsden, W.	0	5	
Massey, J.	0	2	
Middleton, C.	0	2	
Milligan, G.	0	5	
Morris, J. L.	0	5	
Mundey, H.	0	5	
Nuttall, R. H.	1	1	0
Ogden, A.	0	2	6
Paine, Standen	1	1	0
Pharmacy Students' Association	0	10	6
Pickup, Robert L.	0	10	6
Pidd, Arthur J.	0	10	6
Pigot, Samuel	0	2	6
Pratt, G. W.	0	5	0
Reddish, A. F. (Salford)	0	2	6
Ritchie, T.	0	2	6
Ritson, J.	0	2	6
Roberts, W. R.	0	5	0
Royle, John	0	5	0
Sanderson, G. C.	0	5	0
Scaife, Samuel	0	10	6
Smith, E.	0	5	0
Stafford, A. J.	0	2	0
Standring and Co.	1	1	0
Stanford, F. W.	0	5	0
Stark, A. C.	0	5	0
Starling, H. W.	0	2	6
Sugden, Samuel	0	10	6
Sumner, John	0	2	6
Sutcliffe, C. H.	0	5	0
Swinn, Charles	1	1	0
Taylor, J. J.	0	5	0
Teasdale, C.	0	10	6
Terry, Thomas (Withington)	0	5	0
Tucker, C. H.	0	5	0
Turner, W. S.	0	10	6
Twemlow, Richard	0	10	6
Vallance, A. C.	0	5	0
Walton, D.	0	2	6
Waugh, J. (Salford)	0	5	0
Wealthall, Alfred	0	10	0
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whitaker, T.	0	5	0
Whittaker, Ellis (Salford)	0	10	6
Whitfield, C. (Salford)	0	5	0
Wild, John	0	5	0
Wilkinson, George	0	5	0
Wilkinson, William	0	10	6
Wilks, M.	0	2	6
Williams, J. B.	0	15	6
Wood, G. E.	0	10	6
Woolley, Sons and Co.	5	5	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0

Mansfield.

Adams, Benjamin	1	1	0

March.

Vawser, Jesse	0	5	0

Margate.

Baily, John	0	10	6
Candler, Joseph T.	0	10	6
Harvey, William S.	0	10	6
Pettman, R.	0	10	6
Stimpson, George	1	1	0

Market Drayton.

Cooke, William	0	5	0
King, William George	1	1	0

Market Harborough.

Adams, H. G.	0	5	0
Bragg, W. B.	0	5	0
Deacon, Fanny E. (Fleckney)	0	5	0
Maynard, H. R.	0	10	6

Marton (New Zeal

Wilton, M. H.	1	1	0

Maryport.

Cockton, John	0	5	0

Masham (Yorks).

Barker, Mathew M.	1		

Saffron Walden.	£	s.	d.
Hutchin, W. F.	0	5	0
Machon, H.	0	15	6
St. Albans.			
Allenby, Henry	0	2	6
Ekins, Arthur E.	0	10	6
St. Andrews.			
Bruce, A. K.	0	10	6
Govan, Alexander	0	10	6
Kirk, John J.	0	2	6
St. Austell.			
Bice, James	0	5	0
St. Clears.			
Johns, John	0	2	6
Williams, Evan	0	10	6
St. Davids.			
David, Albert	0	2	6
St. Day.			
Corfield, Charles	0	10	6
St. Helens.			
Harrison, James	0	10	0
Sherlock, Thomas	0	5	0
St. Just.			
Wearing, John	0	2	6
St. Leonards. See Hastings.			
St. Neots.			
Wise, James	0	5	0
Sale.			
Smith, Allen	0	5	0
Salisbury.			
Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Brimson, G. F.	0	5	0
Hardy, R. E.	0	10	0
Horne, J.	0	5	0
Kerly, W.	0	2	6
King, L. I.	0	5	0
Newton, J. W.	0	10	6
Orchard, E. J.	0	10	6
Rowe, J.	0	5	0
Saltburn-by-the-Sea.			
Taylor, William	0	10	6
Sandbach.			
Gee, G. H.	0	2	6
San Remo (Italy).			
Ross, C.	0	5	0
Squire, Frank R.	1	1	0
Sandgate.			
Bowen, F. T.	0	5	0
Jenner, William M.	0	5	0
Kennett, E.	0	2	6
Sandown (Isle of Wight).			
Brown, G.	0	5	0
Cocksedge, H. B.	1	1	0
Sandwich.			
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	0
Woodruff, A. E. (Eastry)	0	5	0
Scarborough.			
Chapman, Henry	0	10	6
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Jones, Alfred	0	5	0
Roberts, R.	0	2	6
Simms, R. J.	0	2	6
Smith, John F.	0	5	0
Whitfield, G.	0	5	0
Whitfield, John	1	1	0
Seacombe.			
Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0
Seaham Harbour.			
Storey, W.	0	5	0
Seaton.			
Skinner, A. J. P.	0	5	0
Selkirk.			
Dunn, Thomas	0	5	0
Settle.			
Shepherd, J. W.	0	10	6

Sevenoaks.	£	s.	d.
Pain, E.	0	10	0
Shanklin (Isle of Wight).			
Brown, Andrew Henry	0	10	0
Deeks, W. T.	0	2	6
Sheepshed.			
Moore, Thomas	0	5	0
Sheerness.			
Hills, William	0	5	0
Prosser, David	1	1	0
Rayner, William	0	5	0
Sheffield.			
Basker, J. P.	0	2	6
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Carr, P.	0	2	6
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Eardley, J. F.	0	5	0
Ellinor, George	0	10	6
Eyre, S.	0	5	0
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Greaves, R. B.	0	5	0
Grierson, G. A.	0	5	0
Harrison, Thomas M.	0	5	0
Hewitt, J. P.	0	5	0
Ibbitt, H. E.	0	2	6
Jepson, Xeno	0	2	6
Lowe, S. P.	0	5	0
Marshall, J.	0	5	0
Miller, John T.	0	5	0
Miner, M. T.	0	5	0
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Owen, W.	0	5	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Salisbury, John M.	0	10	6
Stevenson, W.	0	5	0
Turner, J.	0	5	0
Turner, J. W. I.	0	2	6
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, R.	2	2	0
Watts, J.	0	5	0
Wiles, Edwin	0	5	0
Shepton Mallet.			
Fudge, Charles William	0	5	0
Shields, North.			
Burn, Thomas	0	2	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Shields, South.			
Forrest, Robert	0	10	6
Noble, John	0	5	0
Walker, James	0	2	6
Shildon.			
Veitch, T. D.	0	10	6
Shipdham.			
Skoulding, G.	0	2	6
Shrewsbury.			
Adams, William	1	1	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	3	3	0
Gouldbourn, William	0	10	6
Pattison, H.	0	5	0
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Benjamin	1	1	0
Salter, Joseph B.	1	1	0
Sidmouth.			
Chessall, Rowland	0	5	0
Silverdale.			
Wilson, Edward	0	5	0
Sittingbourne.			
Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0
Rook, E.	0	5	0
Stedman, W.	0	2	6
Sleaford.			
Harrison, T. E.	0	5	0
Spyvee, W.	0	5	0

Slough.	£	s.	d.
Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6
Smallthorne.			
Fletcher, Thomas	0	10	6
Snaith.			
Bean, John	0	10	6
Southam.			
Archer, Thomas	0	2	6
Southall (Middlesex).			
Diggens, E. D.	0	5	0
Southampton.			
Alderslade, W.	0	5	0
Bates, William	0	5	0
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	5	0
Hughes, J. H.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Southend.			
Dawson, George R.	0	5	0
South Molton.			
Swingburn, Richard H.	0	10	6
Southport.			
Adams, C. M.	0	5	0
Ashton, William	1	1	0
Ball, Henry	0	5	0
Cave, J. R.	0	2	6
Crook, G.	0	5	0
Elliott, Stephen J.	0	2	6
Gill, Hugh	0	5	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Mainwaring, R.	0	10	6
Merchant and Co.	0	5	0
Platt, W.	0	2	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Whitworth, James	0	10	6
Wilding, G. J.	0	10	6
Winter, William	0	10	6
Young, E. F.	0	2	6
Southsea.			
Childs, James L.	0	10	6
Cruse and Co.	1	1	0
Deacon, F. G.	0	5	0
Ford, H. S.	0	5	0
Sangster, John G.	0	5	0
Trist, R.	0	5	0
South Stockton.			
Ronchetti, T. A.	0	5	0
Southwell.			
Downing, J. H.	0	10	6
Southwold.			
Critten, Robert P.	0	2	6
Spalding.			
Bell, E. W.	0	5	0
Bloodworth, T.	0	2	6
Donington, R.	0	5	0
Holland, J.	0	5	0
Steeper, Samuel	0	5	0
Spennymoor.			
Burdon, Thomas A.	0	5	0
Farthing, G. T.	0	5	0
Spilsby.			
Rainey, J. J.	0	5	0
Stafford.			
Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Spilsbury, James	0	5	0
Viggars, G. D.	0	2	6
Stamford.			
Dickinson, Frederick	0	10	6
March, Frederick	0	5	0
Stanford-le-Hope.			
Cushion, S.	0	5	0
Stevenage.			
Fresson, Lewis Francis	0	10	6

Stockport.	£	s.	d.
Arnfield, J. C.	0	5	0
Johnson, Thomas J.	0	5	0
Kay Brothers	2	2	0
Orton, W. B.	0	5	0
Plant, F. G. L. (Romiley)	0	5	0
Stockton-on-Tees.			
Bainbridge, Robert R.	0	2	6
Stoke Ferry.			
Newsam, W. H.	0	2	6
Stoke-on-Trent.			
Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	10	6
Stone (Staffs).			
Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0
Stonehouse (Devon).			
Davey, H. D.	0	2	6
Netten, Henry J. T.	0	5	0
Stony Stratford.			
Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6
Stourbridge.			
Biggs, F. W.	0	5	0
Burgess, William	0	5	0
Loverock, Henry	0	5	0
Selleck, W. R.	0	5	0
Simpkins, G. S.	0	5	0
Smith, S.	0	5	0
Yeates, A.	0	5	0
Stowmarket.			
Gostling, George J.	1	1	0
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0
Stradbroke.			
Foulsham, Harry B.	0	5	0
Stratford-on-Avon.			
Ashfield, A.	0	5	0
Stratton.			
Pickard, Henry	0	5	0
Strood.			
Picnot, Charles	1	1	0
Stroud.			
Coley, Samuel J.	0	10	6
Pearce, J. A.	0	10	6
Sunbury-on-Thames.			
Price, J.	0	5	0
Sunderland.			
Askew, J. R.	0	2	6
Aslin, John	0	5	0
Aslin, William	0	2	6
Bowman, S.	0	5	0
Fairman, George P.	0	10	6
Harrison, John	0	10	6
Harrison, W. B.	0	5	0
Hodgson, C.	0	5	0
Leadbitter, W. W.	0	2	6
Mitchinson, John	0	5	0
Ranken, Charles	0	5	0
Sayer, J. R.	0	5	0
Scott, W.	0	5	0
Thompson, L.	0	10	6
Todd, M. J.	0	2	6
Walton, T.	0	5	0
Sunninghill (Berks).			
Taylor, T. E.	0	5	0
Surbiton.			
Acfield, William	0	5	0
Lowe, Charles	0	10	6
Sutton (Cheshire).			
Dangerfield, W. H.	0	5	0
Sutton-in-Ashfield.			
Briggs, G. W.	0	5	0
Sutton Coldfield.			
Bate, A. M.	0	2	6
Swaffham.			
Bell, Frederick R.	0	10	0
Christopherson, Fred	0	5	0
Finch, Jacob	0	10	0
Swansea.	£	s.	d.
Bevan, E.	0	5	0
Bonnett, F.	0	5	0
Davies, J. M.	0	5	0
Davies, John (31, High Street)	0	5	0
Davies, John (75, Oxford Street)	0	5	0
Davies, John (Walters Road)	0	10	6
Davies, William	0	5	0
Dixon, F.	1	1	0
Evans, D. L.	0	2	6
Evans, J. W. M.	0	2	6
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Limbrick, J. A.	0	2	6
Lloyd, John W.	0	5	0
Lowther, H. R.	0	5	0
Rees, Daniel	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Trick, M.	0	5	0
Williams, H. E.	0	5	0
Williams, J. T.	0	10	6
Yorath, C.	0	5	0
Swindon.			
Green, John	0	5	0
Taunton.			
Copestake, H. H.	0	5	0
Hambly, Charles J.	0	5	0
Kirkpatrick, Mrs.	0	5	0
Short, G. W.	0	2	6
Tavistock.			
Doble, H. T.	0	5	0
Gill, William	0	2	6
Teignmouth.			
Cocking, Frederick J.	0	5	0
Evans, Joseph J. O.	0	5	0
Maunder, William	0	5	0
Silk, E.	0	2	6
Tenbury.			
Slade, John	0	10	6
Tenby.			
Davies, Moses P.	0	5	0
James, George	0	5	0
Tenterden.			
Willsher, S. H.	0	10	6
Tewkesbury.			
Wilkes, D. T. (Bredon)	0	2	6
Thame.			
Tame, Thomas	0	2	6
Thirsk.			
Ayre, George	0	5	0
Ayre, Henry	0	2	6
Thornhill (N.B.).			
Fingland, James	0	5	0
Thrapston.			
Pars, R. C.	0	10	6
Ticehurst.			
Corke, Edward	0	10	6
Titchfield.			
Smith, W. O.	0	10	6
Tiverton.			
Havill and Son	0	5	0
Rossiter, Thomas E.	0	5	0
Tritton, C. E.	0	5	0
Todmorden.			
Maddock, H.	0	5	0
Topsham.			
Ellis, Frederick	0	2	6
Torquay.			
Adams, J. H.	0	5	0
Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Davies, J.	0	5	0
Guyer, James B.	0	10	6
Knight, Benjamin	0	5	0
Moon, G. W.	0	5	0
Ness, Thomas H.	0	5	0
Newlyn, J.	0	5	0
Noak, W. F.	0	2	6
Shapley, Charles	0	10	6
Sloman, Richard	0	10	6
Taylor, John	0	10	6
Torquay—continued.	£	s.	d
Temple, C. H.	0	2	6
Tomlin, J. P.	0	5	0
Waymouth, T. S.	0	5	0
Totnes.			
Cooke, E. H.	0	2	
Morse, C. H. Stafford	0	5	0
Tredegar.			
Phillips, Charles L.	0	5	0
Tregaron.			
Jones, T.	0	2	6
Truro.			
Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	10	6
James, Hamilton	0	5	0
Percy, Thomas B.	0	10	0
Tunbridge.			
Millidge, Thomas E.	0	10	6
Wardley, S. F.	0	10	6
Tunbridge Wells.			
Arnold, Spencer	0	10	6
Batting, Thomas G.	0	10	6
Cheverton, George	1	1	0
Dunkley and Rogers	1	1	0
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Sells, Robert J.	0	10	6
Thompson, G. A.	0	5	0
Whitrow, Benjamin	1	1	0
Williams, James	0	10	6
Tunstall.			
Keightley, Joseph	0	5	0
Tutbury.			
Green, Isaac	0	5	0
Twickenham.			
Alexander, William	0	5	0
Bishop, Thomas	1	1	0
Davies, O. T.	0	5	0
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6
Tynemouth.			
Atkinson, Joseph	0	5	0
Uckfield.			
Farr, E. H.	0	10	6
Ulverston.			
Willan, Robert	0	10	6
Upton-on-Severn.			
Gibbs, John	0	10	6
Urmston.			
Duncalf, Richard	0	5	0
Uttoxeter.			
Woodward, H.	1	1	0
Woolrich, Charles B.	0	10	6
Ventnor (Isle of Wight).			
Littlefield, J. W.	1	1	0
Nicholls, A. L.	0	2	6
Smith, C. A.	1	1	0
Weston, Charles	1	1	0
Wadebridge.			
Philp, J.	0	5	0
Wakefield.			
Cardwell, James	0	5	0
Chaplin, J. H.	0	5	0
Chaplin, John Lambert	0	10	6
Duffin, Thomas	0	10	6
Green, A.	0	5	0
Job, C. F.	0	10	6
Macaulay, W. H.	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6
Wallingford.			
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6
Wallington.			
Knowles, W. R.	0	5	0
Wood, Edward	0	10	6
Walmer.			
Wood, Henry	0	5	0

	£	s.	d.
Walsall.			
Bayley, C.	0	13	0
Elliott, George	0	10	0
Grove and Son	0	5	0
Morris, J. O.	0	2	6
Thorp, J.	0	2	6
Walsham-le-Willows.			
Harrington, Arthur	0	5	0
Waltham Abbey.			
Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0
Walton-on-Thames.			
Power, William	0	5	0
Wantage.			
Robins, H.	0	2	6
Ware.			
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6
Wareham.			
Harman, E. S.	0	5	0
Marshallsay, R. J.	0	5	0
Randall, Thomas	0	10	6
Warminster.			
Toone, J. V.	0	10	6
Warrington.			
Dunsford, F. W.	0	5	0
Young, John R.	0	10	0
Warwick.			
Mellor, J. G.	0	5	0
Watchet.			
Daymond, Samuel	0	2	6
Watford.			
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6
Wath-upon-Dearne.			
Hick, Allan	0	10	6
Watton.			
Pechey, T. P.	0	5	0
Vincent, Lacey A.	0	10	6
Weaverham.			
Manifold, John J.	0	10	6
Wednesbury.			
Gittoes, Samuel J.	0	10	6
Wellingborough.			
Smith, John T.	0	2	6
Wellington (New Zealand).			
Ridd, A. H.	0	2	6
Wellington (Somerset).			
Gregory, Walter	0	5	0
Windeatt, G. J.	0	5	0
Wells (Norfolk).			
Rump, Robert R.	0	10	6
Wells (Somerset).			
Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0
Welshpool.			
Griffiths, Thomas	0	5	0
Welton.			
Myers, George Henry	0	5	0
Westbury.			
Paine, Charles	0	2	6
Westgate-on-Sea.			
Bessant, Frederick R.	0	10	6

	£	s.	d.
West Malling.			
Stedman, Richard B.	0	5	0
Weston-super-Mare.			
Cooper, John	0	5	0
Duckett, F. W.	0	10	6
Hall, E.	0	5	0
Parkes, Harry C.	0	10	0
Pinch, J. E.	0	5	0
Pumphrey, Arthur	0	5	0
Watson, J. W.	0	5	0
Weybridge.			
Griffin, Thomas	0	10	6
Weymouth.			
Burgess, J.	0	5	0
Cole, W. T.	0	5	0
Gregory. W.	0	5	0
Groves, Thomas B.	0	10	6
Smith, E. M.	0	10	0
Stedman, S. S.	0	5	0
Targett, Charles G.	0	5	0
Whitby.			
Corner, Thomas B.	0	10	6
Frank, John	1	1	0
Stevenson, John	0	10	6
Whitehaven.			
Wilson and Kitchin	1	1	0
Whitley (Yorks).			
Whitehead, G.	0	5	0
Whitstable.			
Arrowsmith, G. W. T.	0	5	0
Whittlesea.			
Callaway, L.	0	10	6
Wick (N.B.).			
Miller, Kenneth	0	5	0
Wigan.			
Ball, Edwin	0	5	0
Dawson, F. R.	0	5	0
Johnson, T.	0	10	6
Kellett, Richard E.	0	5	0
Phillips, Jonathan	0	5	0
Wimbledon.			
Butler, E. D. Barry	0	10	6
Pooley, John D. S.	0	10	6
Spencer, W. G.	0	5	0
Winchester.			
Barratt, F. J.	0	5	0
Knight, George E. Moses	0	5	0
Powell, Edward F.	0	10	6
Winchfield.			
Machin, W. G.	0	5	0
Windsor.			
Collins, Henry G.	0	5	0
Grisbrook, Edward	0	12	0
Harmer, J. D.	0	5	0
Parker, C.	0	2	6
Russell, Charles J. L.	0	10	6
Wood, Robert	0	5	0
Wingate.			
Cross, John T.	0	10	6
Wingham.			
Palmer, Henry B.	0	5	0
Winshill.			
Green, W.	0	2	6
Winslow.			
Parrett, Edward	0	5	0
Wisbeach.			
Hill, Major	0	2	6
Witham.			
Green, Robert P.	0	10	6

	£	s.	d.
Wokingham.			
Pearman, H.	0	2	6
Spencer, Thomas	0	10	6
Wolverhampton.			
Banks, C. H.	0	5	0
Burnett, C. C.	0	5	0
Cannell, William	0	10	6
Gibson, F. J.	0	10	6
Hamp, John	0	5	0
Hill, W. H.	0	2	6
Stanway, Edward Thomas	0	10	6
Weaver, Alfred C.	0	10	6
Woodbridge.			
Betts and Son	0	5	0
Woolston (Hants).			
Pell, John	0	5	0
Worcester.			
Blunt, L.	0	2	6
Briggs, A. E.	0	2	6
Dodge, E.	0	2	6
Ferneley, Charles	0	10	6
George, Henry	0	10	6
Hall, Frederick J.	0	5	0
Hinks, John	0	10	6
Hopkins, E. R.	0	2	6
Horniblow, W. T.	0	5	0
Hunter, J.	0	2	6
Judson, T. B.	0	2	6
Kitson, E. J.	0	10	0
Lunn, T.	0	5	0
Maxey, W. H.	0	10	6
Silk, Thomas	0	5	0
Steward, John A.	0	10	6
Storm, E. B.	0	5	0
Thomas, L. L.	0	2	6
Twinberrow, J.	0	10	6
Turner, C. W.	0	5	0
Virgo, Charles	1	1	0
Workington.			
Birkett, F. J.	0	2	6
Mason, Joseph R.	0	5	0
Worksop.			
Baxter, George	0	5	0
Jones, George W.	0	5	0
Worthing.			
Aston, W.	0	5	0
Berry, H. J.	0	5	0
Burt, James	0	5	0
Cortis, A. B.	0	10	6
Frost, William	0	10	6
Gulliver, W. I.	0	10	6
Wyke.			
Drake, William	0	5	0
Wymondham.			
Skoulding, William	0	5	0
Yarmouth.			
Arthur, John	0	5	0
Clows, John E.	0	10	6
Mornement, H. J.	0	5	0
Poll, W. S.	0	2	6
Pratt, Edward J.	0	10	6
Williams, C. E.	0	2	6
Yaxley.			
Farr, Joseph	0	10	6
Yeadon.			
Blatchley, Thomas	0	10	6
York.			
Batty, Thomas	0	10	6
Clark, J.	1	1	0
Coates, Henry	0	5	0
Lupton, J. A.	0	2	6
Parker, Thomas	0	10	6
Saville, John	1	1	0
Sowray, J.	0	5	0
Wisker, R. H.	0	2	6

ANONYMOUS DONATIONS AND SUBSCRIPTIONS.

	Don.			Subs.		
	£	s.	d.	£	s.	d.
S. J. B.				2	2	0
S. Y. S.				0	2	6
A Friend				0	2	6
Anonymous	5	0	0			

1890

LEGACY.

	£	s.	d.
Sharpe, George Young	52	10	0

The Pharmaceutical Journal,

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SATURDAY, MARCH 7, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE COUNCIL MEETING.

THE Council Meeting last Wednesday was attended by eighteen members, and the additions to the Society on that occasion comprised eight pharmaceutical chemist members, fifty-two associates and sixty-three apprentices or students. The report of the Finance Committee did not present any special features of interest, except the increase of last month's balance on the Benevolent Fund account to fifty pounds, by the receipt of two donations of five guineas each. On the recommendation of the Benevolent Fund Committee a grant was made of fifteen pounds to the widow of a former member and subscriber to the Fund, and one of ten pounds to a chemist and druggist advanced in years and unable to work.

The report of the Library, etc., Committee mentioned the congratulatory address that has been officially presented to the Chemical Society on the occasion of its jubilee, and in reference to the approaching jubilee of the Pharmaceutical Society it was recommended that in addition to the dinner to be held on Wednesday, the 27th of May, there should be a conversazione in the Society's house on the Tuesday evening before the general meeting, any further celebration of the jubilee being left for future consideration. This gave rise to a discussion which brought out the fact that the South Kensington Museum is not available on a Tuesday evening for the purpose of a conversazione, as it is on that day open to the public. In reference to the holding of a conversazione in the Society's house, Mr. HAMPSON mentioned that though he had concurred in the Committee's report, he had since, to some extent, altered his opinion on that point, and had come to the conclusion that any conversazione for social intercourse had better be held elsewhere, as the Society's house is not sufficiently adapted for such a purpose. He suggested that one of the large picture galleries might be secured for a gathering of that kind. In this view he was supported by Messrs. LEIGH, SCHACHT, and HARRISON. They were, however, of opinion that the official portion of the jubilee celebration should certainly take place in the Society's house. It was therefore proposed that the whole question should be referred back to the Committee for further consideration. This was acquiesced in by the PRESIDENT, who pointed out that in any case an afternoon meeting in the Society's house on the Tuesday before the annual meeting would be a suitable opportunity for the official celebration of the jubilee, at which congratulatory addresses or messages from foreign pharmaceutical and other bodies might be formally received and acknowledged, while the further question whether there should be any other function besides that had better be left to the Committee to decide upon. With this alteration the report of the Committee was adopted.

It was decided that the fiftieth annual meeting of the Society should be held on Wednesday, the 27th May next, and the preparation of the annual report was referred to the Library, etc., Committee.

The General Purposes Committee reported the progress that had been made with cases that have been placed in the hands of the Solicitor. In one instance judgment has been obtained for two penalties and costs on the higher scale. Several other cases are still pending. One case of alleged infringement of the Pharmacy Act that has been under consideration is deferred for the purpose of making further inquiries. It was recommended that a special jubilee number ot the Journal should be issued and circulated to all persons on the Register of Chemists and Druggists. The Committee also recommended that the proposed alterations of the Society's Bye-laws, which have been under consideration, should be adopted by the Council, and as a result of the consideration of the report of the Research Laboratory Committee it was recommended that in future the direction of the Research Laboratory should be part of the regular duties of the Professor of Chemistry, the general control being vested as hitherto in a committee to be appointed annually by the Council. A discussion of this general recommendation and of its details then took place on the motion of the PRESIDENT, who pointed out that the initial experimental period of three years has now been completed and the result of it given in the report published last month (see page 693). Whether or not the researches that have been carried out altogether commend themselves to all their brethren, it must, he said, be remembered that the original object was to carry on such research as could only be undertaken by a corporate body, and not such as could be carried on by individuals. It was also held to be important that in the prosecution of this work the Society should be associated with other scientific and medical bodies, since every subject connected with pharmacology is necessarily also connected with therapeutics and physiology. Therefore the Committee considers that the Laboratory would thus be doing better work for the body at large in that direction, than if dealing with subjects more closely relating to pure pharmacy, many of which could well be investigated by individuals without the accessories of the Research Laboratory. The feeling of the Committee is in favour of giving more money support to this work, and the addition of fifty pounds to the sum expended during the last three years was recommended in the belief that more work could be done on purely pharmacological lines with the assistance to be received from other bodies. If that were the case not only would good work be done for the Society, but a position would be attained in regard to other matters, such as future pharmacopœias, etc. No doubt money could be obtained for the purpose from individuals, but in the opinion of the PRESIDENT the Society should, as a corporate body, have the credit, advantage and honour attaching to such investigations. On behalf of the Research Committee he suggested that the Laboratory is a means of education and of advancement for the whole Society, which should not be lost sight of. These views were thoroughly endorsed by Messrs. ATKINS, HAMPSON, SOUTHALL, SCHACHT, GOSTLING, and RICHARDSON, and the general opinion was expressed that not only has the establishment of the Research Laboratory, as well as the work done in it, been appropriate and creditable to the Society during the tentative period, but that the continuance of this work as an integral part of the Society's operations would tend to raise the Society and the body it represents in the estimation of the scientific and medical world with beneficial results. The VICE-PRESIDENT, as a member of the Research Committee, expressed his thanks for the very gratifying recognition of the services rendered by the members of the Committee. It was then resolved that the Report of the Research Committee, and the recommendations of the General Purposes Committee relating to it should be adopted.

On the subject of the Bye-laws the PRESIDENT referred to the circumstance that though the alteration of them was recommended several years ago the matter has been in abeyance because it appeared the Society has not power under the existing Act to deal with the examination as was proposed. It is, however, considered desirable that some important points relating to the constitution of the Society should be adopted, even if the passing of the Pharmacy Act Amendment should not be effected. The most important alterations relate to the entrance fee for chemist and druggist members and the fee for restoration to membership of the Society. They are intended to remove the objections that are urged by those who are not members of the Society. Many seem to regard the payment of the present restoration fee as a sort of stigma. In order to avoid the necessity for re-election some restoration fee is indispensable, but it is proposed to remove the objection now existing by reducing it to the nominal amount of one shilling. The entrance fee of two guineas now required from chemists and druggists who were in business before the passing of the Act of 1868, on joining the Society, it is proposed to abolish. Another alteration relates to the establishment of a class of corresponding members in addition to the present honorary members, the number of which is limited to fifty. This alteration would admit of many men engaged in various parts of the world upon botanical, chemical, or pharmacognostic work being associated with the Society advantageously, while the status of honorary members would still be maintained. The composition fee for life membership has been reduced to ten guineas as the simplest means of avoiding the difficulties that have prevented the adoption of other proposals. In connection with the examination it is proposed to add as an additional subject, in accordance with the recommendation of the Privy Council, the law affecting the sale of poisons, and a slight alteration is made in the Major examination. It is proposed to raise the fee for the Minor examination to five guineas, with a corresponding alteration of the fee to be paid for examination after failure, these changes being intended to provide for the increased expense of conducting the examination attendant upon the probable necessity of altering the mode of procedure to meet the views of the Government authorities. It is considered that a man who passes should pay not only the expenses of the examination, but also something towards the cost of registration, as in the case of medical men. It was unanimously resolved that these Bye-laws should be adopted and read a first time. After considering the legal portion of the report in Committee it was adopted unanimously.

CHEMISTS' ASSISTANTS' ASSOCIATION.

THE thirteenth annual dinner of the Chemists' Assistants' Association was held in the Holborn Restaurant on the 5th inst., Mr. T. TYRER occupying the chair. The gathering numbered about two hundred, and among the guests were Mr. JONATHAN HUTCHINSON, late President of the Royal College of Surgeons, the PRESIDENT and VICE-PRESIDENT of the Pharmaceutical Society, and many other well known members of the pharmaceutical profession. After the customary loyal toast, proposed by the Chairman, had been responded to with enthusiasm, "The Medical Profession" was given by Mr. FRANK A. ROGERS, who dwelt upon the advances lately made in the treatment of tuberculosis and cancer. In reply, Mr. HUTCHINSON, whose name had been coupled with the toast, referred to the Association as one that had by its contributions to the scientific aspect of pharmacy aided in the great revival of belief amongst the medical profession in the efficacy of drugs and in the competency of pharmacists. He trusted that this feeling of confidence would increase, as it would be greatly to the benefit of the public at large if the medical profession had only to attend to the prescribing and not to the dispensing of medicines. He reminded the members of the Association that they were in an excellent position to combine scientific pursuits with their daily business routine. The next toast, proposed by the Chairman, was in honour of the Chemists' Assistants' Association, which he considered to be doing excellent work, and was acknowledged by the President, Mr. Campbell Stark, in suitable terms. The Pharmaceutical Society was proposed by Mr. Lloyd Williams, who contributed a glowing eulogy of Mr. Michael Carteighe. In responding to the toast the President of the Pharmaceutical Society referred to the disinterested labours of his predecessors and their colleagues, who had concentrated their energies in raising a crude trade to the status of a profession. The speeches, which had been interspersed with music, were brought to an end by the toast of the Chairman and Visitors.

An Evening Meeting of the Pharmaceutical Society will be held at 17, Bloomsbury Square, on Wednesday next, March 11, when a paper will be read on "The Nomenclature of Certain Drugs," by Mr. E. M. Holmes, and a "Note on *Phlox carolina*," by Mr. Henry G. Greenish. The chair will be taken at 8 o'clock, but the Theatre will be open an hour previously to give an opportunity for the inspection of articles exhibited.

* * *

On Wednesday morning next, at half-past eleven, a meeting will be held at 17, Bloomsbury Square, for the purpose of making preliminary arrangements for the jubilee dinner of the members of the Pharmaceutical Society and their friends, to be held in May next.

* * *

The use of the telegraph for the communication of important scientific matters involves a brevity of statement that cannot always be conducive to precision or accuracy, and this fact is well illustrated by the newspaper reports of Dr. Liebreich's cure for tuberculosis. As a consequence of the very vague statements which have been published serious inconvenience may be caused, and pharmacists who are required to prepare the remedy recommended by Dr. Liebreich may find themselves in difficulty. The account given last week in the *Lancet* of the preparation of this remedy omits, for instance, to say that the solution of 0·2 gram of cantharidin and 0·4 gram of potassic hydrate in 20 cubic centimetres of water is to be diluted with more water to the volume of one litre in order to reduce the solution to such a strength that one cubic centimetre will contain two decimilligrams (·0002 gram) of cantharidin. Even the statement that the dose to be injected is 1-50th of a decimilligram of the solution does not mend the matter, if other accounts are to be relied upon, and is, in fact, an evident absurdity. The *British Medical Journal*, again, states that the remedy is to be injected in doses of 1 to 2 decimilligrams of cantharidinate of potash, but the statement that one cubic centimetre of the solution is equal to two decimilligrams of the remedy implies that it is cantharidin that is referred to. It is therefore doubtful whether the intended dose is to be a given quantity of cantharidin or of cantharidinate of potash, or of a solution containing one-hundredth part of cantharidin. If it be one-fiftieth of a decimilligram of the solution, as described by the *Lancet*, the dose of cantharidin would be infinitesimal, or only 0·00000002 of a gram. Evidently these telegraphic communications cannot be relied upon.

* * *

The Shop Hours Bill, introduced into the House of Commons by Mr. Provand, would re-enact the present Shop Hours' Regulation Act, which otherwise expires at the end of this year, with the addition that women would be included within its scope, and inspectors would have to be appointed to carry out its provisions. It provides that no woman or "young person" shall be employed in or about a shop for a longer period than seventy-four hours, including meal times, in any one week. It would also make it illegal to employ a woman or "young person" who has already been employed in a factory or workshop for the number of hours allowed by the Factory and Workshop Act, 1878, or for a longer period than would complete that number of hours. The word "shop" is defined as meaning retail and wholesale shops, markets, stalls, and warehouses, in which assistants are employed for hire, and includes public houses and refreshment houses. "Young person" means a person under the age of eighteen years.

* * *

The new Code issued by the Education Department contains a footnote, appended to Schedule 1, to the effect that scholars in Standards 5, 6, and 7 in elementary schools "should know the principles of the metric system and be able to explain the advantages to be gained from uniformity in the method of forming multiples and sub-multiples of the unit." As a preparation for this it is suggested that it will be useful to give in Standard 4 elementary lessons on the notation of decimal fractions.

* * *

At the Council meeting on Wednesday reference was made by the President to the painfully sudden death of Mr. Henry Groves, pharmaceutical chemist, of Florence. At present no information beyond the bare announcement has been received, but we hope shortly to be in possession of the material for an obituary notice.

* * *

We have pleasure in stating that the name of the Mayor of Salford, Mr. Benjamin Robinson, Pharmaceutical Chemist, of Pendleton, has been placed on the Commission of the Peace for the borough of Salford.

* * *

We have been requested to state that Professor Victor Horsley, F.R.S., will give a discourse on "Hydrophobia," at the Royal Institution, on Friday, March 20, in place of Professor W. E. Ayrton, F.R.S., who is unable at present to give his promised lecture on "Electric Meters, Motors, and Money Matters."

* * *

At the Annual Meeting of the Institute of Chemistry, held on Monday afternoon, Professor W. A. Tilden, D.Sc., F.R.S., was elected President in succession to Dr. J. Bell, C.B., F.R.S.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 4, 1891.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martindale, Newsholme, Richardson, Schacht, Southall, Warren and Watt.

The minutes of the last meeting were read and confirmed.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Adams, Arthur Edward.
Clarke, James.
Goss, George.
Robbins, Percy John.
Rosewarne, Richard.
Scott, James Hugill.
Skinner, Gedwin John.
Wilson, William.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Adams, Arthur Edward	Cleobury Mortimer.
Bennet, Andrew Russell	Edinburgh.
Lothian, John	Edinburgh.
Mawer, William Fred	London.
Phillips, Sidney	Horwich.
Rosewarne, Richard	Gwinear.
Scott, James Hugill	Penrith.
Skinner, Gedwin John	Seaton.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Adams, Herbert Richard	Woolwich.
Davies, Daniel Evan	Penrhiwceiber.
Findlay, James	Glasgow.
Jones, Ivor Lloyd	Gowerton.
Nettleship, Thomas William	Bawtry.
Overton, John	Liverpool.
Phillips, Charles Lloyd	Tredegar.
Simpson, Charles Alfred	London.
Smith, Sam	Batley.
Tonking, Wm. Oliver Hosking	Camborne.
Wilkinson, John Henry Varley	Slaithwaite.

ASSOCIATES.

The following, having passed their respective examinations, and tendered or paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Allen, Francis Joseph	Plymouth.
Antcliffe, Herbert	Keighley.
Baxter, Alexander Kidd	Leith.
Blackman, Percy	Southampton.
Blakemore, John Bowen	Oakengates.
Blomfield, Francis Henry	Braintree.
Breese, Richard George	Merthyr Tydfil.
Brown, Sidney Stuckey	South Molton.
Camm, Charles Percy	Wolverley.
Chalmers, Franklin	Devizes.
Cowley, Robert Charles	Douglas.
Davidge, Henry Norris	Langport.
Egginton, John Tertius	Sedgley.
Eliott, Samuel	Liskeard.
Fisher, Ernest Hunter	Blackheath.
Frith, Henry Edward	Colchester.
Gibson, Joseph	Keswick.
Hale, Giles	London.
Hornby, Arthur Smith	Easingwold.
Houfton, Arthur Ellis	Chesterfield.
Ladell, Richard Savory	Norwich.
Manuel, Walter	Grimsby.
Mingay, Adolphus Alfred	Burton-on-Trent.
Minnikin, George Rennison	Keswick.
Morgan, William Ellis	London.
Morris, Edward Ernest	Bristol.
Neville, Egbert	Banbury.
Oldfield, William	Denton.
Overend, George William	Leeds.
Patrick, Herbert Waring	Kettering.
Reay, John	Brampton.
Roper, Henry Arthur	Plymouth.
Scott, William Robert	Harrogate.
Sikes, Alfred Walter	Cork.
Taylor, Henry Hylton	Middlesborough.
Taylor, Horace Dugdale	Stamford.
Tierney, Thomas	Marple.
Wellburn, John Samuel	Scarborough.
Wilson, Charles Henry	Stockton.
Yates, Charles George	Brighton.

Modified.

Corbyn, Joseph Hartwell	London.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Agar, Robert Langbourne	Bridport.
Baugh, John Wm. Mahanoord	Boston.
Beer, William Robert	Canterbury.
Bell, William	Southampton.
Bell, William Arthur	Uttoxeter.
Berrill, Edith Annie	London.
Bowden, William	London.
Brookes, George Henry	Llandudno.
Cooper, Charles	East Hardwick.
Cousins, Alexander	Weston-super-Mare.
Davies, David	Penygraig.
Day, James Alfred	St. Albans.
Doble, Arthur Glendower	Tavistock.
Dyson, John George Peacock	Barnsley.
Emlyn, James Seymour	London.
Evans, Charles Frederick	Birmingham.
Eynon, Chas. Edwd. Jenkins	Leamington.
Fanshawe, Robert Percival	Leicester.
Fillingham, John	Grantham.
Fowke, William Francis	Stafford.
Fowler, Frank	Little Lever.
Frost, John Arthur	Derby.
Geary, Samuel	Leicester.
Gladstone, Arthur	Sowerby Bridge.
Guy, Samuel	Newbury.
Guyer, Richard Glode	Torquay.
Handley, Arthur	Boston.
Harper, Theophilus	Belfast.
Harris, Edwin Thomas Pile	Bristol.
Hart, John Henry	Strangford.
Heath, William	Derby.
Hicks, Joseph	Banbury.
Hughes, John	Birmingham.
Innes, George	Edinburgh.
Johnson, John Richard	Over Darwen.

Kearsley, William Thomas	Stokesley.
Lambert, Ernest Harold	Farsley.
Lean, Wilfred	Ackworth.
Leitch, William Alfred	London.
Lilly, Arthur	London.
Major, Frederick	St. Ives.
Matthews, Robert John	Penzance.
Melhuish, Andrew Ralph	Windsor.
Mills, Arthur	Walsall.
Parkin, Frederic Brooks	Ripon.
Pilling, John William	Halifax.
Poole, Henry Gibson	London.
Powell, Fred. W.	Margate.
Puckrin, Thomas Edward	Whitby.
Read, Thomas	Bristol.
Rose, Alfred, jun.	London.
Scott, Henry	Keswick.
Seaborne, Herbert William	Barnsley.
Seaton, Richard	Stamford.
Shakespear, William, jun.	Birmingham.
Smith, Edward Charles H.	Hull.
Smith, Sidney Frederick	Strood.
Thomas, Hugh Wolseley	Blaenavon.
Tiltman, William	Launceston.
Treadwell, Samuel Ernest D.	West Dulwich.
Wilson, Charles	Louth.
Woodcock, Herbert Henry A.	Margate.
Wyborn, John Gerald	Bromley, Kent.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Joseph Gimson, Richmond House, Newmarket Road, Cambridge.

William Jepson, 43, Eleanor Road, Hackney, London, N.E.

Thomas Brentnall Spensley, 1, Maderia Place, Torquay.

William Marmaduke Walkinton, 23, Wheatley Road, Handsworth, Birmingham.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee was of the usual formal character and recommended several accounts for payment.

The **PRESIDENT** (as Chairman of the Committee) moved the adoption of the report and recommendations. He said there was nothing special to call attention to in the receipts on the general account or the benevolent account, except two donations of five guineas each, bringing that account up to £50.

The report and recommendations were unanimously adopted.

REPORT OF THE BENEVOLENT FUND COMMITTEE.

The report of this Committee included a recommendation of the following grants:—

£15 to the widow (aged 45) of a pharmaceutical chemist, member, and subscriber to the Fund. Her husband died in 1887 and she was not successful in attempting to carry on the business. She is now endeavouring to establish herself in a lodging house. (London).

£10 to a registered chemist and druggist (age 66) who is unable to work, and relies entirely on scanty assistance from relatives. (Birmingham).

Another case had been deferred.

Mr. **HAMPSON** (as Chairman of the Committee at its last sitting) moved the adoption of the report. He observed that two of the applications which came before the Committee were from the widows of men who had been members of the Society and subscribers. One case had been deferred, the real object being that the Secretary might be able to confer with the applicant as to the expenditure of a grant, which would in all probability be recommended next month. It was thought that in this way the money might be more usefully employed, and it was of the first importance, especially in dealing with other people's money, that the greatest economy should be observed, and the best possible use made of the money laid out.

The report and recommendations were unanimously adopted.

REPORT OF THE LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

LIBRARY.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
January	Day . .	584	30	3	22
	Evening .	244	20	5	12

Circulation of books.	Total.	Town.	Country.	Carriage paid.
January . . .	226	117	109	19*s.* 1½*d.*

The undermentioned donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Atlas de botanique. From Mr. JOHN HUMPHREY.

Guignard (L.), Recherches sur la localisation des principes actifs des crucifères, 1890. From the AUTHOR.

Nova Acta Academiæ Cæsareæ Leopoldino-Carolinæ Germanicæ Naturæ Curiosorum, Tomus 54. From the ACADEMIA.

Meyer (A.), Wissenschaftliche Drogenkunde, 1. Teil, 1891. From the AUTHOR.

Burck, Opmerkingen over de onder den Naam van Erythroxylon Coca in Nederlandsch Indie gecultiveerde Gewassen, 1890. From the AUTHOR.

American Pharmaceutical Association, Proceedings, 1890. From the ASSOCIATION.

Illinois Pharmaceutical Association, Proceedings, 1889-90. From the ASSOCIATION.

Victoria, Pharmaceutical Register for 1890. From the PHARMACY BOARD OF VICTORIA.

Manchester Medical Society, Annual Report, with List, 1891. From the SOCIETY.

Martindale and Westcott, Extra Pharmacopœia Supplement, 1891. 2 copies. From Mr. W. MARTINDALE.

Squire (P. W. and A. H.), Supplement to the Companion to the British Pharmacopœia, 1891. From the AUTHORS.

MUSEUM.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
January	Morning	627	40	7	23
	Evening	88	78	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of the beak of a Cuttle-fish, found in Ambergris. From Messrs. WRIGHT, LAYMAN and UMNEY.

Specimen of Twig Bark of *Euonymus atropurpureus*. From Messrs. MORSON and SON.

Specimen of Oil of Eucalyptus from California. From Messrs. HEARON, SQUIRE and FRANCIS.

Specimen of African Peach Root. From Mr. PRATT.

Specimen of true Winters bark and of the fruit of *Myrica cerifera*.

From Messrs. Potter and Clarke.

To the Herbarium—

Specimen of Garoo (*Aquilaria malaccensis*) and Medang (*A. grandiflora*) from Riouw.

From Professor van Eeden.

Chemical Society's Jubilee.

An address to the Chemical Society on the occasion of its jubilee had been agreed to, and the seal of the Society authorized to be affixed thereto.

The Society's Jubilee.

The subject of the celebration of the Society's jubilee had been considered, and it was recommended that in addition to the dinner on Wednesday, May 27, a conversazione be held in the Society's house on Tuesday, May 26. The question of any further celebration was left over for further consideration.

The President having formally moved the adoption of the report and recommendations,

Mr. Schacht asked what sort of conversazione was intended, and was it quite decided to hold it in the Society's house? Had any application been made to South Kensington?

The Secretary said South Kensington was not available on a Tuesday evening, being open to the public on that day.

Mr. Richardson said he thought the Committee was of opinion that the conversazione should be held in the Society's house.

Mr. Atkins said there was also a feeling that former conversaziones at South Kensington had been to a very large extent for the benefit of persons not directly connected with the Society.

Mr. Hampson said though he was a member of the Committee, and concurred in the report which had been read, he had to some extent altered his views with regard to this matter. The official portion of the celebration should undoubtedly take place in the Society's house; but it seemed to him that the social conversazione, or whatever it was, should be held elsewhere. The Society's house was not adapted for such a purpose, and he would suggest that the Committee reconsider the subject. Possibly the use of one of the large picture galleries could be secured, where there were several large rooms *en suite*, which would afford greater opportunities for social intercourse. Bearing in mind the difficulties which were experienced last year—although the new office was then available for use, which it would not now be, as it would be full of business connected with the annual meeting—and that there would probably be a still larger attendance this year, he was sure that some better arrangement could be made.

Mr. Leigh thought the Society's house was most unsuited for a conversazione. It was difficult last year to pass from one room to another, or to get into the room where there was music.

Mr. Schacht was distinctly of opinion that the last conversazione, held in the Society's house, was a mistake, and gave no satisfaction to anyone, as the place was not adapted for it. It was quite proper that any official function should take place there, but a conversazione involved the presence of ladies and the giving of refreshments, and there was no proper accommodation there for supplying refreshments. It occurred to him that something might be done, not in the way of a conversazione, but a reception or something of the kind in the afternoon, to which ladies might come if they liked, of a somewhat more dignified character than was covered by the word conversazione. Whether in addition there should be a conversazione held in some other place was another question, depending mainly on pecuniary considerations. It was proposed to have a dinner, which would involve no expense to the Society, and a reception such as he had alluded to would entail very little expense, and each of those could be done well and satisfactorily; but a conversazione could not be carried out satisfactorily there, and he hoped the question of holding any such gatherings in the Society's house in the future would be reconsidered.

The President did not think the Committee would feel at all hurt at having this subject sent back to it for reconsideration, especially as the report was on the face of it not complete. Several had thought that it would be desirable to have an afternoon meeting on the Tuesday before the annual meeting, which would form such an official celebration as Mr. Schacht had referred to. He knew that some of their foreign confrères were anxious to send congratulatory messages, which might then be formally received and acknowledged, and for such a proceeding the Society's house was the best place. Whether that should be the sole function could be best discussed in committee, and probably it would be better to refer the question back to the Committee giving it authority to act.

Mr. Watt thought it would destroy the special character of the celebration if it were held in any other building. He did not think there was anything disagreeable at the last conversazione, and hoped it would be repeated, and in the Society's house.

Mr. Harrison supported Mr. Hampson's suggestion that the Society's house was built for official not for social purposes, and if part of the celebration took a social character, which he hoped it would, it should be held in some place better adapted for that. So far as the official celebration was concerned, of course no other place could be suitable. If any inconvenience arose last year, it would be much more marked on this occasion, when the number of visitors would probably be much larger.

Mr. Atkins said this question was argued very fully at the Committee meeting, and it was only with great reluctance that he came to the conclusion eventually that the conversazione should be held in the Society's house. It was very desirable now to get the opinion of other members of Council. He did not think the afternoon function, whatever it might be called, would quite take the place of the conversazione. It would be very important in some respects, and would be a good time to receive official congratulations from other bodies, but it would not meet the wishes of a large number of the members, many of whom would be unable to attend in the afternoon. He should like to know how much the conversazione on the last occasion cost, because although objections had been raised to the meetings at South Kensington, on the score of expense, amongst other reasons, he had an impression that the one in Bloomsbury Square was also rather costly.

The Secretary said the expense of last year's conversazione was £273.

Mr. Atkins said he thought that compared unfavourably with the expense at South Kensington. He should be glad if the whole question were referred back to the Committee.

Mr. Gostling expressed the same view. In the present state of the finances it behoved them to be economical.

Mr. Richardson said his idea was that the official reception and the conversazione should be one and the same thing. At any rate there should be a conversazione somewhere this year.

The President said he would withdraw the motion and move that the report be received and adopted, with the exception of the recommendation as to the conversazione, which should be referred back to the Committee with power to take such steps as it might think fit.

This was put and carried unanimously.

THE ANNUAL REPORT.

It was resolved that the preparation of the Annual Report be referred to the Library, Museum, Laboratory, etc., Committee.

THE JUBILEE ANNUAL MEETING.

It was also resolved that the fiftieth annual meeting be held on Wednesday, May 27.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the solicitor stating the progress made with cases which had been placed in his hands. In one case judgmen tfo rtwo penalties and costs on the higher scale had been obtained. Severa lcases are still pending.

One case of alleged infringement of the Act had been considered and deferred for further inquiries.

It was recommended that a special jubilee number of the Journal be issued, and a copy sent to every person on the Register of Chemists and Druggists.

The Committee had considered the proposed alterations in the Bye-laws and recommended their adoption by the Council.

The legal portion of the above report was deferred for consideration in Committee.

The Research Laboratory.

The Committee had considered the report of the Research Laboratory Committee, and recommended that the direction of the Laboratory be in future one of the regular duties of the Professor of Chemistry, the general control being vested as heretofore in a Committee to be appointed annually by the Council. That the Laboratory be provided with gas, water, coals, and stationery, and that £150 per annum be paid to the Committee for the purpose of providing apparatus, materials, and assistance. That the deficit of £17 on the three years' working be paid by the treasurer. That the Research Committee consist of the President, Vice-President, Mr. Greenish, and Mr. Schacht, with the addition of Mr. C. Ekin, Professor Michael Foster, Professor Frankland, and Dr. Lauder Brunton as external members. That the sum of £200 be paid annually to the Professor of Chemistry so long as he is engaged in original research and undertakes the personal direction of the work of advanced students and others in the Research Laboratory. That the Library, etc., Committee be authorized to make the additions to the Research Laboratory recommended in the last report of the Research Committee. That an account of the researches already made be collected and published during the present year. The above recommendations to take effect as from January 1, 1891.

The PRESIDENT moved that the recommendations of the Committee with regard to the Research Laboratory be received and adopted. It was not necessary to say much about it, as practically each member of the Council had discussed the subject in Committee. When the Research Laboratory was instituted and the Committee formed it was admitted to be an experiment for three years; the experiment had been made, and the report read last month gave the result. Possibly, the character of the researches carried out did not commend themselves entirely to all their brethren, some of whom might think they were slightly removed from strict pharmacy; but he would remind any such critics that the object of the original scheme was that primarily the work of the Laboratory should be the carrying on of such research as could only be undertaken by a corporate body, continuous detailed work, not such as could be carried on by individuals. There were many things of immense importance with regard to pharmacy which it was almost impossible for an individual to take up with advantage. It was also held, and he thought that the result justified the opinion, that it was important that the Society should be associated with other scientific and medical bodies. In the prosecution of this work almost every subject connected with pharmacology was more or less associated with therapeutics and physiology, and it seemed to the Committee that the Laboratory was doing better work for the body at large in that direction, than in working on subjects more closely connected with pure pharmacy, many of which could very well be carried out by individuals without the accessories of such a laboratory. In the future it was hoped that some assistance would be received from other bodies, as was pointed out in the Report. The feeling of the Committee was in favour of giving the Research Committee rather more money, if it had been possible, but practically the addition of £50 to the amount expended annually during the last three years was recommended, in the belief that more work could be done on purely pharmacological lines, with the addition of assistance to be received from other bodies. If so, they would not only be doing good work for the Society, but attaining a position in regard to many matters, such as future pharmacopœias, etc., which he need not refer to more particularly. He could not publicly refer to all the details on which the report of the Research Committee was based, some of which he had alluded to in Committee. He believed there would be no difficulty in raising a modest sum annually from individuals, if necessary, to carry on such work as this, but he thought the Society as a corporate body should have whatever credit, advantage and honour attached to such investigations. The Research Committee did not come *in formâ pauperis* to ask for a grant because it could not get the money elsewhere; but on its behalf he suggested that this was a means of education and advancement of the whole Society, which should not be allowed to slip.

Mr. ATKINS thought the results which had been achieved in the Research Laboratory abundantly justified the experiment which was begun three years ago. The work done could not of necessity be that which would deeply impress the ordinary pharmacist, either by its quality or quantity. The quantity must necessarily be limited, because what was desired to be obtained was as far as possible finality, and the work must be extremely exhaustive and prolonged to lead to such a result. The work itself also might not deeply impress some pharmacists as being strictly pharmaceutical, but he quite followed the reasoning of the President with regard to the importance of the work being that which could not be accomplished in an ordinary pharmacy even by the most skilled. Good work had been done, but practically illimitable work remained to be accomplished. On this point there was no difference of opinion in the Council, and the only question which pressed itself upon all was the one of finance, and if there were the means no doubt the Research Committee should be endowed with much larger resources, but it seemed to him the Committee had gone as far in its recommendation as prudence would allow. It was now proposed that the experimental and tentative character of the work should cease, and that it should become an integral part of the Society's operations. This was very important, in order to give that solidarity to it which outside bodies naturally expected before they would substantially co-operate, which was of primary importance to the ultimate success of the work itself. It might be possible at some future time to enlarge the sphere of operations, because just in proportion as money was placed at the disposal of the Committee work might be done, as there were plenty of skilled workers who could be employed. He felt, however, that it was better to give a definite sum to the Committee to work with rather than leave it for applications to be made as the work came in. It would be exceedingly difficult to refuse such grants, and possibly through the Imperial Institute of the future applications might be made to undertake certain work in this unique Laboratory which they would all feel reluctant to decline. It was much better, therefore, at the outset to know the extent of means available. The gentlemen who had acted upon this Committee, in addition to the large amount of other work which they did in connection with the Society, were entitled to the warmest thanks of the members for their services.

Mr. HAMPSON said he had felt considerable anxiety in the past with regard to the Research Laboratory, especially the expense which it entailed in building operations; but that expenditure would now come to an end, and he felt sure that the Laboratory was an institution which, in the future, would be of very great importance, and which it would be impossible to give up. When one remembered the number of new chemicals and drugs which were constantly coming forward from all parts of the world it was absolutely essential to have a place where inquiry could be made with regard to them. He also hoped the time would arrive when the responsibility of the Pharmacopœia would be placed in the hands of the Society conjointly with the Medical Council, and work done in the Research Laboratory would, he thought, conduce to that end. He quite agreed with the increase in expenditure suggested, although he should have been glad if it had not been necessary, as the financial position was not very flourishing, though he believed it would improve.

Mr. HILLS cordially agreed with the Committee in its recommendations, and would re-echo what was said by Mr. Atkins as to the debt of gratitude which the Society owed to those practical pharmacists who had undertaken the work on the Committee, and also to those from the outside who had worked with them. It was hardly necessary to say much on the general question, but he took it the criticisms from outside would take one of two directions, either as to the character of work done or as to the question of expense. Now with regard to the work done during the last three years he, for one, thought it had been generally satisfactory, and much of it bore that stamp of finality which they all desired. They had to steer between two extremes. On the one hand there was abstract science, which he had heard very much glorified last week at the jubilee meeting of the Chemical Society by two great philosophers, the Premier and Sir William Groves, both of whom were pleading for the study of abstract science. That was all very well for the Chemical Society, but it was not the kind of work which could be undertaken there, for pharmacy was essentially practical and depended on the technical application of many sciences. On the other hand, there was another extreme which must be avoided, that of what might be termed elegant pharmacy, which he believed most of them would consider was best carried on by enterprising manufacturers or cultivated individual pharmacists. On the whole the work done by the Research Laboratory had been practical, between those two extremes, and thoroughly satisfactory. With regard to the expense, they were all so much in accord with this great work, which brought them into association with so many trained men of other bodies, and must in the long run do the Society a great amount of good, that if they had £1000 a year to spend on it they would be happy to do so. At present, however, they must go more cautiously, and on the whole he thought the Committee had made a wise recommendation.

Mr. SOUTHALL also supported the motion. He thought it was a step in the right direction, though probably it would not satisfy everyone. It would be difficult to publish sufficient to make the outside world believe that the Laboratory was doing good work. At the same time, after the three years' apprenticeship which the Research Committee and those employed in research had had, and now that it was started on a firm basis, he had no doubt more would be accomplished, and he did not think it would be necessary to go to any great expense. Of course the more money there was provided the more work could be done; but there was quite sufficient means now to do good work, and even if a great show were not made at first, in a few years results would be accomplished which would do the Society credit, and in years to come the importance of this branch of its operations would be thoroughly acknowledged.

Mr. SCHACHT said he should like to emphasize one portion of the President's observations, in which he pointed out the difference between investigations which individuals were capable of undertaking, and those which required that continuous effort, perhaps not simply one of brain, which could only be found in a research laboratory. This difference was palpable to those who had thought about the matter at all, and a little personal experience of his own would exemplify it. Some few months ago a leading scientific man applied to him to undertake a series of investigations as to the effect of certain remedies upon certain articles of food. He carried out these investigations and was glad to co-operate with him in bringing out the results, which were duly published, his name being honorably associated with them. Now this was a very manageable matter, or he should not have attempted it; but about a fortnight ago the same gentleman came, and, probably thinking he had more leisure and perhaps more skill than he really possessed, proposed to him to undertake another series of investigations on another set of medicaments on the human test tube and apparatus, and he wanted him to undertake a careful examination of the secretions produced under certain conditions. Of course this was a much more serious undertaking, and he had to defer giving an immediate answer, though he feared he should be obliged to decline. It had since occurred to him that possibly this investigation might be carried out in the Research Laboratory, with the physiologist on the one side and the practical chemist on the other; and he thought it very probable he should ask the Committee's opinion upon it, as the transfer of material from Bristol to London would not be a very important matter. He mentioned this, however, simply to emphasize the point of the distinction between investigations which came easily under the management of individual pharmacists, and others which lay, in his opinion, beyond their power.

The VICE-PRESIDENT, after expressing his thanks as a member of the Research Committee for the kind expressions which had been uttered with respect to the work, said it had been his privilege to watch the rise and progress of the Society from its infancy through childhood to manhood; he had seen the establishment of the Laboratory and the School, and the discussion of the question whether the School should be maintained within the building or discontinued, and he must say that in his mind nothing would tend more to the advancement of pharmacy and its association with the higher grades of science than the establishment of this Research Laboratory. He looked forward very earnestly to the time when the Society would take a position such as was taken by pharmaceutical societies on the Continent, and though he might not live to see it he felt confident that nothing in the history of the Society had contributed more to the advancement of pharmacy in this country than the establishment of this Research Laboratory.

Mr. GOSTLING said the Research Laboratory had his most cordial support. From the first introduction of the subject he felt that it was a most excellent thing, and as far as it had gone it had certainly raised the Society in the estimation of the scientific, and especially of the medical world. He felt very sanguine that the results would be far greater than could lightly be anticipated.

Mr. Richardson said there was one point which had not been touched upon, and that was the advantage pharmacy in general, and he might say elegant pharmacy in particular, obtained from young men having a certain amount of training in this Research Laboratory. He knew that such young men became very important factors in the progress of pharmacy in different parts of the country.

The **President** said he had perhaps overlooked this last point, but it was quite true that the Research Committee considered it part of its duties to use the Research Laboratory for educational purposes. Of course if the Research Committee had the means of getting highly skilled men in every department more work could be accomplished, but the very process of educating the workers was the best possible thing for the workers themselves. These men became important centres of influence hereafter, and if pharmacy as an art was to be advanced by good learning, it would be better advanced in that way than by putting up a great pharmaceutical factory and endeavouring to do that which only a great factory could do.

It was then resolved that the report of the Research Committee and the report of the General Purposes Committee relating thereto be adopted.

The New Bye-Laws.

The **President** reminded the Council that some seven or eight years ago new bye-laws were recommended which covered practically the ground now dealt with; they dealt with the division of examinations and the curriculum, which it was found the Committee had no power under the existing Act to carry out, and practically the matter had been lying in abeyance ever since. Some of these points, however, having regard to the constitution of the Society itself, had important bearings, and it was considered desirable to get them adopted even if they should be unsuccessful in getting the amended Pharmacy Bill through Parliament. The most important changes proposed were with the view of removing objections to men joining the Society or remaining in it. These grievances, if he might term them, had been accentuated during the last twelve months, as he had found when addressing members of the trade, and he had become very strongly impressed with the idea that if only two alterations were made, viz., the practical abolition of the restoration fee and of the entrance fee for chemist and druggist members, it would be well worth while to make the change. He mentioned this as a justification for bringing forward the subject now. It was practically decided years ago that the major part of these alterations should be made in order to meet the objections which were often urged by those outside the Society. He need not go through the whole in detail, but would briefly summarize the results. First the restoration fee was reduced to a shilling, which was practically abolishing it. A great many seemed to think that this fee was a sort of stigma, and apart from the pure question of amount, there was a sentiment against it which was sometimes very strong. He had heard men say that they would much rather pay the amount of the fee to the Benevolent Fund than have to pay it as a sort of fine to the Society. The present bye-laws were drafted in 1873 on the basis of the then existing ones, which were based on the Pharmacy Act of 1852, when it was practically compulsory for everyone who wished to carry on business as a pharmaceutical chemist to subscribe a guinea a year. As he then lost a privilege if he ceased to subscribe it might have been fair to ask him for a restoration fee when he came back. But in these days, when a man was qualified by examination, if he had subscribed fourteen years, and then for any reason ceased his subscription, it was rather hard to inflict an additional serious money payment upon him, which would not fall upon a newcomer. There must be a nominal restoration fee, or else each gentleman would have to be reelected; but when it was reduced to a shilling it could hardly be considered an obstacle. Chemists and druggists in business before the passing of the Act of 1868—and there were a good many of them—were eligible for membership, but the bye-laws in force required them to pay an entrance fee of two guineas, and this it was proposed to abolish. Many of this class had joined the Society, and this would probably lead many more to do so. The next alteration was to provide for a class of corresponding members. At present the honorary members were limited to fifty, and it was proposed to create a new class, also limited in number. There were a great many men throughout the world who were anxious to be in correspondence with the Society, who were capable of doing very good work in certain departments, botanical, chemical, or in materia medica, and it would be a great advantage to the Society if they were made corresponding members, and hereafter such of them as attained higher positions might become honorary members. It was very desirable that the status of honorary members should be maintained, and that the honour which was now considered to be conferred on the select fifty should not be diminished. Again, it had been a very old idea to have a uniform composition fee. At one time it was thought possible to have a fee on examination, which with registration would make a man not only a pharmaceutical chemist or chemist and druggist, but a life member of the Pharmaceutical Society; but on going into the matter it was found that it could not practically be done. The Government would object to any compulsory payment towards the funds of the Society; it must be a voluntary arrangement. It was found that a certain number would probably join the Society] after passing the Major if their parents would pay the fee outright. On the other hand, a certain number would probably not leave it after having once joined, whilst others would when they retired from business. There were many conditions therefore in which it was thought that a modest composition fee, such as ten guineas, would work better than the present one of twenty guineas. A man who passed the Major would then be able if he chose to become a life member for a total sum of twenty guineas. There were certain little details connected with the examinations which he need not go into; for instance, the additional subject recommended by the Privy Council of a knowledge of the law affecting the sale of poisons. With regard to the examinations themselves no alteration had been made in the subjects except what he had just referred to and words with regard to the Major which would allow the Board of Examiners, with the assent of the Privy Council, if it thought fit, to arrange that the Major might be passed in, say, two subjects without insisting on all. Some people thought that the Major examination would eventually—seeing that the men had already obtained their qualification—become a written and a practical examination only, keeping the *vivâ voce* one for cases of emergency, and that probably a thorough knowledge of one principal subject with a fair knowledge of a secondary one might be considered sufficient without requiring the same standard in all four. With regard to the fees, the Minor was increased from three to five guineas, and a corresponding alteration made in the fees paid for re-examination after failure. The Major fee was reduced from five to three guineas. With regard to the increase in the Minor he might say that many people, including the Government officers, were of opinion that before long some change in the mode of carrying on the examinations under the present schedule would be necessary, whether the curriculum were adopted or not, which would entail additional expense. And it seemed to the Committee that the man who passed the Minor ought to pay, not only the expense of the examination, but, as in the case of dentists and medical men, something towards the cost of registration. Medical men paid not only examination fees, but a registration fee to the Medical Council. This work of registration was carried on for the benefit of all engaged in the trade, and everyone therefore ought to contribute towards the expense. He should also contribute something towards his own defence, because when the Society undertook a prosecution in the interests of the public, it also defended the interests of the registered chemists and druggists. The Council had not been in the habit of separating the accounts and distinguishing between the examination fees and the subscriptions, but the more efficient the examinations became the more expense was incurred. Years ago, when the examinations were conducted in a somewhat perfunctory manner, there was a larger margin of profit on the actual work done; but that was not so now, and all who went on the Register ought to contribute something towards the expense of keeping it.

Mr. **Greenish** seconded the motion.

Mr. **Martindale** said the present bye-laws were become somewhat obsolete, and one good point about the alterations was that it would give a greater choice of examiners; they ought to get the best men they possibly could for the work. The alteration of the fees was only fair, for the Major really cost less than the Minor. Even if the present Bill were not carried, he hoped some day it would be possible to divide the work of the examinations and spread it over two days. He also agreed with the suggested alteration with regard to the Major examination, that a thorough acquaintance with one or two subjects to which a man had paid special attention, with a general knowledge of others, should be held sufficient. The Minor examination conferred the right to trade, and it was only fair that something should be paid for that.

Mr. **Warren** said he had found as Divisional Secretary that the fine on restoration to membership often caused considerable friction, and he was therefore very pleased to hear that it was proposed to practically abolish it.

The **President** added that the Modified examination was not in any way interfered with, except to add to it a knowledge of the law with regard to the sale of poisons.

It was then resolved unanimously that the Bye-laws as presented be read a first time.

The Bye-laws, as read a first time, are printed at p. 821.

The Council went into Committee to consider the legal portion of the report; on resuming it was unanimously adopted.

The Late Mr. Henry Groves.

The **President** said the Society had lost during the last few days, he believed by an attack of paralysis, a distinguished member, Mr. Henry Groves, of Florence, brother to Mr. Thomas B. Groves, a former member of Council and Ex-President of the Conference. Mr. Henry Groves passed his examination about 1863, and had been an active member of the Society ever since; not perhaps visiting this country very often, but all through his life showing to the Italians what an educated English pharmacist should be. He knew of no scientific man in Italy who had a higher reputation. His special department was botany, and his collections of plants were eagerly inspected by all botanists who had the opportunity. Every year he was accustomed to make an excursion to the Italian Alps, where he collected specimens, and his herbarium was probably unique. In Italy, as well as in England, Mr. Groves was held in the highest respect socially, and it was particularly gratifying to find that he was as highly esteemed there as any continental pharmacist.

Mr. **Atkins** said that although Mr. Groves was his junior, he was intimately associated with him in early life, and had a great esteem for him. Some might remember that Mr. Groves visited England in 1872, and put in an appearance at the Conference at Brighton. He could confirm what the President had said as to the great esteem in which Mr. Groves was held at Florence.

Report of Examinations.—*February*, 1891.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (18th)	4	1	3
„ (19th)	4	3	1
„ (25th)	4	1	3
„ (26th)	4	3	1
	— 16	— 8	— 8
Minor (18th)	28	11	17
„ (19th)	26	9	17
„ (20th)	28	9	19
„ (25th)	26	12	14
„ (26th)	26	10	16
	—134	—51	—83
Modified (19th) . . .	1	1	0
	151	60	91

Preliminary Examination.

26th.— Eleven certificates by approved examining bodies were received in lieu of the Society's examination.

SCHOOL OF PHARMACY EXAMINATION QUESTIONS.

PRIZE EXAMINATION.

Pharmacy and Practical Pharmacy.

Mr. Ince.

BRONZE MEDAL.

Session, 1890–91.—*Winter Course. Thursday, March 5.—Time allowed*—2 *p.m. to* 5 *p.m.*

The following are the questions that were set for this examination:—

1. Define Levigation, Elutriation, Lixiviation, Infusion, and Maceration. Give one typical illustration of each process.

2. Mention instances in which special temperatures are indicated in official preparations, and the reasons for their employment.

3. Describe the Tincturæ of the British Pharmacopœia which are made by solution, simple or chemical.

4. Write dispensing note on Creasotum, Chloral Hydras, Menthol and Oleum Terebinthinæ.

5. Translate the sentences given into unabbreviated Latin:—

Make twelve pills, of which let two now and then be taken at a time.

Let woollen rags moistened with the lotion be applied constantly to the swelling.

A few drops of olive oil, warmed, to be put morning and evening into the right ear.

The anodyne draught to be taken twice a day or oftener in case of heartburn.

Provincial Transactions.

BRIGHTON JUNIOR ASSOCIATION OF PHARMACY.

On Thursday, February 26, a meeting of Chemists' Assistants was held under the auspices of the above

Society at the rooms of the Association. The President, Mr. Nosworthy, occupied the chair, and there was a good attendance.

After a few words of introduction he called on Mr. Marshall Leigh to read a paper on—

THE PHARMACY ACTS AMENDMENT BILL.

Mr. Marshall Leigh expressed his pleasure at meeting them, and said: It is very appropriate that the Junior Association of Pharmacy should meet to consider and discuss the Pharmacy Act Amendment Bill, which the Pharmaceutical Council is about to introduce into Parliament, because it is the young men, the assistants and apprentices of to-day, who will be most affected and most benefited should it become law. Even if the Bill passed through Parliament and became law this year the chemists now actually in business would be affected very slightly; it would be some years before its beneficial effect would be enjoyed.

It is not surprising, therefore, that some who do not expect to have many more years of business life are indifferent, and we naturally look to the young to supply that enthusiasm, energy, and support which is necessary for pushing a Bill through Parliament.

First, then, let us consider the reasons which actuate us in seeking legislation in regard to pharmacy. It will be remembered, perhaps, that Herbert Spencer says that "Life is the definite combination of heterogeneous changes, both simultaneous and successive, in correspondence with external coexistences and sequences," or, put more concisely, "That life is the continuous adjustment of internal relations to external relations," or, more clearly, he says that our physical life depends upon our adaptation to our surroundings or environment.

A little consideration will show how true is this statement. The law is applicable alike to the life of the individual, a single business or to a whole trade. Just to the extent that a man adapts himself to his environment, does he continue to live; when this adaptation ceases the man dies. The business man who adapts himself to his environment is successful; the one who does not do so fails.

To seize continuously the opportunity of more and more perfect adjustment to changing circumstances is the law of life for a business man. The secret of a successful business life is "adaptation to environment."

The same law affects trades and professions, and it seems to me that this Bill is an attempt on the part of the Council to adjust the trade to new conditions.

During the past ten years our environment has altered, and as a trade we have not been successful in adapting ourselves to the altered conditions. On looking around on society we notice specially that there has been a vast increase of intelligence and education; the minds of people are more cultivated and informed than at any other point of our previous history. A brief glance at the curriculum of the Board Schools will show beyond doubt that even amongst the working classes the standard of knowledge is much higher than it was, and there is every prospect that the standard of intelligence will be maintained too.

This being the case we must adapt ourselves to the change.

The time is fast coming, if it has not already arrived, when the most valuable commodity a pharmacist can offer the public will be his education, his skill and his conscientious appreciation of the responsibility of his calling. If we do not prepare ourselves for the change and are unwilling to supply the knowledge required, if we choose to remain mere buyers and sellers, we shall most inevitably be crushed out of existence as traders, by the development of competition, the influence of capital and the organization of labour.

It is quite true that something has been done for the intellectual development of chemists during the past thirty years; the pharmaceutical chemist of to-day is the product of work done by the Society; but no well informed person will assert that the education of the average chemist has advanced equally with the times. Of the 13,000 chemists on the register, there is proportionately a large number who have not submitted themselves to examination, and even those who have passed examinations have not always been careful to educate themselves.

The Council is acting wisely then, and in conformity with natural laws, in endeavouring to more fully prepare the trade for altered and altering conditions. Education is not only a necessity for our advancement, but a condition of our actual continued existence, and it is because the Council recognizes this fact that it is so earnest in pressing on the trade the question of improved education.

The Council is like a man on a watch tower, looking ahead; it sees there will in the future be no chance for the chemist who is only a trader, but that with the advance of intelligence on the part of the community there will be a demand for more highly educated and competent men.

In endeavouring to guide the trade therefore it places systematic technical education in the forefront.

In our examination of the Bill, we shall see the methods which the Council proposes to use to secure that future pharmacists may be more highly educated.

Clause 1.—The title and explanation of the meaning of terms.

Clauses 2 *and* 3.—These clauses deal with the conditions under which young people will acquire the legal qualification for entering the business. In the past it has too often been the practice of chemists, especially in the north, to take in as apprentices youths of the errand boy class, who have received no education beyond the three R's, and who consequently have had to spend their apprenticeship in preparing for the Preliminary examination instead of learning the business. That this class should be encouraged to enter the trade is most deplorable, because from deficiency in early education they rarely become efficient, and find it out too late in life to change their avocation. They consequently drift off as unregistered and unqualified assistants, and are frequently found the moving spirits of the bogus companies which are such an incubus on the trade, and which tend to drag down the level of pharmacy. The bye-laws which will be drawn up in accordance with clauses 2 and 3 will discourage such youths from entering the trade. So that, in future, the apprentices will be youths whose classical and general education has been such as to qualify them for an advanced technical education. This will react not only for the benefit of the trade, but will be good for both master and apprentice. The latter would, as soon as he entered his business career, be able to give his mind to his professional studies.

All authorities agree that, at the present time, there is a disposition amongst students to shirk persistent study during apprenticeship. Mr. Carteighe, our honoured President, states that "the great evil he had found from his examination experience was that students neglected to educate themselves during apprenticeship," and this statement is amply confirmed by all those who have had to do with our examinations. All deprecate the fact that youths neglect serious study during apprenticeship, and afterwards endeavour to make up for lost time by grinding (and often cramming) for a short period at some school of pharmacy in London or elsewhere, the result being that the knowledge gained is far less permanent than if it had been slowly assimilated. Thus the present system is bad for students themselves, because it has tempted them to postpone their studies under the idea that they would not be allowed to put their knowledge to a test until 21 years of age. It has seemed to a young apprentice, of say 15 or 16, such a very long time before his knowledge could be tested, so he has put off study and lost golden opportunities, until at the age of 21 he finds himself with no preparation for the Minor.

That this system is bad for the apprentice himself you will all concede, and, when we reflect, we shall acknowledge that an ignorant apprentice is a burden and an anxiety to a master as well as a source of danger to the public.

To remedy the evil, the Council proposes to divide the qualifying examination into two parts, a written one, which can be taken during or at the end of apprenticeship, and a practical one, to complete the qualification which can be taken at twenty-one. In order to compel all apprentices, whether reluctant or not, to steady and continuous study, the Council will require certificates of having attended courses of instruction in chemistry, botany and materia medica. These courses of instruction will be obtainable in every large or even moderate-sized provincial town, so that there will be little extra expense, whilst the written examinations will be held in the centres now appointed for the Preliminary examinations.

We advocate these clauses of the Bill, because we believe that not only are they necessary for the continued existence of the trade, but they are good for the apprentices themselves. Step by step the apprentice would qualify himself, and during apprenticeship would lay the foundation of a scientific education. The division of the examination would moreover make the examination easier—instead of being examined in six subjects in three hours and the success of the examination being imperilled by perhaps a fit of nervousness or a passing headache, the candidate would have ampler opportunity of showing his knowledge.

Clause 4 is intended to give the title "Student Associate" to those who now are Apprentices or Students of the Society.

The term Apprentice of the Society has caused some confusion, and it is better to use a term which cannot be misunderstood.

Clause 5.—Those who know the work of the Pharmaceutical Council, are aware that its difficulties are much increased and its power of obtaining legislation lessened by the fact that it is neither elected by, nor really representative of the whole trade. Less than one-third of the trade are connected with the Society.

There are in the country a considerable number of men who were in business before the passing of the 1868 Act, and many of them have always been in opposition to the Society or have regarded its proceedings with indifference or contempt. We hardly expect to attract these to the Society; but there are others, men who have passed the Minor and are in business for themselves, who are at present only entitled to become associates of the Society, and have withheld or perhaps withdrawn their support. They have felt that they were not treated on an equality with members, that they were not admitted to the full privileges of membership. Moreover they complain that the title associate does not carry so much weight with the public as the title "member." Their absence weakens, their presence would strengthen the Society, but from a feeling of pique or jealousy they still continue to withhold their support.

This clause would remove any just cause of complaint, and it is to be hoped that the result will be that this class of men will now join the Society and make it more powerful to act for the trade.

In conceding the title of member to Minor men, the Major men are really foregoing their claim to the exclusive privileges and rights of membership, but this they are willing to do for the good of the trade at large and to remove any cause of friction.

Clause 6.—It has been asked in criticism of the curriculum clauses of the Bill, "What return is there for this added expenditure of money, time and study?" The answer to that is to be found in the sixth and seventh clauses of the Bill, by which it will become unlawful for any person to keep open shop for the sale of or the compounding of medical prescriptions, unless he be qualified (or acting within certain exemptions) or is acting under the supervision of a qualified person. At the present time in nearly every town in the country there are unqualified men carrying on to all intents and purposes the business of a chemist and druggist. They call themselves herbalists, phrenologists and what not; and they sell everything that a chemist sells, except the poisons in the schedule. Some of them go so far as to advertise "no noxious poisons kept."

It has always seemed to me an anomaly that though the sale of poisons is restricted to a certain class of men who have to prove their qualification by examination, anybody can sell a potent drug very nearly a poison, if outside the schedule, and anybody can compound a prescription when scheduled poisons are not included. These clauses will put a stop to that little game. We expect the effect will be to shut up a good many quack shops.

The term "medical prescription" will be found to mean a great deal more than some imagine.

Parliament has already granted a similar monopoly to the Irish pharmaceutical chemists, and will doubtless see the reasonableness of applying the same rule to England and Scotland.

The net result of these clauses will be to place a monopoly of dispensing in the hands of qualified men, which must prove of some value. Thus the Bill aims at increasing the value of the qualification.

The objections that have been urged to these clauses are all made on behalf of unqualified men, and at first sight it does seem hard on a number of men who, as branch managers, have grown into middle life, have now, it has been humorously said, "small wives and large families," and who have never qualified.

But it must be remembered that this class was specially provided for in the 1868 Act by the institution of a modified examination, and there is no evidence that they would avail themselves of it if a modified examination was continued under the present Bill. Besides, it is not fair to those who have striven to pass their examinations to have to wait for an improvement until this class of men has ceased to exist.

Clause 8.—Every one agrees with this clause, and especially because, since the Wheeldon decision, employers are less able to leave their businesses to unqualified assistants than formerly.

Clause 9 simply arranges for a different method of electing the Council of the Society.

Clause 11 enacts that no bye-laws relating to the curriculum can come into force before the beginning of the year 1896.

Having now reviewed the Bill, let us refer to some objections that have been made. The most important is that it does nothing to protect chemists from bogus companies.

The more this matter is examined the more difficult it becomes, and everyone who has spoken about it has acknowledged its difficulty.

Even Mr. Harrison, when he so ably advocated a clause to prevent new companies being formed to trade as chemists, acknowledged that we must recognize the existing companies, and if that must be so there would then be nothing to prevent existing companies from increasing their capital and opening branches in every town in the kingdom.

Moreover, the principle that trustees can carry on a chemist's business with a qualified assistant is already recognized in the existing Act, and in order to carry any clause preventing seven men from doing the same we must logically give up what is called the "widow's clause." Legislators would say, "if the trustees of a dead man can carry on business with a qualified manager, why cannot seven men do the same?"

There is no difference so far as the security of the public is concerned.

And besides we might as well recognize that stores do not hit chemists nearly so hard as the cutting men who are inside our own ranks. Also, nothing can be done to prevent qualified men from supplying small shops. Chemists suffer from that form of competition more than some imagine.

We think that it is better to leave the companies alone at present, relying on the Wheeldon decision to enforce the employment of registered assistants.

We have also to remember that many members of Parliament are pecuniarily interested in co-operative stores and will oppose any measure that is injurious to them.

Will the Bill pass? The first essential for success with a Bill in Parliament is that the whole class affected by it should be unanimous, or nearly unanimous in its support.

Is this condition fulfilled? Perhaps there never was a trade so much divided by rival interests as ours. It is true that the magnificent exertions of our President, Mr. Carteighe, in his tour through England, Scotland, and Wales, has dissipated much opposition, but no one will imagine that even he has secured the enthusiastic support of the trade.

Then, again, our trade has little influence in Parliament; our voting power is microscopic compared to the whole electorate; as a trade we have no political power. On the other hand there are a number of influential men in Parliament who are interested in technical education, and these will doubtless take the Bill in hand and lend it the support of their influence. We have also a President of marvellous talent and matchless tact. If any one can convince an unwilling member of Parliament, it is Mr. Carteighe. Even Mr. Carteighe, with all his brilliant ability, is helpless without substantial and hearty support from the chemists of the country.

In conclusion, let me say that an able and well directed effort is now being made for the future status and remuneration of our calling, and we look to the young men who will reap most of the benefit for their concurrence and hearty support. We do not profess that if the Bill passes it will give all that we want. The Bill is not final; it will be a step taken forward, a position gained from which we can further advance. If the Bill passes, then in a few years we can go to Parliament with a statement of what men have to do to become qualified, and that will give us a better position in claiming further exclusive privileges. In the natural evolution of things we shall approach Parliament with a stronger case than we have at present.

A very interesting discussion followed the paper.

The Chairman, Mr. Nosworthy, remarked that he was sure they understood the measure much better than they had before that meeting. With regard to the Bill he thought it pointed to the fact that they should adapt themselves to circumstances, the condition of things having much altered since 1868, when the former Bill became law. The clauses which would practically compel a youth to pass the Preliminary examination before entering on his apprenticeship was in his opinion a splendid provision. While, too, he supported the clause in regard to the Minor examination being passed at twenty-one years of age, he could not help thinking that between the time a youth finished his apprenticeship and his Minor examination, he would be merely living on his outgoings. As to clause 6 no doubt the herbalists and others did more harm in some districts than the stores, and he also thought in many cases cutting men were responsible for the establishment of stores. He also thought it unfair that pharmaceutical chemists were exempt from jury service while an ordinary chemist was not.

Mr. Marshall Leigh pointed out that the old Juries Act was altered in 1862, and at that time there was only a register of pharmaceutical chemists. The chemists and druggists had not a register and could not claim the privilege of exemption.

Mr. Harry Kilby Pears thought that both Mr. Leigh and the Chairman were rather hard on the cutting men. He did not like the idea of associates enjoying the full privileges of membership, and with regard to the omission of the word "immediate" in clause 6, would not that be opening the thin end of the wedge for the formation of bogus companies?

Mr. Timbury thought the erasure of the word "immediate" in clause 6 made very great difference to the clause, and he thought unqualified men would now be enabled to carry on their work as in the past. They must all see the advantage of a youth passing his Preliminary examination before apprenticeship; the drawbacks under the present system were manifest. As assistants they must also have noticed what importance attached to their position by reason of the Wheeldon decision. Qualified men were at once at a premium.

Mr. Willis Bailey gave a qualified support to the Bill. The examination, he said, would be in two parts, and regulated by the Society, would mean expense to the students, who were not all gentlemen of means. In how many towns and villages would there be schools, and would the Society provide them? Then supposing an apprentice finished his time at eighteen, what was he to do until he was 21? Would he be allowed to act as assistant?

Mr. Horsey advocated the formation of a trade union amongst assistants, with a pledge not to accept an appointment at the stores.

Mr. Jefferson said that at first he was disposed to oppose the Bill, but after thinking over it more calmly he was much more favourably inclined to it. It was very difficult to legislate to suit all chemists. He supported the jury exemption clause, and said that the Legislature had a great objection to granting monopolies, and he did not think they would get it to put down stores.

Mr. Marshall Leigh in reply disclaimed altogether any intention to be hard on cutting men; as a matter of fact, he felt a large amount of sympathy with those who were obliged to cut. The Major men would still have the title "pharmaceutical chemist," though associates were converted into members. The word "immediate" was taken out of clause 6 to meet the wishes of the trade. He thought it a matter of congratulation that the increase of chemists on the register did not keep pace with the population. With regard to the curriculum it was impossible to state what decision the Council would come to, but no doubt classes would be formed in every town in the country and be subsidized by the Pharmaceutical Society. In a town like Brighton, for instance, there was a school of science and art where classes were formed to supply everything required. In other places where there was no school, a local chemist who had passed the examination would probably be induced to take classes. In conclusion he hoped they would give the measure their best support.

Mr. Jefferson said he had great pleasure in moving the following resolution:—

"That this meeting of the members of the Brighton

Junior Association of Pharmacy gives its unqualified approval to the Pharmacy Act Amendment Bill and hopes that in due time it will become law."

Mr. H. K. Pears having seconded, the resolution was carried *nem. con.*

A vote of thanks to Mr. Marshall Leigh brought the meeting to a close.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the forty-second session was held at the Royal Institution on Thursday evening, Feb. 26, the President, Mr. C. Symes, Ph.D., in the chair.

The minutes of the previous meeting were read and confirmed, and the donations announced. A vote of thanks was accorded to the respective donors for these, and Mr. G. A. Redford was unanimously elected a member of the Association.

There being no miscellaneous communications, the following paper was read entitled—

A POLICY FOR THE CONSTRUCTION AND CONSOLIDATION OF PHARMACEUTICAL INTERESTS.

BY J. S. WARD, F.C.S.

"Every one seems dissatisfied with our position and progress—few, if any, suggest a remedy."

These, gentlemen, are the words of our worthy President, Dr. Symes, in his inaugural address to us at our last meeting, and they unhappily only too truly represent the sentiments of the great majority of those who like ourselves are engaged in the calling of a pharmacist; they, therefore, I think, justify my appearance, or indeed the appearance of anyone before you in the form of a politician; if, however, further justification for such a course be needed I plead the complaint and the request of Mr. Carteighe when with us.

He said: Gentlemen, you complain of your grievances and very naturally so: but I want something more. I want you to talk about a constructive policy and give me help in this direction.

Well, gentlemen, as a consequence of these observations I am induced to lay before you what I firmly believe to be the only course to be pursued if we desire to improve our condition. It may, however, be advisable, before proceeding, to look for a minute at the causes of our present condition, because this may enable us to avoid something in the future. Time will not permit me to enter into detail about all these causes, but I unhesitatingly say that in my opinion the principal factor in determining the present state of things has been the various Pharmacy Acts, framed and pushed forward with every good intention on the part of the promoters for our welfare, but with dire results. For whilst I will not deny that they may have done some good, I maintain we have been led on to expect from them more than they can ever possibly afford us, and consequently we have been seriously disappointed. We have been led to suppose that by the expenditure of time and money in educating and qualifying ourselves for a better position the public would be brought to recognize this, and willingly acknowledge us as professional gentlemen and reward us accordingly, and I say in this we have been terribly disappointed.

We find that the public of to-day, for all practical purposes, think no more highly of us than they did of our forefathers of old, utterly ignoring our qualification, and all that we undertake in the way of preparation for the better discharge of our duties to them. They are willing to treat us only as other tradesmen, to pay as little as possible for what we have to sell, and entirely refuse remuneration for anything in the way of professional services; in fact, to leave us altogether if they can find a better market in the stores or bogus drug companies.

Well, gentlemen, little wonder is there if, after twenty years' trial, we, finding our qualification of no value to us, express discontentment, and even consider ourselves injured by those who have been the means of placing these burdens upon us, without at the same time securing for us a corresponding remuneration. I am convinced that it is the every day experience of the utter worthlessness of the past Pharmacy Acts to the pharmacist that causes so large a majority of them not only to feel coldly towards the Pharmaceutical Society, but even to think they have a grievance against it.

Gentlemen, we must not be too hard upon the Society. It has done much good one way or another, and would have accomplished much more had it been supported, as it ought to have been, by the trade at large, and the evil done has been in error not intentional.

The great mistake in the legislation of the past has been its one-sidedness. It has been all give and no take; all work and no pay. And this we must avoid in the future. We must have no more Pharmacy Acts constructed on these lines. We have a right to, and are perfectly logical in demanding something better than this. If it be necessary for the safety of the public that a man must be highly educated and specially qualified to dispense medicine to them, I hold it is equally necessary, for the safety of the said public, that they be compelled to buy their medicine from the said qualified person and from none other.

Well, gentlemen, so much for the course pursued in the past. I would not have referred to it but for the lesson it teaches. What of our present action?

We have, as you are aware, a Pharmacy Act Amendment Bill before us now, and we are earnestly entreated to give it our support on the ground that it will elevate pharmacy and generally improve our position. Will it accomplish this? I say emphatically, No! It is constructed on the same principle as former Acts, another example of one-sided legislation, and like its predecessors it must prove a failure, for how can it do us any good when it has no power to prevent unfit men from entering the trade, no power to compel men to qualify when they have entered, and, worse still, no power to prevent unqualified men or even perfect outsiders from going into business and competing with us, yea, even assuming our title, which we have in the past been taught to value so dearly.

Call you this a constructive policy? I call it rather a policy of destruction, for the only thing it can accomplish is to increase the burdens of those who willingly submit to the yoke, to make it more difficult for those who desire to enter the trade legitimately, and yet offer no resistance to those who, less scrupulous, wish to enter viâ the bogus company route. Even the promoters of the Bill are not satisfied with it. They would fain ask for something in return, they tell us, but, alas! they have no hopes of getting anything if they do, and so, forsooth, we must be content with this. Now do not such apologies make it appear as though this Bill was the outcome of some such reasoning in the Council room at Bloomsbury Square as this: "We are in a dreadful fix and something must be done. . . . and if it be utterly impossible to do anything beneficial to the trade, well . . . . something must be done, and that without delay, for the force of circumstances and the clamour of the trade demand that we attempt something."

Gentlemen, I have dwelt upon this Bill only so far as I have thought it necessary to convince you, even as I am convinced, that the first step in a truly constructive policy is the rejection of it. I contend that much as we stand in need of further legislation, it is unwise and impolitic to attempt anything in this way at the present time, for the simple reason that we are not prepared for it. We are not united, and consequently have no reasonable chance of getting what we want or even what we have a perfect right to demand in the form of a Pharmacy Bill. Let us therefore be wise and stop further legislation for the present. Let us look the matter squarely in the face and acknowledge frankly our weakness, and then let us organize, yea, even fraternize, drop, at any rate for the time, all petty jealousies, and work in unison for a common cause, viz., the elevation of pharmacy and the proper recognition and remuneration of the pharmacist.

Let the Pharmaceutical Society lead us in this. Do not misunderstand me, gentlemen. I have no desire to see an opposition faction set up nor would I be a party to any such. The Society is our recognized and legitimate organization, and in this capacity it is its duty as well as its privilege to lead pharmacists and take the lead in every good work in which they may be engaged.

Let the Council do all in their power to stimulate local associations, and where none exist at the present time let them through their local secretaries endeavour to establish such. Yea, and let them even help these financially, if need be, and above all let members of the Council visit these associations from time to time and so come into contact with the great bulk of the trade; they will then have an opportunity of enlightening the multitudes upon what the Society can and will do for them if properly supported, and, what is equally important, they will have an opportunity of learning the opinions and requirements of the trade in its different phases. I have no hesitation in saying that if such a system of intercourse were established, very much of the coldness, misunderstanding and actual antagonism that now exists towards the Society would disappear as if by magic, and in a short period such an amount of good feeling would be created as would literally astonish us who have been accustomed to hear little or nothing but grumbling against the Society. Much of the ill will of to-day and of the past arises from a want of acquaintance with the Society and the men who rule it, and, depend upon it, if this acquaintance could be made many things and many persons would appear in an entirely new light. Outsiders would no longer appear to the leading spirits of Bloomsbury as the barbarians they are now accounted, and the said leading spirits would no longer appear to the outsiders as the "uppish" and stand off persons they are now thought to be, but would be understood and appreciated as their abilities and services demand, and a feeling of good fellowship all round ensue. If any one is cynical and doubts my word on these points, I refer him to the visit of Mr. Carteighe to us, and if he were not present at the banquet to see for himself let him read in the trade journals of the receptions everywhere accorded to Mr. Carteighe. Here, then, I say is a grand opportunity for the Society to begin a truly constructive policy, and I sincerely hope they will not neglect it.

Another way in which the Council of the Pharmaceutical Society, if they really have the interest of the trade at heart, may show it, is in exercising more energetically the powers they possess against illegal trading in poisons by outsiders. It is well known what a large amount of this goes on to the detriment of the chemist, and it is notoriously difficult to get the Society to take these cases up, because they require that the informer be in a position to legally prove the charges against the offenders, and this in many cases is not at all pleasant. One particular case in this city presents itself to my mind now. A chemist here has told me more than once of a man who, some years ago, having failed to pass his examination, opened a drug store near him, and who does not hesitate to sell or dispense poisons to persons he knows. When I advised this chemist to communicate with the Society or its local secretary he said he had already done so, and they would take no action unless he could give more evidence, and as he had no desire to appear in the case the matter was allowed to drop, or rather to go on unmolested. Now I say that if this is anything like a correct version, the Society is not doing its duty to the chemists in that neighbourhood. Those who have properly qualified ought to be protected from such unscrupulous persons, and it is the Pharmaceutical Society who ought to protect them; they ought to send some one to investigate such a case, and the transaction would pay them, for by so doing they would acquire the good will and support of a number of chemists, not only in the immediate neighbourhood but throughout the country. Other cases of what appear to me to be flagrant breaches of the Pharmacy Act are the supplies of cyanide of potassium and other poisons to photographers by unqualified persons, and the sale of homœopathic medicines containing aconite, belladonna, arsenium, opium, and other poisons by drapers, stationers, and shopkeepers generally. I say that if the Society will stir up itself on behalf of the trade and against the outsiders who are constantly encroaching upon our preserves, it will earn the gratitude and support of many a struggling chemist who to-day asks what does the Society do for us? Why should I give a guinea or half a guinea subscription yearly to it? We should be just as well off if there were no Society. Gentlemen, if any fair proportion of the multitude who to-day are making these observations could be brought into the Society by some stroke of liberal policy what a gain it would be to the constructive movement. Let us hope the Council will take the hint and see what can be effected in this direction. I am pleased to say they are attempting something in this direction now, in trying to get all qualified chemists exempted from jury service, and let due credit be given to them for this. Although I am bound to confess that the very tardy manner in which it has been done makes it appear as a sop given to silence many who would otherwise actively oppose the more vital parts of the Bill.

There is still one other way in which the Society has it in its power to do much in the way of uniting and consolidating the pharmaceutical party; this is in bringing themselves into closer touch with the younger members of the craft. Their policy in this direction in the past has been most indiscreet; they have systematically neglected and well nigh treated with contempt the apprentices as a class; and in the absurdity of their folly have on many occasions actually closed the door of their Museum and of their Library to those who have visited London, and hoped to make the acquaintance of the *alma mater* of their profession. How many hundreds of young men who have gone up from the country to London to present themselves for the Minor, and having requested to look over the Museum have been denied; because, forsooth, they were not associated with the Society; and with what result? I say these young men who before were indifferent to the Society have now been made into open enemies. How is it possible afterwards to convince such men that the Society has their welfare at heart, and is striving to do them what good it can; when at the time which young men probably regard as the most critical in their life, the same Society has spurned them as outsiders and shown them the door, frequently with language more forcible than polite? When, I ask, will our councillors learn that the Society is not a mere club, but a public institution, with power to do much if it chooses to benefit the class it represents? When will they learn that an act of grace is never in vain? When will they be wise enough to extend to young men anxious to make their acquaintance the hand of fellowship, and thereby impress them favourably, instead of as at present giving them the cold shoulder?

Wisdom, I contend, dictates not only the advisability but the necessity for the Society to court the acquaintance and friendship of every assistant and apprentice it comes into contact with; for sooner or later they must of necessity occupy positions in which the Society can no longer afford to do without their support.

Let the Council go to work in earnest to conciliate the young. Let them in every possible way show by unmistakable signs that they are in sympathy with them and ready and willing to help them as far as they have the power to do so; help them to form classes and associations for social intercourse, instruction and general improvement; succour such associations and classes; help them to procure libraries of books, specimens for their museums and apparatus for laboratories. Yea, go farther still by turning these into centres of provincial education and support them by grants somewhat on the South Kensington principle. Adopt some such liberal policy as this for a few years, and I guarantee that in a short period, instead of having a mere tithe of the apprentices and unqualified assistants associated with the Society, the great bulk of them will join you, and be proud to do so, and, impressed with a good opinion of the work you are doing, they will not afterwards desert you but remain staunch supporters for years to come. And this will mean that even if you fail to win the old members of the craft, who have unfortunately been driven into a state of chronic discontent and want of confidence, you will in a few years have the strength and vitality of the trade at your back, and with these you will be able to do what Mr. Carteighe spoke of at Manchester when he said, "Give me the united support of the trade and I will pass anything." Gentlemen, I fancy I hear our leaders say this is all very nice, but we have no means to do it with, we have no money to subsidize education with. I reply it is no new principle. You already subsidize education, and have done for years, and done it very unfairly too. Your school costs you annually £600 or £700, and as you average sixty to seventy full time pupils, what is this but making a grant of about £10 per head to this select few? Is it fair that you should spend so much of what belongs equally to all on the few and refuse to do anything for the many? Is this a policy likely to command the respect of the masses, or would it not be better to distribute whatever funds you may have at disposal for education more evenly? I commend this consideration to your notice, and sincerely hope that if you are desirous of the unanimous support of the trade you will give it your serious attention.

Gentlemen, I have endeavoured to point out to you what I consider is the part the Society ought to play in the future of pharmacy. I will now, if you will kindly permit me, point out briefly what I think is necessary on your part. In the first place let me assure you that if any real good is to be done every one in the fraternity must be prepared to play his part, and that manfully. The Society can never accomplish this without the moral and active support of its constituents. If you desire to improve your position and raise your profession you must give your hearty co-operation to those who are attempting to do this for you, even if it cost you something. There are many ways in which you can do this. Permit me to point out a few. In the first place, if you have not already done so, join the Pharmaceutical Society as the legitimate organization of your calling, and by taking an active part in its operations help to mould it into what it ought to be. Gentlemen, this is far more logical than to remain outside and grumble, and it is far better than to stand by quietly and allow it to make laws for you, whether you like them or not.

In the next place be very careful that you admit none but suitable persons to the ranks. This is most important, perhaps the most essential of all considerations. A great many of our troubles and calamities have come upon us through the admittance of unfitted persons into the trade. Unfortunately in very many instances members requiring apprentices have had no regard whatever to the qualifications of the candidates other than the financial or labour value. This course has crowded us with men who can never even qualify, much less ornament the calling they find themselves in. Such men must of necessity be a constant drag upon the wheel of progress, and I entreat you, if you wish the cause well, to do all in your power to put a stop to this practice. Take no one for an apprentice who has not already passed the Preliminary examination or who has not had such an education that this will be a mere matter of form to him.

In connection with this I feel bound to say something about the present system of pupilage, and I regret to say that it is not at all satisfactory. In many instances youths give three or four years of their time and pay appreciable sums of money to be taught the art of pharmacy, and are never taught anything more pharmaceutical than to hand drugs or patents over the counter and take the money for them. I assure you in many cases it is absolutely lamentable to see the utter want of knowledge of common pharmaceutical operations on the part of those who have served an apprenticeship; and I ask you, gentlemen, how can we expect to elevate pharmacy whilst this thing goes on? These men will some day go into business and deal with others as they have been dealt with, and so perpetrate the evil from generation to generation, the art of pharmacy in the meantime gradually dying out. I appeal to all those who take apprentices to look to this, and to see that such as come under them shall have every opportunity of learning what they undertake to teach them. This will doubtless necessitate in many instances a higher premium, but I am convinced it will be better for everyone concerned, and, above all, the training of such a generation of pharmacists will be the surest step in the elevation of pharmacy.

Gentlemen, if you will pardon me, I will just point out one other thing that I think highly desirable. This is that chemists should become more sociable with each other. A coldness and kind of distrust which is very injurious to us as a body exists largely, and I believe springs from a want of knowledge of each other. I think if we came into contact more frequently, and got to know each other better, this as a consequence would disappear, and the ground for concerted action be considerably cleared.

In conclusion, allow me to bring before you in brief *résumé* the points I desire to draw your earnest attention to, viz., the weakness of past Pharmacy Acts, the same failing in the present proposed one, the desirability of rejecting it, the necessity of organization and unison before attempting further legislation, the true policy for the Pharmaceutical Society to adopt and the duty of pharmacists individually.

At the close a somewhat lengthy discussion ensued, in which Messrs. R. Parkinson, J. Hocken, J. Smith, H. Wyatt, jun., B. Dickens, and the President took part.

The President said he approved of the paper in many particulars. He hoped, however, members would not go away with the erroneous impression that in cases of illegal trading the Society required the person who gave the information to appear in the case in any way. All it asked was evidence (not mere hearsay) that it was a *bonâ fide* case of infringement before it expended money in going into the case. This, he thought, was reasonable, and it was certainly not too much to ask that a person whose business was being injured by an illegal trader should take the trouble to give proof confidentially which would justify placing the matter in the hands of a solicitor. With reference to the constructive policy he had already propounded one of his own, which involved a slight increase in the examination fees or the addition of a registration fee which need not be very considerable. Every person on passing the qualifying examination would be elected a life member of the Society, but would not receive the Journal unless he subscribed (say 10*s.* per annum) or paid a composition sum for it. This he held would be a rational means of consolidating not merely the Pharmaceutical Society but the whole trade. The initiative must come from the Society itself, and he hoped the day was not far distant when broader views would be held by the Council with regard to those outside the present minority.

A vote of thanks, proposed by Mr. R. Parkinson and seconded by Mr. Hocken, was accorded to Mr. Ward for his paper, and Mr. Ward having replied, the meeting terminated.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association held on Thursday, January 15, Mr. A. Campbell Stark, President, in the chair, the following short papers were read:—

NEW REMEDIES.

BY H. HELBING, F.C.S.

The expression "new remedies" is capable of very wide application, since every substance when for the first time it is introduced into medicine might lay claim to the title. Five years ago something more than a passing interest began to be shown in what were specified as new remedies, by which were meant synthetical products chiefly manufactured by those who previously had not taken any part in the preparation of medicinal agents. This was the commencement of a movement by which to a greater or less extent the manufacture of medicaments has been transferred from the practical pharmacist, and even from the pharmaceutical manufacturer, to the proprietors of large aniline dye works, who form quite a distinct class of scientists. At the same time, of course, the former, more or less connected with pharmacy, have lost an important source of profit.

But the relation of pharmacists to new remedies must not be regarded as that merely of dispensers of products turned out by manufacturers, who, as we have seen, have no direct connection with pharmacy.

The introduction of these synthetical products into medicine gave the pharmacist an opportunity of developing his scientific education, and a number of chemists quite distinguished themselves by defining the characters and raising the standards of purity of these remedies, and so compelling the manufacturers to place them in a pure form upon the market.

With the appearance of these, mostly synthetical compounds, began a new era for the medical man and the pharmacist. At first new remedies were produced with comparatively long intervals of time, so that opportunity was afforded of studying their properties, but as time went on they sprang up here and there as fast and as thick as fungi, so that before the medical man was thoroughly acquainted with one, another still more recent demanded attention.

Further it must be admitted that among the number of new remedies recently so frequently announced there are some which scarcely increase the reputation of their class and many which fail to fulfil the claims made for them. All this of course detrimentally affects the general estimation of other substances, which might prove successful in the cure of disease if there were sufficient time for the pharmacologist to complete his experiments without the fear that he may lose the fame of being the first to report on any particular compound, through the previous appearance of a similar communication by another author.

What then is the best to do under these difficult conditions? It is a matter for regret that recently here and there, as for instance in the United States, not a few of the new remedies have made their *début* very much in the style of patent medicines, even their chemical constitution being kept secret. They are forced under the notice of the medical man, who, induced thereby to try them, may very possibly fail to obtain such satisfactory results as he was led to anticipate, and the natural result is that he looks with suspicion upon the whole class of new remedies.

Looking deeper into the matter, however, I must say from my own personal experience that to a great extent synthetical remedies were at first underestimated in this country. From the very beginning some prejudice has existed against chemical medicaments not of home production, and they have received little attention from the pharmacologist, the therapeutist or the pharmacist. Further, the medical press has almost ignored these German products as not sufficiently important to merit consideration.

When, however, it was found, in spite of this apathy and neglect, that many of the synthetical bodies were most valuable in medicine, as much interest was shown in them as in other countries. Recently, however, their number has so greatly increased that the preparation of a short paper dealing with them is not easy. It is not possible to enter upon the consideration of physical characters, of chemical structure or of manufacturing processes, nor to detail the extensive literature of therapeutics which the new remedies have gathered round them—to do all this would require volumes.

During the year 1890, of which something more may be said in detail, interesting features in the way of new remedies have not been wanting. Early in the year the first synthetical stomachic, namely, orexin hydrochloride, was introduced into medicine. It was recommended for internal administration in doses of 5 to 8 grains by Professor Penzoldt. Although it is not yet quite clear whether it will justify the hopes first entertained of it, it is necessary to point out that recent experiments and observations seem to indicate that to a great extent the method of administration must be held responsible for the non-success sometimes experienced. Owing to its pungent and even caustic taste, orexin hydrochloride can scarcely be taken unmixed; it was therefore prescribed in pills, but in this form was rarely dissolved and consequently appeared inert. The remedy is best taken in wafers.

During the same twelve months the first synthetical local anæsthetic was also heard of under the name anæsthesin, as which the compound was to be protected by patent. At the International Medical Congress in Berlin the product was privately shown to me, and from what I then heard it seemed to be anticipated by pharmacologists that it would prove a formidable rival to cocaine. Although a considerable time has since elapsed nothing further has been publicly heard of it; possibly experiments are being still carried on with it which may lead to something.

A synthetical stimulant was also announced under the name ethylenimine or piperazidine hydrochloride, which was believed to be identical with the substance isolated from various organized structures by Charcot and Robin, and hence called Charcot's crystals, as well as with the base of Schreiner, prepared in 1878 from fresh spermatic fluid.

Recently however, differences of opinion have arisen as to the identity of Schreiner's spermine and piperazidine. The physiological experiments with the base and with the hydrochlorate of some authors seem to indicate the absence of stimulating properties, while others speak in favour of its use as a stimulant.

It is specially noteworthy that the base itself, piperazidinum purum, is able to dissolve twelve times as much uric acid as the same weight of lithium carbonate, and hence its future application is expected to lie in the treatment of gout.

Among other remedies which claim attention, benzoyl-guaiacol, or benzosol, must not be forgotten. It was introduced as a comparatively tasteless preparation of guaiacol for use in the so-called intensive creosote treatment of phthisis. It was given by Dr. Walzer in doses of 4 grains, gradually increasing to 1 grains (equal to 20 ms. of creasote), with satisfactory results, but the absorbing interest of Professor Koch's treatment has for the time, at least, quite obscured earlier methods of combating tuberculosis and allied diseases.

Salipyrin, or salicylate of antipyrin, is one of a class of compounds with antipyrin as a base. In quantities of 90 grains, divided into four or five doses, with intervals of an hour, it has been given as an antipyretic and antirheumatic. Under the name diuretin a double salicylate of sodium and theobromine has been put forward as a pure diuretic, and also in England successfully employed in doses of 8 to 15 grains.

Efforts have been continuously made to increase our knowledge of many of the new remedies, even to the extent in some instances, such as antipyrin, of devising new methods of synthesis. At the International Congress, Berlin, a large show-glass was exhibited containing antipyrin said to be prepared by a special process. The inventor of the new method, however, did not apparently think it advisable to introduce the product, as the process did not sufficiently differ from that of the patentees to prevent it being included in their specifications. More recently quite a new process has been patented, the product of which is apparently identical with antipyrin. As the process has already been described it will be unnecessary to detail it here.

Further, the introduction of "euphorine" (the fancy name for phenyl-urethane) must be recorded. In doses of 6 to 8 grains it has been employed as an antipyretic, antirheumatic and analgesic.

Of paracresotate of sodium I have previously elsewhere given a sufficiently detailed account with special reference to its nontoxicity and employment as a substitute for salicylate of sodium. At the same time I described the various salicyl esters of salol, the so-called cresalols, which have also been applied in medicine.

As I have already pointed out it is not possible in the limited space at my disposal to give details of chemistry, etc., but I have appended a full list of new remedies, stating their therapeutical use and dose, which may, if printed in your proceedings, be useful to the members for reference.

Acetanilide	Analgesic and antipyretic	2-5 grns. per os.
Acetylphenylhydrazin	Antipyretic and analgesic	3-5 grns. "
Agaricine	Antisudorific in phthisis	¼ gr. "
Amylene hydrate	Hypnotic, anodyne	½-1 drm.
Anthrarobin	Against skin diseases	
Antipyrin	Antifebrile and anodyne	15-30 grns. per os. or subcutaneously.
Aristol	Antiseptic and in skin diseases	
Benzoyl-anilide	Antipyretic	1½-5 grns. per os.
Benzoylguaiacol	Antituberculotic	4-10 grns. "
Betol	Anti-gonorrhoic	In bougie.
Bismuth salicylate	Against gastric affections	6-15 grns. per os.
Bromoform	Against pertussis	1-2 ms. per os.
Camphoric acid	Antisudorific in phthisis, etc.	30 grns. "
Cetrarin	Stomachic	2 grns. per os.
Chloralamide	Hypnotic	30-45 grns. per os.
Chloralurethan	Hypnotic	15-45 grns. "
Creolin	Antiseptic	5 ms. internally.
Creasote	Anti-tuberculotic	3 ms. per os.
Cresalol	Antiseptic, antifebrile	
Ethylenimine hydrochloride	General stimulant	⅙-⅓ grain subcutaneously.
Exalgine	Analgesic	4 grains.
Guaiacol	Anti-tuberculotic	1 m. per os.
Hydrastinine	Against uterine hæmorrhage	1 gm. subcutaneously.
Hydroxylamine	Against skin diseases	Externally.
Hydracetin	See acetylphenylhydrazine	
Hypnone	Hypnotic	3 8 ms. per os.
Ichthyol	Anti-rheumatic; against sciatica, erysipelas, skin diseases	Externally and 4-20 ms. per os.
Iodine trichloride	Antiseptic	Externally in 1 p. c. of solution.
Iodoform bituminate	Antiseptic	Externally.
Iodol	Antiseptic	Externally.
Lanoline	As an ointment base or vehicle for other medicaments	
Mercury phenate	Antisyphilitic	⅓-½ grns. subcutan.
Mercury peptoglutine	Antisyphilitic	⅙ grn. "
Mercury salicylate	Antisyphilitic	⅙-⅓ grn. "
Mercury succinimate	Antisyphilitic	
Methacetin	Antipyretic	3 grns. per os. for children
Methylal	Hypnotic and anæsthetic	15-30 grns. per os.
Methylene blue	Analgesic	8-15 grns. "
Methylene chloride	Narcotic anæsthetic	
Monobromacetanilide	Analgesic	1-8 grns. "
Myrtol	Antiseptic in phthisis	5 ms. "
Naphthalene	Antiseptic	2-8 grns. "
Naphthoic acid	Antiseptic and antiparasitic	
Naphthol	Antiseptic	
Naphthol camphoratum	Antiseptic antituberculotic	Subcutaneously
Orexin hydrochloride	Stomachic	5-8 grns. per os.
Paraldehyde	Hypnotic and sedative	15-45 ms. "
Phenacetin	Antipyretic, antineuralgic	8-20 grns. "
Phenylurethan	Antifebrile, antirheumatic	6-8 grns. "
Piperazide hydrochloride	General stimulant	Externally
Pyoctanin	Antiseptic	
Pyridine	Antasthmatic	1-1½ drms. by inhalation
Pyrodin	See acetylphenylhydrazine	
Resorcin	Antipyretic and antifermentative	
Rubidium ammonium bromide	Antepileptic	½-1½ drms. per os.
Salipyrin	Antifebrile, anti-rheumatic	15 grns. "
Salol	Antiseptic antigonorrhoic	15-30 grns. "
Sodium theobromine salicylate	Diuretic	8-15 grns "
Sodium anisate	Antipyretic, antirheumatic	15 grns. "
Sodium dithiosalicylate	Antipyretic antirheumatic	3 grns. per os.
Sodium paracresotate	Antipyretic, antirheumatic	8-15 grns. "
Somnal	Hypnotic	30 ms. per os.
Sozoiodol	Antiseptic	Externally
Sulphaminol	Antiseptic	"
Sulphonal	Hypnotic	15-30 grns. per. os.
Terpene hydrate	Against pulmonary affections	3-10 " " "
Terpinol	Against pulmonary affections	2 ms. per os.
Tetronal	Hypnotic	15-30 grns. per os.
Thallin sulphate	Antigonorrhoic	Injection.
Thiol	Ichthyol substitute q.v.	
Tribromphenol	Antiseptic	Externally.
Trional	Hypnotic	15-30 grns. per os.
Thioresorcin	Antiseptic	
Urethane	Hypnotic	15-40 grns. " "

The President said the Association was indebted to Mr. Helbing for his valuable paper. Most of the new remedies were recommended very strongly by the men who invented them, but English doctors were inclined to look upon them with suspicion. They could not afford to devote their whole time to the therapeutic study of them, indeed few could undertake such work, and consequently many of these so-called new remedies were pronounced to be more or less failures. As evidence of how thoroughly up to date the paper was, he noticed the statement about the prescribing of orexin, which had only appeared a short time previously. He did not think the solvent action of piperazidine on uric acid was of much significance, though he would be glad to hear if its stimulant action had been practically proved.

Mr. Frank A. Rogers said the list of new remedies was a very interesting one, but he was not in a posision to discuss it. The author had not stated the best way of dispensing them except in one or two instances, and this was a point which was of special interest to them. He had not seen the statement that orexin was not given well in pills. The method of giving drugs in the form of wafers he quite agreed with; it was a practice which was coming more and more into use every day.

Mr. Smith asked if spermine had been shown to have any aphrodisiac properties.

Mr. Helbing in replying sketched the history of spermine from the emulsions of Brown-Séquard to the reputed purer preparation of Professor Poehl, and then alluding to the discussion on the subject at the International Medical Congress—when the identity of the active principle of spermine and Ladenburg's ethylenimine was suggested—showed how the synthetical ethylenimine or piperazidine came to be prepared. In the hands of Professor Kobert neither the synthetical compound nor Poehl's spermine gave encouraging results, while others found that piperazidine hydrochlorate was a useful remedy. Even in England one physician spoke well of it in lead paralysis. With regard to orexin, the compound was at first recommended to be given as pills. Professor Penzoldt himself gave it in wafer and in a second paper showed that the latter was the only effective form of administration. There was very little to say as to the dispensing of new remedies; if they were soluble they were given in solution with a little syrup, and if insoluble were best given in wafers. As known, the compressed form was also used, but of course special formulæ were not given for those. In Germany it was the general custom to prescribe these compounds as fine powders divided into doses which the public took in any way they liked. Benzoylguaiocol was, he believed, only given in the one series of cases, and then, as far as he remembered, in solution.

(*To be continued.*)

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

A meeting of the section was held on Monday, March 2, Mr. Tyrer in the chair.

Mr. V. H. Veley, of Oxford, read a paper on the action of nitric acid upon metals. He said that such a subject, though seemingly elementary, proved on study to present many important problems for solution, and the results of its investigation were largely different from those that would be expected by a conscientious believer in the assertions of the average text-book. An instance of the anomalies presented was afforded by the fact proved by Russell twenty years ago that hydrogen passed through silver nitrate precipitated silver, whence it might be supposed that silver would not dissolve in dilute nitric acid, which was of course not the case. His first experiments had been carried out with copper; the nitric acid used had been freed from nitrous acid by blowing air through it, the temperature being kept fairly low. Such nitric acid was sufficiently free from nitrous acid to give a reaction neither with metaphenylenediamine nor with potassium iodide and starch, the truth of this assertion being proved by direct experiment before the audience. Copper was without action on nitric acid thus prepared, provided both liquid and metal were kept in agitation. Traces of nitrous acid that might still be present or might be liberated by some incipient reaction set up by an external cause, might be got rid of by the addition of urea or potassium chlorate, either of which would destroy the nitrous acid as fast as it was formed. The need for the presence of nitrous acid to start and continue the reaction between copper and nitric acid was shown, by throwing on the screen the image of a trough, divided into three compartments, containing each a strip of copper, immersed one in purified nitric acid, another in nitric acid containing nitrous acid, and the third in nitric acid to which had been added one of the reagents aforesaid, which determined the removal of any nitrous acid that might be present or evolved. In the first little reaction (as evidenced by the bubbles of gas given) took place, in the second the action was brisk, while in the third it was scarcely perceptible. Similar tests were made with mercury and bismuth, the need for the presence of nitrous acid being demonstrated in each case. Coming to the interesting question of how the reaction between sensibly pure copper and nitric acid ever began, as it undoubtedly did begin, if special precautions to prevent it were not taken, Mr. Veley advanced the alternative hypotheses: (1) That there is in nitric acid purified from nitrous acid, however carefully, a quantity of the latter body too small for detection even by the very delicate methods at our disposal, but nevertheless sufficient to start the reaction; (2) that even in the most carefully purified metal there were traces of impurities which set up local galvanic circuits, and evolve small quantities of nitrous acid, which then serve to continue the reaction. Mr. Veley then referred to the experiments of Dr. Divers, which had led the latter to conclude that metals might be divided into two classes, according to the nature of the products evolved by their action on nitric acid; (1) those that yield nitrous acid as a primary product, and (2) those that do not. A belief in this division appeared to the author scarcely tenable. Zinc cadmium and iron had been ranked by Dr. Divers in the latter class. Carefully purified samples of these metals in the form of spheres were treated with nitric acid at the meeting and nitrous acid recognized as a product of their reaction therewith by means of the metaphenylenediamine test. Mr. Veley then demonstrated the truth of the seeming paradox that nitric acid was rather a retarding agent than otherwise in the reactions he had studied. By means of the lantern the image of a compartmented cell was thrown on the screen, in one division of which was seen the reaction caused by nitrous acid alone going on more briskly than that brought about by a mixture of nitrous and nitric acids. The action of nitric acid upon lead had also been studied; the same general law appeared to hold good, but matters were somewhat complicated by the insolubility of lead nitrate in nitric acid. Work illustrating the importance of the presence of nitrous acid in the action of nitric acid upon organic bodies had been done by Mr. Cross, the substance dealt with being jute cellulose.

In the discussion which followed Mr. A. G. Bloxam wished to hear further on the interesting point of the causes of initiation of the reaction between metals and nitric acid, as it appeared to him worthy of the closest investigation.

Mr. Rosenthal doubted the applicability of the general principle that nitrous acid was a necessary intermediary to the case of the nitration of organic substances, instancing the preparation of nitro-cellulose, in which the presence or absence of a little nitrous acid in the nitric acid was immaterial.

Mr. Watson Smith and Mr. Crowder spoke of the considerable influence exercised by the presence of nitrous acid in the sulphuric acid on its corrosive effects upon the lead of vitriol chambers.

Mr. Veley, in reply, disclaimed the intention of rigidly applying the principle he had enunciated to the action of nitric acid upon organic bodies. He could not throw further light on the point raised by Mr. Bloxam, but of the two hypotheses he had put forward preferred the second, viz., that attributing the starting of the reaction to the presence of impurities in the metal setting up local circuits.

After Mr. Wanklyn had read a note supplementary to the paper he recently presented to the section on the constitution of butter, the proceedings terminated.

Parliamentary and Law Proceedings.

THE SALE OF INFANTS' CORDIALS BY CHEMISTS.

An inquiry which had been adjourned on two previous occasions was concluded before the Wolverhampton Borough Coroner (W. H. Phillips, Esq.) on Wednesday, February 25, touching the death of Mary Jane Moore, four months old, which had resulted from an overdose of soothing syrup containing tincture of opium. The evidence in the case was remarkable for the singular discrepancies in the statements of the different witnesses, especially that of the chemist from whom the cordial was obtained, and that of the public analyst by whom it had been examined.

The mother of the deceased stated that it was an illegitimate child, and very weak from birth. On Saturday night week, as it did not seem well, she took it to Mr. Walton, chemist, and got a small bottle of soothing syrup. She afterwards gave the child two drops and put her to bed. The child slept with her all night and was alive when she got up next (Sunday) morning, but some time afterwards she found her dead. She was positive she had given the child no more than the two drops, and she did not believe any other person had given it any, although she admitted the bottle produced only contained one half the cordial she purchased from the chemist, and she could not account for what had become of the other portion. Mr. John Walton, pharmaceutical chemist, stated that he remembered the deceased child being brought to his shop on the Saturday night referred to. It was very thin and emaciated, and at the mother's request he supplied her with an ounce of soothing cordial prepared by himself, the ingredients of which were a very simple kind of syrup, essence of aniseed, and tincture of opium in the proportion of 2 minims to the ounce. He put a label on the bottle with the word "poison" and directions as to the number of drops to be given to an infant of the age of deceased. At least one half of the preparation he sold to the mother had been used.

Mr. A. H. W. Hunt, house surgeon at the Wolverhampton and Staffordshire Hospital, stated the results of a *post mortem* examination of the deceased. The body, though small and thin for a child of the age mentioned was fairly well nourished, and all the internal organs healthy. There were no marks of violence. There was a slight smell of opium perceptible, and from the appearances presented he came to the conclusion that the child died from the effects of administration of laudanum or some other narcotic poison.

At the concluding inquiry Mr. E. W. T. Jones, analytical chemist and borough analyst, stated that by direction of the coroner he had made a careful analysis of the contents of the bottle produced containing the preparation supplied by Mr. Walton, chemist. If the bottle had in the first instance contained an ounce of the mixture there would have been in the quantity missing about four minims or drops of tincture of opium. If the maximum dose mentioned on the label were taken, there would be less than half a minim of the tincture in it. There were about seven minims to the ounce.

The Coroner said it was difficult for him to direct the jury, because whilst half the quantity was stated by the chemist to be missing from the bottle, the mother said she gave the child only two drops of the cordial, in which there would have been an infinitesimal quantity of tincture of opium. Whatever verdict they returned, however, he thought it ought to be accompanied with a very strong recommendation with regard to the sale of these poisonous compounds.

The jury, after consulting for some time in private, returned a verdict that deceased, being a delicate child, died from the effects of opium innocently administered to her. They accompanied the verdict with the following remark: "The jury strongly recommend all chemists throughout England to cease the sale of any preparation containing opium which is to be administered to infants."

Obituary.

Notice has been received of the death of the following:—

On the 17th of February, Mr. Thomas Hewitt, Chemist and Druggist, Hulme, Manchester. Aged 73.

On the 20th of February, Mr. Samuel Thomas Negus, Chemist and Druggist, Gold Street, Northampton. Aged 55 years. Mr. Negus was an Associate in Business of the Society.

On the 21st of February, Mr. James Vaughan, Chemist and Druggist, Thornbury, Gloucestershire. Aged 79 years.

On the 25th of February, Mr. Robert Thornton, Chemist and Druggist, Preston, Lancashire. Aged 57.

Correspondence.

STANDARDIZATION OF TINCTURES.

Sir,—We notice in the last issue of the Journal, under the heading of "Standardization of Tinctures," a letter from Mr. J. Findlay, who states that he is working on the tinctures of aconite, belladonna and henbane with a view to their standardization. As we presume the object of his letter is to assert priority, and deter any one else from taking up the subject, we would beg to remind him that we have been working on this subject for many months past in connection with our experiments on tincture menstrua, and to call his attention to a letter in the *Pharm. Journ.* (Sept. 27, 1890) in which the fact, which he appears to ignore, was announced. Whilst we have no objection to Mr. Findlay, or indeed any one else working at the subject, we can but feel that after months of patient work on our part, it is scarcely fair for another to step in and calmly assert priority.

R. WRIGHT,
E. H. FARR.

NOTICES OF MEETINGS.

Chemists' Assistants' Association.—Thursday, March 12.—Paper on "Pharmaceutical Etymology," by Mr. J. C. Hyslop.

School of Pharmacy Students' Association.—Thursday March 12.—Paper on "Leeches," by Mr. T. M. Taylor, and a "Report on Materia Medica," by Mr. H. W. K. Pears.

Errata.—In the Benevolent Fund List of Subscriptions, p. 795, col. iii., insert—

Stark, A. Campbell 0 5 0

On p. 779, col. ii., line 22 from bottom, *for* "mischievous" *read* "insectivorous."

Nemo.—Probably the preparation of the Homœopathic Pharmacopœia (1882, p. 370).

J. F. Russell.—Hooker's 'Primer of Botany' or Holmes's 'Botanical Note Book.'

Inquirer.—A supply of the common couch grass could probably be obtained from a neighbouring nurseryman.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Andrews, Humphrey, Wright, Baker, Johnston, Gerrard, Merson, Mair, Hill, Nemo.

PROPOSED ALTERATIONS IN THE BYE-LAWS.

The following are the present bye-laws and the proposed new bye-laws that were read a first time at the meeting of the Council on Wednesday last:—

	Present Bye-laws.	**Proposed Bye-laws.**
	PRELIMINARY.	PRELIMINARY.
	In the following Bye-laws words importing the singular number shall include the plural number, and words importing the plural number shall include the singular number, unless there be something either in the subject or context repugnant to such construction. By the expression, "the Statute, 1852," shall be meant and intended the Statute, 15 and 16 Vict., cap. 56, intituled "An Act for regulating the qualifications of Pharmaceutical Chemists;" and by the expression "the Act, 1868," shall be meant and intended the Statute, 31 and 32 Vict., cap. 121, intituled "An Act to regulate the Sale of Poisons, and alter and amend the Pharmacy Act, 1852." All the Bye-laws heretofore passed are hereby repealed.	In the following Bye-laws words importing the singular number shall include the plural number, words importing the plural number shall include the singular number, and words importing the masculine shall include the feminine, unless there be something either in the subject or context repugnant to such construction. By the expression, "the Charter," shall be meant and intended the Royal Charter of Incorporation of the Society. By the expression "the Statute, 1852," shall be meant and intended the Statute, 15 and 16 Vict., cap. 56, intituled "An Act for regulating the qualifications of Pharmaceutical Chemists;" and by the expression "the Act, 1868," shall be meant and intended the Statute, 31 and 32 Vict., cap. 121, intituled "An Act to regulate the Sale of Poisons, and alter and amend the Pharmacy Act, 1852." All the Bye-laws heretofore passed are hereby repealed.
	SECTION I. QUALIFICATIONS, ELECTIONS, AND SUBSCRIPTIONS.	SECTION I. QUALIFICATIONS, ELECTIONS, AND SUBSCRIPTIONS.
Charter, lines 77, 90, 92; Stat. 1852, sec. 10.	1. Persons who have respectively become Members, Associates, and Apprentices or Students of the Society, pursuant to the Charter of Incorporation, the Statute, 1852, and the Bye-laws which have heretofore from time to time been in force, may continue to be Members, Associates, and Apprentices or Students respectively, subject to the Bye-laws in force for the time being.	1. Persons who have become Members and Associates pursuant to the Charter, the Statute, 1852, or the Act, 1868, may continue to be such Members or Associates accordingly. Persons who have become Apprentices or Students, pursuant to the Charter and the Statute, 1852, may be registered as Students, and all the said Members, Associates or Students, shall respectively so continue, subject to the Bye-laws in force for the time being.
Charter, lines 77, 90, 92; Stat. 1852, sec. x.; Act 1868, secs. xviii. xx.	2. Persons qualified to be elected Members, Associates, or Apprentices or Students of the Society, shall at a meeting of the Council be proposed and seconded by Members of the Council. The qualification of the proposed Member, Associate, or Apprentice or Student, shall be stated in a written resolution, which, when proposed and seconded, shall be submitted to the Council, and, when passed, shall confer the right of becoming a Member, Associate, or Apprentice or Student.	2. Persons qualified to be elected Members, Associates, or Students of the Society, shall at a meeting of the Council be proposed and seconded by Members of the Council. The qualification of the proposed Member, Associate, or Student, shall be stated in a written resolution, which, when proposed and seconded, shall be submitted to the Council, and, when passed, shall confer the right of becoming a Member, Associate, or Student.
Stat. 1852, sec. x.	3. Persons registered as Pharmaceutical Chemists under section 10 of the Statute, 1852, and desirous of becoming Members of the Society, shall make application to the Council in that behalf.	No alteration.
Act 1868, secs. xviii. xix.	4. Persons who, at the time of the passing of the Act, 1868, were or had been in business on their own account as Chemists and Druggists, who shall be registered as Chemists and Druggists, and be desirous of becoming Members of the Society, in exercise of the privileges conferred by Sections 18 and 19 of the Act, 1868, shall make application to the Council in that behalf.	4. Persons who, at the time of the passing of the Act, 1868, were or had been in business on their own account as Chemists and Druggists, who have been registered as Chemists and Druggists, and are desirous of becoming Members of the Society, in exercise of the privileges conferred by Sections 18 and 19 of the Act, 1868, shall make application to the Council in that behalf.
Charter, line 82.	5. Associates of the Society, who became such before the 1st day of July, 1842, shall be elected Members on the production of certificates of qualification satisfactory to the Council.	To be repealed.
Stat. 1852, sec. x.; Act 1868, sec. xviii.	6. No persons other than those who have previously been registered as Pharmaceutical Chemists, or Associates of the Society who became such before the 1st day of July, 1842, or those who, at the time of the passing of the Act, 1868, were or had been in business on their own account as Chemists and Druggists, and have previously been registered as Chemists and Druggists, shall be elected Members, unless as Honorary or Corresponding Members.	5. No persons other than those who have previously been registered as Pharmaceutical Chemists, or those who, at the time of the passing of the Act, 1868, were or had been in business on their own account as Chemists and Druggists, and have previously been registered as Chemists and Druggists, shall be elected Members, unless as Honorary Members or as Corresponding Members.
Stat. 1852, sec. x.; Act 1868, sec. xviii.	7. Persons registered as Assistants, and desirous of becoming Associates of the Society, under Section 10 of the Statute, 1852, and persons registered as Chemists and Druggists, by reason of having obtained certificates of qualification from the Board of Examiners, and desirous of becoming Associates of [the	6. Persons registered as Chemists and Druggists, by reason of having obtained certificates of qualification from either of the Boards of Examiners, and desirous of becoming Associates of the Society, under section 20 of the Act, 1868, shall make application to the Council in that behalf, and no other person shall be elected an Associate. [7.

	Present Bye-laws.	Proposed Bye-laws.
	the Society, under section 20 of the Act, 1868, shall make application to the Council in that behalf, and no other person shall be elected an Associate.	
Charter, lines 92, 97; Stat. 1852, sec. x.	8. Persons registered as Apprentices or Students under Section 10 of the Statute, 1852, shall be eligible for admission as Apprentices or Students of the Society, and, if desirous of being admitted accordingly, shall make application to the Council in that behalf.	7. Persons registered as Apprentices or Students under Section 10 of the Statute, 1852, shall be eligible for admission as Students of the Society, and, if desirous of being admitted accordingly, shall make application to the Council in that behalf.
	9. All persons on election as Members, Associates, or Apprentices or Students, shall sign a written declaration, stating their full names and addresses, and their willingness to comply with the regulations of the Society.	8. All persons on election as Members, Associates, or Students, shall sign a written declaration, stating their full names and addresses, and their willingness to comply with the regulations of the Society.
Charter, lines 85, 98, 269. Stat. 1852, sec. v.	10. All Subscriptions for the current year shall become due upon election, and all annual subscriptions shall become due on the first day of January in every year; and if any Member, Associate, or Apprentice or Student shall not have paid his annual subscription before the first day of May in any year, his name shall be omitted from the Register of Members, Associates, and Apprentices or Students of the Society, certified by the Council at the Annual Meeting. It shall be competent to the Council to restore any person whose name has been so removed to his former status in the Society on payment of his subscription for the then current year, and a sum not less than the amount of half of one year's subscription, nor exceeding five guineas, as for and in commutation of his arrears of subscription.	9. All Subscriptions for the current year shall become due upon election, and all annual subscriptions shall become due on the first day of January in every year; and if any Member, Associate, or Student shall not have paid his annual subscription before the first day of May in any year, his name shall be omitted from the Register of Members, Associates, and Students of the Society, certified by the Council at the Annual Meeting. It shall be competent to the Council to restore any person whose name has been so removed to his former status in the Society on payment of his subscription for the then current year, and a sum to be determined by the Council, and being not less than one shilling nor exceeding one guinea, as for and in commutation of his arrears of subscription.
Charter, line 85.	11. All persons who have become Life Members of the Society pursuant to Bye-laws which have heretofore from time to time been in force, shall be exempt from further contributions to the funds of the Society.	No alteration.
	12. All persons becoming Members of the Society, in exercise of the privileges conferred and defined by Sections 18 and 19 of the Act, 1868, shall on election pay an entrance-fee or sum of two guineas, exclusive of an annual subscription.	To be repealed.
Charter, lines 85, 269.	13. All Members of the Society, except Life Members or Honorary and Corresponding Members, shall pay an annual subscription of one guinea.	11. All Members of the Society, except Life Members, Honorary Members and Corresponding Members, shall pay an annual subscription of one guinea.
Charter, line 268.	14. All persons who before the 1st day of October, 1862, paid fees on, and passed the Major examination, and who, by reason of registration as Pharmaceutical Chemists, under the Statute, 1852, qualified themselves to be elected Members of the Society, shall have the option of becoming Life Members exempt from further contribution on payment of a life subscription of five guineas.	To be repealed.
Charter, line 269.	15. All Members of the Society, other than those mentioned in the last preceding Bye-law, shall, after having paid the entrance fee, if any payable, have the option of becoming Life Members exempt from further contribution on payment of a life subscription of twenty guineas.	12. All Members of the Society, and all persons qualified for election as Members of the Society shall have the option of becoming Life Members exempt from further contribution on payment of a life composition of ten guineas.
	16. All persons who, prior to the 1st day of October, 1862, became Associates, Apprentices or Students, and who may not for the time being be entitled to exercise and be exercising any privilege created by Section 20 of the Act, 1868, shall be exempt from annual subscriptions to the funds of the Society, as Associates, Apprentices or Students respectively.	To be repealed.
Charter, lines 96, 269.	17. All Associates, Apprentices, and Students, other than those exempted by the last-preceding Bye-law and other than Associates entitled to continue, and continuing Associates, being in business on their own account, shall pay an annual subscription of half-a-guinea.	13. All Associates and Students, other than Associates who are in business on their own account, shall pay an annual subscription of half-a-guinea.
Act, 1868, sec. xx.	18. All the Associates who, under Section 20 of the Act, 1868, are entitled to continue, and are desirous of continuing as such Associates, being in business on their own account, shall give notice to the Secretary in that behalf, and shall, in accordance with the same section, contribute to the funds of [the	14. All the Associates who, under Section 20 of the Act, 1868, are entitled to continue and are desirous of continuing as such Associates, being in business on their own account, shall give notice to the Secretary in that behalf, and shall, in accordance with the same section, contribute to the funds of the [Society

Present Bye-laws.	**Proposed Bye-laws.**
the Society the same subscriptions as Members, and in default thereof shall cease to be Associates.	Society the same subscriptions, whether annual, life, or otherwise, as Members, and in default thereof shall cease to be Associates.
19. Persons who have exercised the privilege of continuing Associates whilst in business on their own account shall, on ceasing to be in business on their own account give notice thereof to the Registrar, and the Registrar shall thereupon, without fee, amend the Register of Associates, in accordance with such notice, and the Associates shall, whilst so ceasing to be in business pay the annual subscription of half-a-guinea.	To be repealed.
SECTION II. HONORARY AND CORRESPONDING MEMBERS.	SECTION II. HONORARY AND CORRESPONDING MEMBERS.
Charter, lines 225, 274. 1. The Council shall at their discretion elect as Honorary and Corresponding Members of the Society such scientific men as have distinguished themselves in any of the branches of knowledge embraced in the educational objects of the Society.	1. The Council shall at their discretion elect as Honorary Members, or as Corresponding Members of the Society such scientific men as have distinguished themselves in any of the branches of knowledge embraced in the educational objects of the Society.
Charter, lines 225, 274. 2. The Council shall from time to time determine the number of persons to be Honorary and Corresponding Members, and there shall be a book kept by the Council in which Members of the Council shall enter the names of persons whom they may consider eligible for election, and at the meeting of the Council in April of every year names shall be selected from the book so to be kept, not exceeding in number the vacancies in the list of Honorary and Corresponding Members, and the names of the persons so selected shall be exhibited in the Library, until the meeting of the Council in the ensuing month, when the Council shall proceed to the election.	2. The Council shall from time to time determine the number of persons to be Honorary Members, and the number of persons to be Corresponding Members. There shall be books kept by the Secretary, in which Members of the Council shall enter the names of persons whom they may consider eligible for election as Honorary Members or as Corresponding Members, and at the meeting of the Council in April of every year names shall be selected from the books so kept, not exceeding in number the vacancies in the lists of Honorary Members or of Corresponding Members respectively, and the names of the persons so selected shall be exhibited in the Library, until the meeting of the Council in the ensuing month, when the Council shall proceed to the election.
SECTION III. COMMON SEAL.	
Charter, line 36. 1. The Common Seal of the Pharmaceutical Society of Great Britain shall consist of the armorial bearings, crest, and motto, registered in Her Majesty's College of Arms.	No alteration.
2. The said seal shall be deposited at the house of the Society, in a box having a lock and two keys, one of which shall be in the custody of the President, and the other in that of the Vice-President.	No alteration.
3. The Common Seal may be set or affixed to any deed, instrument, or writing, in pursuance of an order or minute of the Council entered in their minute book, and in the presence of the President, or Vice-President, or two Members of the Council, and not otherwise.	No alteration.
SECTION IV. BYE-LAWS AND REGULATIONS.	SECTION IV. BYE-LAWS AND REGULATIONS.
The making, altering, or abrogating of any Bye-law or any Regulation, to be prescribed by the Society, in accordance with any statute, shall be in the following manner :—	
Charter, lines 250, 277; Stat. 1852, sec. ii. Act 1868, sec. vi. 1. A written formula for any proposed Bye-law or Regulation, or for altering or abrogating any Bye-law or Regulation, being delivered by a Member of the Council to the Chairman, shall thereupon be read and, if seconded and approved, shall be referred to two subsequent ordinary or special Meetings of the Council for confirmation, and then to a special General Meeting of the Members of the Society, and afterwards to the Privy Council, according to the provisions of the Pharmacy Act, 1852, and the Pharmacy Act, 1868.	No alteration.
2. A copy of the Bye-laws shall be given to every [Member	2. A copy of the Bye-laws shall be given to every [Member

	Present Bye-laws.	Proposed Bye-laws.
	Member and Associate of the Society on his election, and shall at any time be delivered to any Member, Associate, Apprentice or Student of the Society, on his applying for the same and paying one shilling.	Member, Associate, and Student of the Society on his election, and shall at any time be delivered to any Member, Associate, or Student of the Society, on his applying for the same and paying one shilling.
	SECTION V. ELECTION OF COUNCIL AND AUDITORS.	SECTION V. ELECTION OF COUNCIL AND AUDITORS.
Charter, lines 166, 180	1. Two thirds of the Members of Council shall go out of office in every year according to the provisions of the Charter: seven of them shall consist of those Members who remained in the Council after the lot was taken in the last preceding year, or their representatives; the other seven shall be taken by lot from the remaining fourteen Members.	1. Two thirds of the Members of Council shall go out of office in every year according to the provisions of the Charter; seven of them shall consist of those Members who remained in the Council after the lot was taken in the last preceding year, or their successors; the other seven shall be taken by lot from the remaining fourteen Members.
	2. The retiring Members of the Council shall be ascertained and determined at the monthly meeting held in February of every year, and the names shall be advertised on or before the 10th day of March in every year.	2. The retiring Members of the Council shall be ascertained and determined at the monthly meeting held in February of every year, and their names shall be published on or before the 10th day of March in every year.
Act 1868, sec. xix.	3. Any person qualified to vote desirous of nominating any Member for election as a Member of the Council or as an Auditor, shall give notice in writing with the name and address of the nominee, and if for the Council disclosing whether such nominee be or not a Pharmaceutical Chemist, to the Secretary of the Society, on or before the 24th day of March in every year, and the Secretary shall on or before the 26th day of March then instant address and send by post to each nominee a notice of his having been so nominated and inquiring whether he will accept office if elected, and in default of a written reply from such nominee, declaring his readiness to accept office if elected being received on or before the 31st day of March then instant, such nominee shall not be deemed eligible or willing to be elected.	3. Any person qualified to vote desirous of nominating any Member for election as a Member of the Council or as an Auditor, shall on or before the 24th day of March in every year, give notice in writing to the Secretary of the Society, with the name and address of the nominee, and if for the Council disclosing whether such nominee be or not a Pharmaceutical Chemist. The Secretary shall on or before the 26th day of March then instant address and send by post to each nominee a notice of his having been so nominated and inquiring whether he will accept office if elected, and in default of a written reply from such nominee being received on or before the 31st day of March then instant, declaring his readiness to accept office if elected, such nominee shall not be deemed eligible or willing to be elected.
Act 1868, sec. xix.	4. The Council shall at their monthly meeting, held in April of every year, prepare a list of all persons nominated for election and eligible and willing to be elected Members of the Council and Auditors for the ensuing year, and disclosing the qualifications of nominees for the Council; and in default of the nomination of a sufficient number of persons eligible and willing to accept office, the Council shall nominate as many as may be required to form a complete list of eligible and willing persons to fill all the vacancies in the Council, and a complete list of five Auditors. No nominations shall be received or made after the 24th day of March, except such as may be made by the Council, in the manner and under the circumstances aforesaid, at the monthly meeting in April.	No alteration.
Act 1868, sec. xix.	5. The Secretary shall issue to every person residing in Great Britain and qualified to vote, not less than ten days prior to the meeting at which Members of the Council and Auditors, or either of them, are to be elected, a Voting Paper for such elections. The names and residences of the Members eligible and willing for election, and whether they are or not on the Register of Pharmaceutical Chemists, shall appear in such Voting Papers, and in all Voting Papers for the election of Members of the Council, the names of the Members who remain in office, and whether they are or not on the Register of Pharmaceutical Chemists, shall also appear.	5. The Secretary shall send by post to every person qualified to vote, not less than ten days prior to the meeting at which Members of the Council and Auditors, or either of them, are to be elected, a Voting Paper for such elections. The names and residences of the Members eligible and willing for election, and whether they are or not on the Register of Pharmaceutical Chemists, shall appear in such Voting Papers, and in all Voting Papers for the election of Members of the Council, the names of the Members who remain in office, and whether they are or not on the Register of Pharmaceutical Chemists, shall also appear.
Charter, line 149; Act 1868, sec. xxi.	6. At all elections of Members of the Council and Auditors, votes may be given by ballot, either by personal delivery of the said Voting Papers at the time of election, or by the said Voting Papers being transmitted under cover to the Secretary, so that the same shall be received by him not less than one clear day prior to the day on which the election is to take place, and the Voting Papers shall be in the following form:— Voting Paper to be delivered personally on the [day	No alteration.

Present Bye-laws.

day of election, May , 18 , or transmitted under cover to the Secretary, so that it shall be received by him not less than one clear day prior to the day on which the election is to take place. An envelope duly addressed accompanies this.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

17, BLOOMSBURY SQUARE, W.C.

For the election of Fourteen Members of the Council.

NAMES OF MEMBERS ELIGIBLE AND WILLING FOR ELECTION.

1* ____
2 P.C. ____
3 ____
4*P.C. ____
5 ____
6 ____
7 ____
8 ____
9 ____
10 ____
11 ____
12 ____
13 ____
14 ____
15 ____
16 ____
17 ____
18 ____
19 ____
20 ____

The names to which Stars are prefixed are those of Members of the present Council who are eligible for re-election.

The names to which the letters P.C. are prefixed are those of Pharmaceutical Chemists.

The names to which the letters P.C. are not prefixed are those of persons who are not on the Register of Pharmaceutical Chemists.

INSTRUCTIONS FOR VOTING.

Every person voting must erase the names of all the Candidates for whom he does not intend to vote. If more than fourteen names be left, the Voting Paper will be rejected. Section 19 of the Act, 1868, is printed below.

The Voting Paper, after the erasure of names, should be folded up, and must be transmitted under cover to the Secretary, so that the same shall be received by him not less than one clear day prior to the day on which the election is to take place, or delivered by the voter personally at the time of election.

To prevent imposition, the person voting must sign his name and address on the line on the outside of the cover.

The following are the Members who remain on the Council:—

P.C. ____

____

P.C. ____
P.C. ____

____

P.C. ____

The names to which the letters P.C. are prefixed, are those who are Pharmaceutical Chemists.

Section 19 of the Act, 1868, is as follows:—

Every person who is or has been in business on his own account as a Chemist and Druggist, as aforesaid, at the time of the passing of this Act, and who shall become a Member of the Pharmaceutical Society, shall be eligible for election to the Council of the Pharmaceutical Society, but the said Council shall not at any time contain more than

[seven

Present Bye-laws.	**Proposed Bye-laws.**
seven Members who are not on the Register of Pharmaceutical Chemists. —— is the utmost number of Members not Pharmaceutical Chemists who can be elected on the Council on the present occasion. PHARMACEUTICAL SOCIETY OF GREAT BRITAIN. 17, Bloomsbury Square. *Voting Paper, May, 18 , for the election of Five Auditors.* CANDIDATES. 1 ______________ 2 ______________ 3 ______________ 4 ______________ 5 ______________ 6 ______________ 7 ______________ INSTRUCTIONS FOR VOTING. Every person voting must erase the names of all the Candidates for whom he does not intend to vote. If more than five names be left, the Voting Paper will be rejected. The Voting Paper, after the erasure of names, should be folded up, and must be transmitted to the Secretary, so that the same shall be received by him not less than one clear day prior to the day on which the election is to take place, or delivered by the voter personally at the time of election. To prevent imposition, the voter must sign his name and address on the outside of the cover. *Form of Address, etc., on Envelope.* VOTING PAPER. Voter's Signature ______________ Voter's Address ______________ *To the Secretary of the Pharmaceutical Society, 17, Bloomsbury Square, London, W.C.* The Voting Paper must be returned to the Secretary, so that the same may be received by him on or before the day of May, 18 , or be delivered personally at the time of election.	
7. Before the votes are taken, the persons constituting the meeting shall appoint from amongst themselves four or more Scrutineers, of whom four shall form a quorum.	No alteration.
8. The Voting Papers to be delivered personally shall be received at the General Meeting, and the Voting Papers duly transmitted under cover to the Secretary shall be opened by or in the presence of the Scrutineers.	No alteration.
Charter, line 113. 9. The Scrutineers shall ascertain the number of votes given for each Member nominated for election, and in any case of an equality of votes, the Chairman of the Meeting shall have a second or casting vote.	9. The Scrutineers shall ascertain the number of votes given for each Member nominated for election.
Act 1868, sec. xix. 10. It being provided by Section 19 of the Act, 1868, that the Council shall not at any time contain more than seven Members who are not on the Register of Pharmaceutical Chemists, the Scrutineers shall, after the voting on any election of Members of the Council, certify to the Chairman of the Meeting whether or not the number of Members not on the Register of Pharmaceutical Chemists nominated for election is more than seven, or more than may with any like Members remaining on the Council make up the number of seven; and if they shall certify that the number of Members not on the Register of Pharmaceutical Chemists nominated for election is more than seven, or more than may as aforesaid [make	No alteration. [No

Present Bye-laws.	Proposed Bye-laws.
make up the number of seven, then they shall further likewise certify the number of votes given in favour of each of such Members so nominated, and which of such Members so nominated to the number of seven or the lesser number, sufficient to make up as aforesaid the number of seven, have a majority of votes over the remainder of such Members, and that such of the said Members as have not the said majority are in a minority of their class.	
11. The Scrutineers shall make to the Chairman a return, signed by them, of the names of the Members nominated for election, but in the case of an election of Members of the Council, such return shall be exclusive of the names of such, if any, Members not being Pharmaceutical Chemists as may be certified to be in a minority of their class, and the said return shall disclose the number of votes given for each Member named therein.	No alteration.
12. The Chairman of the Meeting shall declare the result of every election; and, in cases where there shall have been a poll, shall declare the election to have fallen on the Members who according to the return of the Scrutineers contemplated by the last preceding Bye-law, shall appear to have a majority.	12. The Chairman of the Meeting shall declare the result of every election; and, in cases where there shall have been a poll, shall declare the election to have fallen on the Members who, according to the return of the Scrutineers contemplated by the last-preceding Bye-law, shall appear to have a majority, and in the case of an equality of votes, the Chairman of the Meeting shall have a second or casting vote.
13. The Chairman at any Meeting for the election of members of the Council or Auditors, shall have the power of adjourning such Meeting from time to time, with a view to the reception of the Report of the Scrutineers, but no such adjournment shall extend beyond a period of four days.	No alteration.
SECTION VI. COUNCIL.	SECTION VI. COUNCIL.
Charter, line 196. Charter, line 201. 1. The Council shall meet at the Society's house on the first Wednesday in every month at eleven o'clock in the forenoon. Seven Members shall constitute a quorum, and without that number being present no business shall be transacted; before other business is entered on, the minutes of the preceding monthly and of any subsequent meeting or meetings shall be read.	1. The Council shall meet at the Society's house on or about the first Wednesday in every month at eleven o'clock in the forenoon, or at such other hour as may from time to time be decided by the Council. Seven Members shall constitute a quorum, and without that number being present no business shall be transacted. Before other business is entered on, the minutes of the preceding monthly and of any subsequent meeting or meetings shall be read.
Charter, line 110. Charter, line 113. 2. All motions or proposals shall be written, together with the names of the mover and seconder, and upon being put shall be decided by a show of hands, except in cases of a ballot, which may be demanded by any Member. Should the numbers be equal, the Chairman shall have a second or casting vote. It shall be lawful for the Chairman to postpone or adjourn to the next meeting any motion whereof notice in writing has not been given at a prior meeting.	2. All motions or proposals shall be written, together with the names of the mover and seconder, and upon being put shall be decided by a show of hands, except in cases of a ballot, which may be demanded by any Member. Should the numbers be equal, the Chairman shall have a second or casting vote. It shall be lawful for the Chairman to postpone or adjourn to the next meeting any motion whereof notice in writing has not been given to the Secretary at least six clear days before the meeting.
3. All resolutions carried at the Meetings of the Council, except such as relate to the Bye-laws, shall be acted upon without confirmation.	No alteration.
4. The Council shall elect from among themselves a Committee for General Purposes, a Committee of Finance, a Committee for the Library, Museum, and Laboratory, and from time to time such other Committees as may be necessary. The President and Vice-President shall be *ex officio* Members of all Committees, and, if present, one of them shall preside.	4. The Council may from time to time in their discretion appoint such Committees as shall appear to them expedient, and shall elect from among themselves a Committee of General Purposes, a Committee of Finance, and a Committee for the Library, Museum, School and House, and may from time to time modify or dissolve any Committee. The President and Vice-President shall be *ex officio* Members of all Committees, and the President shall preside at all meetings of the Council and of Committees, or in his absence the Vice-President. If the President and Vice-President are both absent, a Chairman shall be chosen by the Members present.
SECTION VII. COMMITTEE FOR GENERAL PURPOSES.	
1. This Committee shall consist of not less than twelve Members, four of whom shall constitute a quorum.	No alteration.
[The	[1.

Present Bye-laws.	**Proposed Bye-laws.**
The Committee shall meet as often as may be required, and its proceedings shall be reported to the Council.	
SECTION VIII. COMMITTEE OF FINANCE.	SECTION VIII. COMMITTEE OF FINANCE.
1. This Committee shall consist of not less than four Members, two of whom shall constitute a quorum. The Committee shall meet once or oftener in every month.	1. This Committee shall consist of not less than four Members, two of whom shall constitute a quorum. The Committee shall meet as often as may be required.
2. It shall be the duty of this Committee to regulate and examine the accounts, to check the receipt of all moneys, to examine all bills, and to present at the monthly meetings of the Council such as shall have been approved for payment, with the signature of a quorum attached. This Committee shall also prepare a balance sheet for the Auditors previous to the annual meeting.	2. It shall be the duty of this Committee to regulate and examine the accounts, to check the receipt of all moneys, to examine all bills, and to present at the monthly meetings of the Council such as shall have been approved for payment, with the signature of a quorum attached. This Committee shall also prepare a Financial Statement for the Auditors previous to the annual meeting.
SECTION IX. THE COMMITTEE FOR THE LIBRARY, MUSEUM, AND LABORATORY.	SECTION IX. THE COMMITTEE FOR THE LIBRARY, MUSEUM, SCHOOL AND HOUSE.
1. This Committee shall consist of not less than five Members, three of whom shall constitute a quorum. The Committee shall meet once, or oftener, in every month, and report from time to time to the Council.	1. This Committee shall consist of not less than five Members, three of whom shall constitute a quorum. The Committee shall meet as often as may be required, and report from time to time to the Council.
2. It shall be the duty of this Committee to superintend the arrangement and preservation of the books, specimens, and apparatus, to inspect the Laboratory, and to make regulations for the admission of visitors and students to the Library, Museum, and Laboratory.	2. It shall be the duty of this Committee to superintend the School and the House, the arrangement and preservation of the books, specimens, and apparatus, to inspect the Laboratory, and to make regulations for the admission of visitors and students to the Library and Museum.
SECTION X. EXAMINERS—EXAMINATIONS—FEES.	SECTION X. EXAMINERS—EXAMINATIONS—FEES.
Charter line 218; Stat. 1852, sec. viii Act 1868, sec. vi. 1. The Boards of Examiners respectively heretofore appointed shall continue in office until the end of the year 1873.	To be repealed.
2. The Council shall, at their first meeting, in December, 1873, and in every subsequent December, appoint such competent persons as they shall think fit, to be Examiners for the year to commence on the then following first day of January, to conduct all such examinations as are provided for or contemplated by the Charter or by the Statute, 15 and 16 Vict., c. 56, and the persons so appointed shall, for the period of their appointment, constitute and be called the Board of Examiners for England and Wales.	1. The Council shall, at their meeting, in December, in every year, appoint such competent persons as they shall think fit, to be Examiners for the year to commence on the then following first day of January, to conduct all such examinations as are provided for or contemplated by the Charter, or by the Statute, 1852, or by the Act, 1868, and the persons so appointed shall, for the time being, constitute and be called the Board of Examiners for England and Wales.
3. The Council shall, at their first meeting in December, 1873, and in every subsequent December, appoint fit and proper persons in Scotland to be Examiners for the year to commence on the then following first day of January, and to meet in Edinburgh or Glasgow, or such other place or places as the Council may think desirable, and to conduct there all such examinations as are provided for or contemplated by the Statute 15 and 16 Vict., c. 56, and the persons so appointed shall for the period of their appointment constitute and be called the Board of Examiners for Scotland.	2. The Council shall, at their meeting in December, in every year, appoint such competent persons in Scotland as they shall think fit to be Examiners for the year to commence on the then following first day of January, to conduct all such examinations as are provided for or contemplated by the Charter, or by the Statute, 1852, or by the Act, 1868, and the persons so appointed shall, for the time being, constitute and be called the Board of Examiners for Scotland.
4. The President and Vice-President of the Society shall, *ex officio*, be members of the Boards of Examiners, and either of them present at any meeting of either of such Boards shall preside thereat.	No alteration.
5. The Council shall not appoint any person who has attained the age of sixty-five years at the time of the appointment to be an Examiner.	No alteration.
6. No person shall be appointed an Examiner who at the time of appointment is, or who during one year prior to the time of appointment has been, a Member of the Council; and the election of any Examiner to be a Member of the Council shall vacate his appointment as an Examiner.	No alteration.
7. The Board of Examiners for England and [Wales	6. The Boards of Examiners for England and [Wales

	Present Bye-laws.	Proposed Bye-laws.
Charter, lines 218, 253.	Wales shall consist of not more than fourteen nor less than eight Pharmaceutical Chemists, exclusive of the President and Vice-President of the Society. The Board of Examiners for Scotland shall consist of not more than eight nor less than four Pharmaceutical Chemists, exclusive of the President and Vice-President of the Society. The Council of the Society may from time to time appoint Professors of Science to assist either of the Boards of Examiners at any of their Examinations. Eight members of the Board of Examiners for England and Wales, and four members of the Board of Examiners for Scotland, exclusive in each case of assistant Professors, shall constitute a quorum.	Wales shall consist of not more than fourteen nor less than eight persons, exclusive of the President and Vice-President of the Society; eight to constitute a quorum. The Board of Examiners for Scotland shall consist of not more than eight nor less than four persons exclusive of the President and Vice-President of the Society; four to constitute a quorum.
Stat. 1852, sec. viii.	8. The Council of the Society shall from time to time supply any vacancy in the office of Examiner, and may remove any member of the Board of Examiners, and substitute another person in his place, and may also from time to time appoint a Special Examiner, or Special Examiners, to conduct any examination as to knowledge of the Latin language.	7. The Council shall from time to time supply any vacancy in the office of Examiner, and may remove any member of the Boards of Examiners, and substitute another person in his place, and may also from time to time appoint a Special Examiner, or Special Examiners, to conduct any examination or part of an examination, or to assist the Boards of Examiners.
Act 1868, sec. vi.	9. As the Act, 1868, contains a provision that all such persons as have from time to time been appointed to conduct examinations under the Pharmacy Act shall be and are thereby declared to be Examiners for the purposes of that Act, provided that no person shall conduct any examination for the purposes of that Act until his appointment has been approved by the Privy Council, the Secretary shall from time to time submit to the Privy Council for approval all appointments of Examiners made by the Council of the Society, and shall also give notice to the Privy Council of all examinations to be held for the purposes of that Act, stating the times and places at which such examinations will be held, at least three days *prior* to the holding of the same.	8. The Secretary shall from time to time submit to the Privy Council for approval, in accordance with the Pharmacy Act, 1868, all appointments of Examiners made by the Council, and shall also give notice to the officer appointed by the Privy Council of all examinations to be held for the purposes of the Act, 1868, stating the times and places at which such examinations will be held, at least three days *prior* to the holding of the same.
Charter, line 253.	10. The Boards of Examiners respectively shall meet as often as may be required for the purpose of conducting examinations at such times as the Council of the Society from time to time shall direct; and such Boards respectively shall report the result of every examination to the Council of the Society at the monthly meeting immediately following the same.	9. The Board of Examiners for England and Wales and the Board of Examiners for Scotland shall meet as often as may be required for the purpose of conducting examinations at such times as the Council from time to time shall direct; and shall report the result of every examination to the Council at the monthly meeting immediately following the same.
Charter, lines 250, 253.	11. The Boards of Examiners shall conduct all examinations according to the Bye-Laws in force in that behalf, and according to such regulations as shall be made or adopted by them from time to time, and as shall have been approved by the Council of the Society. Such regulations shall from time to time be inserted in the published Report of the Transactions of the Society.	10. The Boards of Examiners shall conduct all examinations according to the Bye-laws in force in that behalf, and according to such regulations as shall be made or adopted by them from time to time, and as shall have been approved by the Council. Such regulations shall from time to time be inserted in the published Report of the Transactions of the Society.
Stat. 1852, sec. viii.	12. All persons who shall tender themselves to the Examiners for examination in accordance with the Charter and the Statute, 1852, shall be examined in their knowledge of the Latin language, in English Grammar and Composition and Arithmetic, which Examination shall be called the First Examination. Such of the said persons as shall desire Certificates of competent skill and qualification to be engaged or employed as Assistants shall be examined in or produce Certificates of having previously been examined in the First Examination, and shall be examined in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Minor Examination; and such of the said persons as shall desire Certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall be examined in or produce Certificates of having previously been examined in the Minor Examination, and shall be examined in more extended knowledge of Botany, [Materia	11. All persons who shall tender themselves to the Examiners for examination in accordance with the Charter and the Statute, 1852, or the Act, 1868, shall be examined in their knowledge of the Latin language, in English Grammar and Composition and Arithmetic, which Examination shall be called the First Examination. Such of the said persons as shall desire Certificates of competent skill and qualification to be registered as Chemists and Druggists under the Act, 1868, shall be examined in or produce Certificates of having previously passed in the First Examination, and having been registered as Apprentices or Students, and shall be examined in the translation and dispensing of Prescriptions, in Botany, in Materia Medica, in Pharmaceutical and General Chemistry, Physics and Posology, and in their knowledge of the law relating to the sale of Poisons, which examination shall be called the Minor Examination; and such of the said persons as shall desire Certificates of competent skill and qualification to exercise the business or calling of Pharmaceutical Chemists shall produce Certificates of having been previously registered as Chemists [and

	Present Bye-laws.	**Proposed Bye-laws.**
	Materia Medica, the translation and dispensing of Prescriptions, Pharmacy, General Chemistry, the Chemistry of Poisons, and Posology, which examination shall be called the Major Examination.	and Druggists, and shall be examined in more extended knowledge of Botany, Materia Medica, Chemistry, and Physics, or any two of them, which examination shall be called the Major Examination.
Act 1868 sec. vi.	13. All persons who shall tender themselves to the Examiners for examination, under the provisions of the Act, 1868, excepting only those specified in the next following Bye-law, shall be examined in the Minor Examination.	No alteration.
Act 1868 sec. iv.	14. All persons entitled to be registered as Chemists and Druggists on passing a modified examination, who shall tender themselves to the Examiners for examination under the provisions of the Act, 1868, shall pass the Modified Examination, which the Council of the Pharmaceutical Society, with the consent of the Privy Council, have declared to be in their case sufficient evidence of skill and competency to conduct the business of a Chemist and Druggist, as the same is set out in the Schedule hereto, or such other modified examination as may in like manner be declared such sufficient evidence.	No alteration.
Act 1868 sec. vi.	15. The Examiners shall grant or refuse to such persons as have tendered themselves for the Minor Examination and the Major Examination respectively, as in their discretion may seem fit, Certificates of competent skill and knowledge and qualification; and such Certificates, or duplicates thereof, or cards of like purport, shall be delivered by the Examiners to the Registrar.	15. The Examiners may grant or refuse to such persons as have tendered themselves for the First Examination, the Minor Examination, and the Major Examination respectively, as in their discretion may seem fit, Certificates of competent skill and knowledge and qualification; and lists of such persons shall be delivered by the Examiners to the Registrar.
Charter, line 268; Act 1868 sec. vii.	16. All persons shall before registration as Apprentices or Students, pay a fee of Two Guineas and pass the First or Preliminary Examination, whereupon they shall be registered as Apprentices or Students.	16. All persons shall before registration as Apprentices or Students pay a fee of Two Guineas and pass the First Examination, whereupon they shall be registered as Apprentices or Students.
Charter, line 261; Act 1868 sec. vii.	17. All persons desiring registration as Assistants under the Statute, 1852, or as Chemists and Druggists under the Act, 1868, excepting those named in the next following Bye-law, shall pay a fee of Three Guineas if previously registered as Apprentices or Students, or otherwise a fee of Five Guineas and pass the Minor Examination, whereupon they shall be registered accordingly.	17. All persons desiring registration as Assistants under the Statute, 1852, or as Chemists and Druggists under the Act, 1868, excepting those named in the next following Bye-Law, shall pay a fee of Five Guineas if previously registered as Apprentices or Students, or otherwise a fee of Seven Guineas, and pass the Minor Examination, whereupon they shall be registered accordingly.
Stat. 1852, sec. x.; Act 1868 sec. vii.	18. All persons entitled to be registered as Chemists and Druggists on passing a modified examination, and desiring so to be registered, shall pay a fee of One Guinea and pass the Modified Examination, whereupon they shall be registered accordingly.	No alteration.
Stat. 1852, sec. x.; Act 1868 sec. vii.	19. All persons desiring registration as Pharmaceutical Chemists under the Statute, 1852, shall pay a fee of Five Guineas, if previously registered as Assistants, or otherwise a fee of Ten Guineas and pass the Major Examination, whereupon they shall be registered accordingly.	19. All persons desiring registration as Pharmaceutical Chemists under the Statute, 1852, shall pay a fee of Three Guineas, if previously registered as Chemists and Druggists by virtue of having passed the Minor Examination, or otherwise a fee of Ten Guineas and pass the Major Examination, whereupon they shall be registered accordingly.
Charter, line 253.	20. All persons intending to attend for examination in the First or Preliminary Examination shall give to the Registrar notice in writing of their intention in that behalf not less than fourteen clear days prior to the day which has been appointed for the holding of the said examination.	20. All persons intending to present themselves for examination in the First Examination shall give to the Registrar notice in writing of their intention in that behalf not less than fourteen clear days prior to the day which has been appointed for the holding of the said examination.
Charter, line 253.	21. All persons intending to present themselves for examination in the Major, the Minor, or the Modified Examination, shall give to the Registrar notice in writing of their intention in that behalf, on or before the first day of the month in which the examination is to take place.	No alteration.
Act 1868 sec. vii.	22. All notices of intention to attend for examination shall be to attend on the next occasion of the examination being held, and all fees in respect of examination and registration shall be payable on the giving of notice of intention to attend for examination, and in no case shall any fee paid in accordance with the Bye-laws be remitted or returned.	No alteration.
Charter, line 253.	23. No person shall be admitted to the Major or the Minor Examination who shall not have attained the [full	[No

Present Bye-laws.	Proposed Bye-laws.
full age of twenty-one years, nor unless he shall satisfy the Examiners that for three years he has been registered and employed as an apprentice or student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions. Persons who have passed the Minor Examination at least three months previously may be admitted to the Major Examination, and all other persons desirous of passing the Major Examination may make application to the Board of Examiners for special leave in that behalf.	No alteration.
Act 1868 sec. vii. 24. Persons who have attended and failed to pass an examination, shall not be entitled to attend on any future occasion within an interval of three months therefrom, nor unless and until they shall have given renewed notice of intention to attend an examination, and shall have paid fees as follows— (*a*) *In respect of a Major Examination, Two Guineas;* (*b*) *In respect of a Minor Examination, Two Guineas;* (*c*) *In respect of a First or Preliminary Examination, One Guinea;* *in cases of renewed notices for examinations to be held before the expiration of one year*, computed from the first day of the month wherein the examination was held in respect of which the original fee was paid; and in all other cases fees of amounts corresponding with the fees paid on the original notice.	24. Persons who have attended and failed to pass an examination, shall not be entitled to attend on any future occasion within an interval of three months therefrom, nor unless and until they shall have given renewed notice of intention to attend an examination, and shall have paid fees as follows— (*a*) *In respect of a Major Examination, Two Guineas;* (*b*) *In respect of a Minor Examination, Three Guineas;* (*c*) *In respect of a First Examination, One Guinea—* *in cases of renewed notices for examinations to be held before the expiration of one year*, computed from the first day of the month wherein the examination was held in respect of which the original fee was paid. In all other cases fees of amounts corresponding with the fees paid on the original notice shall be paid.
Act 1868 sec. vii. 25. Persons who have given original or renewed notices of intention to attend an examination, and have failed duly to attend at the time appointed for the same shall not be entitled to attend on any future occasion unless and until they shall have given renewed notice of intention to attend an examination, and shall have paid fees as follows, viz.:—*In cases of renewed notices for examinations to be held before the expiration of one year*, computed from the first day of the month wherein the examination was held in respect whereof the original fee was paid,—One Guinea,—or if the persons shall have proved to the satisfaction of the Council or the Board of Examiners (by production of medical certificates or otherwise) that the said failure was occasioned by unavoidable and proper causes,—One Shilling,—and in all other cases, fees of amounts corresponding with the fees paid on the original notice.	No alteration.
SECTION XI. REGISTRAR AND REGISTRATIONS.	SECTION XI. REGISTRAR AND REGISTRATIONS.
Stat. 1852, sec. v. 1. The Registrar shall receive and preserve certificates, cards, or tickets issued by the Examiners, signifying that examinations have been passed.	1. The Registrar shall receive and, for at least five years, preserve the lists issued by the Examiners, signifying that examinations, or parts of examinations, have been passed.
Stat. 1852, secs. v. x. Act 1868 sec. x. 2. The Registrar shall from time to time make out and maintain a Register of all persons being respectively Members, Associates, and Apprentices or Students of the Society, also a Register of all persons entitled to be registered under the Statute, 1852, and also a Register in accordance with the provisions of the Act, 1868, of all persons who shall be entitled to be registered under that Act, with proper indices of such Registers respectively.	No alteration.
3. The names of persons registered as Apprentices or Students of the Society, shall, upon their Registration as Pharmaceutical Chemists, Associates, Assistants, or Chemists and Druggists, be removed from the Register of Apprentices or Students.	3. The names of persons registered as Students of the Society, shall, upon their registration as Pharmaceutical Chemists, Associates, or Chemists and Druggists, be removed from the Register of Students of the Society.
4. The names of persons registered as Associates or Assistants shall, upon their registration as Pharmaceutical Chemists, be removed from the Register of Associates, or the Register of Assistants, as the case may be.	4. The names of persons registered as Associates shall, upon their registration as Pharmaceutical Chemists, be removed from the Register of Associates.
5. Persons who have not been examined under the [said	[No

	Present Bye-laws.	Proposed Bye-laws.
Charter, lines 84, 268. Stat. 1852, sec. v.	said Statute, 1852, who have been registered as Pharmaceutical Chemists by reason of their election as Members of the Society, and who have not paid life subscriptions, shall pay the annual subscription required from Members; and the names of all such Members as last mentioned who fail to pay their annual subscription before the first day of May in any year, shall be omitted from the Register of Pharmaceutical Chemists.	No alteration.
Act 1868 sec. ix.	6. The Registrar shall comply with such Orders or Regulations for regulating the Register to be kept under the Act, 1868, as may from time to time be made by the Council.	No alteration.
Stat1852 sec. v.; Act 1868 sec. x.	7. All the said Registers shall be revised annually and laid before the Annual General Meeting of the Society.	No alteration.
Act 1868 sec. xiii.	8. The Registrar shall, in the month of January in every year, at the expense and for the profit (if any) of the Society, cause to be printed and published, and sold, a correct Register, as required by the Act, 1868, and in so doing shall comply with such rules and regulations as may from time to time be in that behalf made by the Council.	No alteration.
	SECTION XII. TREASURER.	**SECTION XII.** TREASURER.
Charter, line 194.	1. It shall be the duty of the Treasurer to receive all moneys, to pay such accounts as the Council may order by the signature of six Members of the Council in Council assembled, and to render his account at each monthly meeting.	1. It shall be the duty of the Treasurer to take charge of all moneys, to pay such accounts as the Council may order by the signature of six Members of the Council in Council assembled, and to render his account at each monthly meeting.
	SECTION XIII. SECRETARY.	**SECTION XIII.** SECRETARY.
Charter, line 195.	1. The Secretary shall have authority over the servants of the establishment, whose wages he shall pay. He shall be in attendance at his office from 9.30 a.m. to 5 p.m. every day, except Saturday, and be present at all meetings of the Council and Committees, General and Special Meetings, and also at the Evening Meetings and Lectures. It shall be his duty to superintend the affairs of the Society under the direction of the Council and Committees. He shall keep the books of the Society in a neat and orderly manner, shall conduct the correspondence, and issue all summonses, take the minutes of all Meetings for business, and read them, and make a report of all matters that come under his cognizance for the information of the Council and Committees. He shall consult the President or Vice-President on any business requiring attention, between the various meetings, and be responsible for the safe custody of all the documents and property belonging to the Society which shall be under his control; he shall find security in the sum of £500, and shall receive all subscriptions, fees, and donations, and give a printed receipt for the same, and no other, checking each receipt. He shall every Saturday transact any business of the Society that may be required out of doors, and pay to the Treasurer the amount of moneys received by him during the week. He shall receive such a sum in advance for current expenses as the Council may order, and account for the same to the Finance Committee. He shall also superintend the transmission of the Transactions.	1. The Secretary shall have authority over the clerks and servants of the establishment, whose wages he shall pay. He shall be in attendance at his office during the hours to be from time to time specified by the Council, and be present at meetings of the Council and Committees, General and Special Meetings, and also at the Evening Meetings. It shall be his duty to superintend the affairs of the Society under the direction of the Council and Committees. He shall keep the books of the Society in a neat and orderly manner, shall conduct the correspondence, and issue all summonses, take the minutes of all Meetings for business, and read them, and make a report of all matters that come under his cognizance for the information of the Council and Committees. He shall consult and act on the instructions of the President or Vice-President on any business requiring attention, between the various meetings, and be responsible for the safe custody of all the documents and property belonging to the Society which shall be under his control. He shall find security in the sum of £500, and shall receive all subscriptions, fees, and donations, and give a printed receipt for the same, and no other, checking each receipt. He shall promptly pay to the account of the Treasurer at the Society's bankers the amount of moneys so received by him. He shall receive such a sum in advance for current expenses as the Council may order, and account for the same to the Committee for Finance. He shall also superintend the transmission of the Journal and Transactions.
	SECTION XIV. AUDITORS.	**SECTION XIV.** AUDITORS.
Charter, line 151.	1. The Auditors shall meet at least one month previous to the Annual Meeting; it shall be their duty to inspect the Accounts of the Society, and the Balance-Sheet prepared for them by the Finance Committee, which must be certified and signed by [them	1. The Auditors shall meet at least one month previous to the Annual Meeting. It shall be their duty to inspect the Accounts of the Society, and the Financial Statement prepared for them by the Committee for Finance, which must be certified and signed [by

	Present Bye-laws.	**Proposed Bye-laws.**
	them, and be presented to the Council at their Meeting in May.	by the Auditors present at the Audit, and presented to the Council not later than at their ordinary Meeting in May.
	SECTION XV. SUMMONSES. FOR ALL MEETINGS OF THE COUNCIL, EXAMINERS, COMMITTEES, OR AUDITORS.	
	1. Printed summonses shall be issued by the Secretary, with his name attached, and if left at the place of business, or transmitted by post, addressed to the place of business or residence of the person summoned, shall be considered as received.	No alteration.
	2. All summonses shall be issued at least three clear days previous to the Meetings, inclusive of the day of issuing the same, except in the case of Special Meetings ; and all notices of motion shall be inserted therein, and also notice of such matters as require particular consideration.	No alteration.
Charter, lines 142 200.	3. The Secretary shall issue summonses, notices, or advertisements convening all Special Council or General Meetings. If for the latter, not less than ten clear days' previous notice shall be given ; and such summonses, notices, or advertisements shall contain full notice of the business to be discussed at the Special Meeting.	No alteration.
	4. Cards of invitation to the Pharmaceutical Meetings and Evening Lectures shall be issued by the Secretary in the name of the Council, to such persons as the Council may direct ; and each Member of the Society may, on application to the Secretary, obtain a card for the admission of a friend, to which his own signature must be attached.	To be repealed.
	SECTION XVI. FILLING UP VACANCIES BY DEATH, RESIGNATION OR REMOVAL.	SECTION XVI. FILLING UP VACANCIES BY DEATH, RESIGNATION OR REMOVAL.
Charter, line 258.	1. In the event of any vacancy occurring in the office of President, Vice-President, or Treasurer, the Secretary shall report the same, and the cause thereof, in the summons for the next meeting of the Council, who shall thereupon find and declare such vacancy, and immediately proceed to elect from their remaining number a proper person to fill such vacant office.	No alteration.
Charter, lines 173, 258. Act 1868 sec. xix.	2. In the event of any vacancy occurring in the Council or Auditors, or in the several Committees during the current year, the Secretary shall report such vacancy and the cause thereof, in the summons for the next meeting of the Council, at which some Member of the Council, or of the Society, as the case may require, shall be nominated to fill up such vacancy.	2. In the event of any vacancy occurring in the Council or Auditors, or in the several Committees during the current year, the Secretary shall report such vacancy and the cause thereof, in the summons for the next meeting of the Council, at which some Member of the Council, or of the Society, as the case may require, shall be appointed to fill up such vacancy.
Charter, line 258.	3. In the event of a vacancy occurring in the office of Registrar or Secretary, the President or Vice-President shall appoint some person, *pro tempore*, to fulfil the duty of the office, and in the summons for the next meeting of the Council the vacancy shall be declared ; and some person or persons being proposed and seconded at such meeting the election shall take place, but shall not be final, unless confirmed at the next meeting of the Council.	No alteration.
	SECTION XVII. REMOVAL OF OFFICERS AND MEMBERS.	
Charter, lines 185 254.	1. Every Member of Council who shall commit any act or acts which appear to the Council derogatory to the honour of his office, shall give an explanation of the same to the Council, on being required so to do ; and in default thereof, or if such explanation be unsatisfactory to the Members present, he shall be liable to the censure of the Council ; or, if it be deemed expedient, a notice may be given by any Member of the Council for a motion of removal from the Society of the Member so offending, which notice shall be [inserted	No alteration. [No

	Present Bye-laws.	**Proposed Bye-laws.**
	inserted in the summons for the ensuing meetings of the Council until disposed of, and shall be taken into consideration at the first ensuing meeting of the Council at which not less than twelve Members thereof shall be present.	
Charter, lines 185, 254.	2. If any report be made to the Council by a Member of the Society in writing, with his name attached, that another Member or any Associate has been guilty of any act or conduct which is contrary to, or subversive of the interests of the Society, or a violation of its laws and regulations, and if the Council be of opinion that the alleged act or conduct is of such character, the Secretary shall write to the Member or Associate so accused for an explanation, and in default of explanation, or if the same be unsatisfactory, two Members of the Council shall be deputed to communicate, personally or by letter, with such Member or Associate, and shall report the result to the Council, when any Member of the Council shall, if he think it expedient, give notice of a motion for the removal of such Member or Associate from the Society. This notice must be inserted in the summons for the ensuing meetings of the Council until disposed of; and be taken into consideration at the first meeting thereof at which twelve Members are present.	No alteration.
Charter, line 268.	3. Any Member or Associate, Apprentice or Student, desiring to retire from the Society, shall send notice thereof to the Secretary in writing, together with the certificate or diploma of membership, if any, held by him. No Member or Associate shall be released from his obligation to pay his annual subscription until such time as the certificate or diploma of membership, if any, shall have been returned.	No alteration.
	SECTION XVIII. FUNDS AND PROPERTY.	
Charter, line 40.	1. The Council of the Society shall from time to time cause such parts of the funds in the hands of the Treasurer as may not, in their judgment, be required for carrying on the business of the Society, to be invested in Government or real securities in the corporate name of the Society.	No alteration.
Charter, line 237.	2. The property and funds of the Society, other than moneys from time to time in the hands of the Treasurer or Secretary, shall not be disposed of, or otherwise dealt with, except in pursuance of an order of the Council of the Society, signed by six members, at the least, in Council assembled.	No alteration.
	SECTION XIX. BENEVOLENT FUND.	
Charter, line 232.	1. The Benevolent Fund shall consist of donations and subscriptions, and such grants as may from time to time be made by the Council from the General Fund towards the particular objects of such Fund, in addition to the sum already invested in respect of the same Fund.	No alteration.
	2. Donations* in aid of the Benevolent Fund shall be invested in Government or real securities: and no part of the invested capital of such Fund shall be distributed among the recipients of relief.	No alteration.

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* FORM OF BEQUEST.

TO THE GENERAL OR BENEVOLENT FUND.

"*I give and bequeath the sum of* *unto the* PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, *the same to be paid out of my pure personal estate, and to be applied for the purposes of the* GENERAL OR BENEVOLENT FUND *of the said Society.*"

N.B. — Devises of land and bequests of money savouring of realty, or in other words connected in any way with land will be void.

[3.

* FORM OF BEQUEST.

TO THE BENEVOLENT FUND.

"*I give and bequeath the sum of* *unto the* PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, *the same to be paid out of my pure personal estate, and to be applied for the purposes of the* BENEVOLENT FUND *of the said Society.*"

N.B.—Devises of land and bequests of money savouring of realty, or in other words connected in any way with land will be void.

[No

	Present Bye-laws.	**Proposed Bye-laws.**
Act 1868, sec. xxii	3. The interest accruing from the invested portion of the Benevolent Fund, together with annual subscriptions and grants made from the General Fund in aid thereof, shall be applicable, in the discretion of the Council, towards the relief of persons eligible to receive the same according to the provisions of the Act, 1868, and any unapplied portion of the same in any year may be invested and thenceforward form part of the invested Fund.	No alteration.
	SECTION XX. ANNUAL AND SPECIAL GENERAL MEETINGS.	SECTION XX. ANNUAL AND SPECIAL GENERAL MEETINGS.
Charter, lines 101, 127.	1. The Council shall prepare a Report of their proceedings during the past year, together with a statement of the funds, which shall be read at the Annual General Meeting, and inserted in the published report of the Transactions of the Society.	1. The Council shall prepare a Report of their proceedings during the past year, which, together with the Report of the Auditors, shall be read at the Annual General Meeting, and inserted in the published report of the Transactions of the Society.
	2. The Council shall meet previous to the General Meeting, and arrange the business to be transacted thereat; and the proceedings of the General Meeting shall be considered perfect in themselves without the necessity of reading or confirming the minutes of the preceding Annual Meeting.	No alteration.
Charter, line 141.	3. No business shall be brought forward at any Special General Meeting but that for which it is convened, and of which due notice has been given to the Members of the Society, pursuant to the preceding Bye-law, No. 3, under sec. 15.	No alteration.
	SECTION XXI. DIPLOMA AND CERTIFICATES.	SECTION XXI. DIPLOMAS AND CERTIFICATES.
Charter, lines 222, 267.	1. Every Member of the Society shall be entitled to possess and use a Certificate of Membership.	No alteration.
	2. Persons registered as Pharmaceutical Chemists under Section 10 of the Statute, 1852, shall be entitled to possess and use a Diploma stamped with the Seal of the Society.	No alteration.
Stat. 1852, sec. viii.; Act 1868 sec. vi.	3. All persons examined, pursuant to the Bye-laws, shall, after having passed their examination and been registered, receive appropriate Certificates.	3. All persons examined in the Minor or in the Major examination pursuant to the Bye-laws, may, after having passed their examination and been registered, receive appropriate Certificates.
	4. All plates used from time to time for printing the several forms of Diploma and Certificate shall be deposited at the house of the Society, in a box having a lock and two keys, one of which shall be in the custody of the President and the other in that of the Vice-President.	No alteration.
	5. No print shall be taken from the said plates, or any or either of them, without an express order of the Council. All prints taken shall be in the custody of the Secretary.	No alteration.
	6. Every Diploma and every Certificate of Membership shall be signed by the President and Vice-President, and countersigned by the Secretary or Registrar. Every Certificate of Examination shall be signed by the Board of Examiners, or at least four members thereof.	No alteration.
	7. Diplomas and Certificates shall be in such form as shall from time to time be determined upon by the Council.	No alteration.
	8. Every person ceasing to be a Member of the Society shall forthwith deliver up to such person as the Council shall order the Certificate of Membership furnished to him, pursuant to the preceding Bye-laws.	No alteration.
Stat. 1852, sec. xii. Act 1868, sec. xv.	9. All persons pirating or imitating or improperly using any Diploma, or any or either of the Certificates, or the Common Seal of the Society, or falsely holding themselves forth to the public by means of advertisement, handbills, labels, circulars, or otherwise, as Members of the Society, or registered under the Statute, 1852, or Act, 1868, will be subject to legal proceedings, and the Council shall from time to time order the same in their discretion.	9. All persons pirating or imitating or improperly using, or inciting any person to pirate, imitate or improperly use, any Diploma, or any or either of the Certificates, or the Common Seal of the Society, or falsely holding themselves forth to the public by means of advertisement, handbills, labels, circulars, or otherwise, as Members or Associates of the Society, or registered under the Statute, 1852, or Act, 1868, will be subject to legal proceedings, and the Council shall from time to time order the same in their discretion.
	[SECTION	[SECTION

Present Bye-laws.	**Proposed Bye-laws.**
SECTION XXII.	SECTION XXII.
JOURNAL AND TRANSACTIONS.	JOURNAL AND TRANSACTIONS.
1. The PHARMACEUTICAL JOURNAL (the copyright of which now belongs to the Society) shall be edited, printed, and published in such manner as the Council shall from time to time direct.	1. The PHARMACEUTICAL JOURNAL shall be edited, printed, and published in such manner as the Council shall from time to time direct.
Charter, line 141 2. The Transactions of the Society required by the preceding Bye-laws to be published, shall be inserted in the said Journal, and all notices or advertisements shall be considered duly made or given if inserted therein.	No alteration.
SECTION XXIII.	SECTION XXIII.
PHARMACEUTICAL MEETINGS.	MEETINGS FOR THE READING OF PAPERS.
1. Evening Meetings may be held at the house of the Society, as the Council shall from time to time direct, for the reading of papers and discussion of subjects relating to the objects of the Society.	1. Meetings of the Society may be held for the reading of papers and discussion of subjects relating to the scientific objects of the Society.
2. Notice of such Meetings shall be given in the PHARMACEUTICAL JOURNAL next preceding.	No alteration.
3. All communications intended to be made at such Meetings shall be submitted to the President, or, in his absence, to the Vice-President, or to the Chairman of the Meeting, for his sanction, and without such sanction no subject shall be introduced.	No alteration.

Present Schedule.	**Proposed Schedule.**
SCHEDULE.	SCHEDULE.
THE MODIFIED EXAMINATION FOR ASSISTANTS UNDER THE PHARMACY ACT, 1868.	THE MODIFIED EXAMINATION FOR ASSISTANTS UNDER THE PHARMACY ACT, 1868.
AS APPROVED BY THE PRIVY COUNCIL.	
Candidates will be examined in the following subjects:—	Candidates will be examined in the following subjects:—
PRESCRIPTIONS.	PRESCRIPTIONS.
Candidates will be required to read Autograph Prescriptions, translate them into English, render a correct Translation of the Directions for Use, and detect unusual Doses.	Candidates will be required to read Autograph Prescriptions, translate them into English, render a correct Translation of the Directions for Use, and detect unusual Doses.
PRACTICAL DISPENSING.	PRACTICAL DISPENSING.
To weigh, measure, and compound Medicines, write the Directions in suitable language, finish and properly direct each package.	To weigh, measure, and compound Medicines, write the Directions in suitable language, finish and properly direct each package.
MATERIA MEDICA AND QUALITY OF SPECIMENS.	MATERIA MEDICA AND QUALITY OF SPECIMENS.
To recognize the Pharmacopœia Chemicals in frequent demand, and specimens of Roots, Barks, Leaves, Fruits, Resins, and Gums in ordinary use; the following Plants, either in a fresh or dried state, or from plates:—Belladonna, Stramonium, Hyoscyamus, Conium, Aconitum, Digitalis, and Sabina; also to estimate the quality of each specimen submitted, and its freedom from adulteration.	To recognize the Pharmacopœia Chemicals in frequent demand, and specimens of Roots, Barks, Leaves, Fruits, Resins, and Gums in ordinary use; the following Plants, either in a fresh or dried state, or from plates:—Belladonna, Stramonium, Hyoscyamus, Conium, Aconitum, Digitalis, and Sabina; also to estimate the quality of each specimen submitted, and its freedom from adulteration.
PHARMACY.	PHARMACY.
To recognize the preparations of the Pharmacopœia which are not of a definite Chemical Nature, such as Extracts, Tinctures, and Powders, and give the proportions of the more active ingredients.	To recognize the preparations of the Pharmacopœia which are not of a definite Chemical Nature, such as Extracts, Tinctures, and Powders, and give the proportions of the more active ingredients.
	Candidates will also be examined in their knowledge of the law relating to the sale of Poisons.

THE NOMENCLATURE OF CERTAIN DRUGS.*

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

The object of the following remarks is to direct attention to the need for greater precision in the names applied to certain drugs, so that a definite name may signify only one drug and no other. The present loose method of employing names constantly leads to inconvenience and waste of time. Thus the name "bayberry" is applied to the bark of *Myrica cerifera*, but is often supposed to refer to the powdered berries of the bay tree, *Laurus nobilis*; the "oil of bay" may mean either the fatty oil or the volatile oil of the fruit of *Laurus nobilis*, or the volatile oil of the fruit of *Pimenta acris*. Again, to the educated pharmacist "mandrake root" signifies the root of *Mandragora officinalis*, to the consumer of herbs it is that of *Podophyllum peltatum*, and to the culler of simples it is the root of *Bryonia dioica*.

Similarly, to the English purchaser "camomile" means *Anthemis nobilis*, and to the German living in London it is *Matricaria Chamomilla*. To the English purchaser "pellitory root" is that of *Anacyclus Pyrethrum*, but to the German it is that of *Anacyclus officinarum*.

I propose this evening to notice a few of the drugs in which a similarity or identity of name leads occasionally to some inconvenience, and to mention under each such names as seem likely to provide greater accuracy.

Belladonna.—This name, some years ago, referred only to *Atropa Belladonna*, but now there is the danger of its being used to indicate the rhizome of *Scopola japonica*, under the name of Japanese Belladonna, and that of *Scopola carniolica* under that of "*Belladonna Scopolia.*" For the sake of clearness the two last should be distinguished as Japanese Scopola and Austrian Scopola.

Chirata.—The allied species, *Ophelia angustifolia* and *O. alata*, as well as *Andrographis paniculata* have frequently been imported into this country as chirata. The first two give a weaker infusion, and are therefore undesirable, and the last belongs to a different natural order. The reason of this confusion appears to be that *O. angustifolia* is also known in Northern India as chirata. There, however, it is distinguished as "Pahari," or hill chirata, whilst the official plant is called "Dukhani," or southern chirata. *Andrographis paniculata* is called in India by the name of "Kariyat" or "Creyat," which has a very similar sound to chirata. Apparently the only way to obtain a recognition in commerce of the distinctness of these plants is to place the botanical name in brackets after the vernacular name.

If this had been the custom, it might perhaps have prevented the error which occurs in a recent number of the *British Medical Journal* (p. 520), where kreat, mentioned as identical with *Agathotes* (the old generic name of *Ophelia Chirata*), is described as if it were a new remedy of considerable value, instead of a drug already official for many years.

Coca.—It sometimes happens, when an article of materia medica first comes into extensive use, that the botanical source is not absolutely certain or that commercial varieties exist which differ in alkaloidal value. This is the case with coca leaves, concerning which it has recently been shown (*ante*, p. 760) that different varieties have very unequal medicinal value. So long as these came from different provinces or countries it was possible to indicate their difference by the addition of the name of the country; but now that coca is being extensively cultivated in several of our colonies, as well as in Java, it becomes necessary to use the varietal name in brackets, to indicate the particular kind of the drug required or offered.

Coto Bark.—In this case the exact botanical origin of the two barks which entered commerce under the same name is not known, but the difference between them has been emphasized by the use of the name paracoto for the second.

Hemlock.—The application of the name "hemlock to the products of the *Abies canadensis*, or hemlock spruce, often leads to confusion and annoyance. The oleoresin is known as "hemlock pitch," the distilled oil as "oil of hemlock," and the extract of the bark, which is used by tanners, as "hemlock extract." The bark itself is better known to herbalists as *Pinus canadensis*. The difficulty that would occur, if oil of hemlock or hemlock extract were ordered in places where ignorance of the above mentioned usage exists, may easily be imagined. This could easily be avoided by the use of the full name, "hemlock spruce," or, better still, by the use of the scientific name *Abies canadensis* in price lists and in business.

Jaborandi.—Three kinds of leaves have come into commerce at various times under this name, viz., (1) Jaborandi leaves from Pernambuco, with veinlets prominent on the upper surface, and which is generally referred (but, I think, erroneously) to *Pilocarpus pennatifolius*, Lem.; (2) Jaborandi leaves from Rio Janeiro, with the veins not prominent on the upper surface and the leaves more obovate in outline, and which are undoubtedly the product of *P. Selloanus*, a species yielding much less alkaloid than the Pernambuco plant; (3) The leaves of a species of *Piper*, probably *P. Jaborandi*, Vell. These might be distinguished as *Fol. Jaborandi* (Pernambuco), *Fol. Jaborandi* (*Pilocarpus Selloanus*) and *Fol. Jaborandi* (*Piper Jaborandi*). The leaves of the last named are, however, so unlike those of the other two that there is little chance of anyone mistaking them, and they have rarely entered retail commerce. It may be well here to recall attention to the fact that it is a very common occurrence in South America for the same name to be applied in different provinces to very different plants, provided they are used for similar purposes. It is for this reason that false ipecacuanhas are sent to this country, since in South America they are called by the name "Poaya," and are used as emetics and diaphoretics.

Indian Pink.—In this country Indian or Carolina pink is usually sold with the herb attached to the rhizome, so that it is easy to identify it. In the United States, however, and occasionally in this country, the rhizome appears to be sold separated from the herb, and is then often mixed with that of *Phlox Carolina*, as has been pointed out by Dr. A. W. Miller so long ago as 1875. This arises from the fact that the name "Carolina pink" is also applied in some of the Southern States to the latter plants. This confusion might be prevented by the botanical name being placed after "pink root." The difficulty that arises in this case from the same name being given to different plants is added to by the fact that it is now impossible to say from which of the two plants the volatile alkaloid spigeline was obtained.

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 11.

Opopanax.—The resin formerly sold under this name, and of which the botanical origin is still unknown, has almost entirely disappeared from commerce, and another product passes under its name. The opopanax of the present day is distilled for the volatile oil, which is used in perfumery. It is the gum resin of *Balsamodendron Kafal.* In collections of Chinese drugs this product is usually found under the name "myrrh." It may possibly be the myrrh of Scripture, which is spoken of as a perfume in connection with aloes wood and cinnamon. It should be distinguished as "perfumed bdellium."

Pennyroyal.—The pennyroyal of the United States is *Hedeoma pulegioides*, and the oil distilled from it is the *Ol. Pulegii Exot.* of druggists, sold at about one-ninth of the price of the oil of *Mentha Pulegium.* It should be distinguished by the botanical name placed after it, or as "*Ol. Hedeomæ* (American pennyroyal)." In some persons it seems to cause symptoms of irritant poisoning which are not produced by the oil of *M. Pulegium.*

Valerian.—American valerian is the rhizome of *Cypripedium pubescens* and *C. parviflorum.* Although totally different in appearance, structure, and odour from the root of *Valeriana officinalis*, it is used for the same purpose by herbalists in this country, and the difference should be emphasized, as it is by some dealers, by calling the latter "ladies' slipper root," or by placing the botanical name after the word "valerian."

Verbena.—The oil of verbena of commerce is obtained from a grass, *Andropogon citratus*, and not, as might be supposed, from the so-called scented verbena, *Lippia citriodora.* The true verbenas are bitter rather than aromatic plants. The scientific name should here be given and verbena in brackets placed after it, and the same rule should apply to the so-called Turkish oil of geranium, which is the product of another grass, *Andropogon Schœnanthus*, and not of a geranium. In the case of oil of verbena it will become necessary to do this, if the Australian oils of *Eucalyptus Staigeriana, E. citriodora* and *Backhousia citriodora*, and the oil of the Java plant *Tetranthera citrata*, all of which have a verbena odour, find their way into commerce.

Wintergreen. — The oil of wintergreen should be derived from *Gaultheria procumbens*, which bears the name of "wintergreen" in the United States, in common with another plant used in medicine, viz., *Pyrola*, or *Chimaphila umbellata.* Ignorance of this fact appears to have led to the appearance of *Ol. Pyrolæ* in drug lists of recent date. The *Pyrola umbellata* is, however, not aromatic, and does not yield a volatile oil. In this the use of the scientific name of the plant in the first place would have prevented error, and possibly mortification when the error was detected by some thoroughly educated student of the present day.

Wormseed.—The flower heads of *Artemisia maritima*, var. *Stechmanniana*, are sometimes called "wormseed" ('Pharmacographia,' p. 385), but the American wormseed is *Chenopodium ambrosioides*, var. *anthelminticum.* A person accustomed to the use of American herbal remedies, as numbers of factory hands in the midland and northern counties are, would expect to receive the latter drug under the name "wormseed." In this case the botanical names being both of unwieldy length the term "santonica" might be applied to the first exclusively, and the name "wormseed" restricted to the seed of the *Chenopodium.*

Winter's Bark.—The original bark sold under this name was that of *Drimys Winteri*, a dark brown pungent bark in which the medullary rays are very distinct. This was originally obtained from the Straits of Magellan, but the difficulty of procuring it thence, and the small demand for it, probably led to the substitution of the bark of *Cinnamodendron corticosum* from Jamaica, which possesses similar pungency, but is of a much paler brown colour, and resembles canella bark, except in the absence of the chalky white inner surface. During the last three or four years this bark has been unobtainable in the London market, and has been replaced by that of *Croton Malambo*, a bark slightly resembling that of cinnamodendron in colour and thickness, but having a bitter taste and a flavour resembling that of *Acorus Calamus.* There should, however, be no difficulty in obtaining true Winter's bark, since the tree occurs in various forms from Cape Horn to Mexico, and the bark of the variety *granatense* occasionally comes into the London market under the name of "pepper bark."

Besides these more commonly occurring instances of the misapplication of names, numerous others occur in the lists of herbal remedies, and as these may possess some interest for members of the Society residing in the counties where such drugs are in frequent demand, I here append a list of them:—

ENGLISH PLANTS.	AMERICAN PLANTS.
Adder's tongue. *Ophioglossum vulgatum.*	Adder's tongue. *Erythronium americanum.*
Black alder bark. *Rhamnus Frangula.*	Black alder. *Prinos verticillatus.*
Avens. *Geum urbanum.*	Avens. *Geum rivale.*
Bear's foot. *Helleborus viridis.*	Bear's foot. *Polymnia Uvedalia.*
Birch. *Betula glutinosa.*	Birch (or Sweet Birch). *Betula lenta.*
Bittersweet. *Solanum Dulcamara.*	(False) Bittersweet. *Celastrus scandens.*
Blackberry. *Rubus fruticosus.*	Blackberry. *Rubus villosus.*
Celandine (greater). *Chelidonium majus.*	Celandine (wild). *Impatiens pallida.*
Centaury. *Erythræa Centaurium.*	Centaury (American). *Sabbatia angularis.*
Clover. *Trifolium pratense.*	Clover (sweet). *Melilotus officinalis.*
White clover. *Trifolium repens.*	White clover. *Melilotus alba.*
Cranesbill. *Erodium cicutarium.*	Cranesbill. *Geranium maculatum.*
Dwarf elder. *Sambucus Ebulus.*	Dwarf elder. *Aralia hispida.*
Fleabane. *Pulicaria dysenterica, etc.*	Fleabane. *Erigeron canadense.*
Hemlock. *Conium maculatum.*	Hemlock (Spruce). *Abies canadensis.*

English Plants.	American Plants.
Yellow jessamine.	Yellow jessamine.
Jasminum fruticosum.	*Gelsemium nitidum.*
Liverwort.	Liverwort.
Marchantia polymorpha.	*Hepatica triloba.*
Maidenhair.	Maidenhair (Canadian).
Adiantum Capillus-veneris.	*Adiantum pedatum.*
Mandrake.	Mandrake (American).
Bryonia dioica.	*Podophyllum peltatum.*
Pennyroyal.	Pennyroyal (American).
Mentha Pulegium.	*Hedeoma pulegioides.*
Ivy.	Ivy (American).
Hedera Helix.	*Ampelopsis quinquefolia.*
Pulsatilla.	Pulsatilla.
Anemone Pulsatilla.	*A. patens*, var. *Nuttalliana.*
Queen of the meadow.	Queen of the meadow.
Spiræa Ulmaria.	*Eupatorium purpureum.*
Ragweed.	Ragweed.
Senecio Jacobæa.	*Ambrosia elatior.*
Raspberry.	Raspberry.
Rubus Idæus.	*Rubus strigosus.*
Scullcap.	Scullcap.
Scutellaria galericulata.	*Scutellaria lateriflora.*
Sloe.	Sloe.
Prunus communis.	*Viburnum prunifolium.*
Valerian.	Valerian (American).
Valeriana officinalis.	*Cypripedium pubescens, etc.*
Vervain.	Vervain.
Verbena officinalis.	*Verbena hastata.*
Water lily (white).	Pond lily (white).
Nymphæa alba.	*Nymphæa odorata.*
Water lily (yellow).	Pond lily (yellow).
Nuphar lutea.	*Nuphar advena.*
Water pepper.	Water pepper.
Polygonum Hydropiper.	*Polygonum punctatum.*
Wintergreen.	Wintergreen.
Pyrola rotundifolia, etc.	*Gaultheria procumbens.*

In this list only English plants have been mentioned, in order to show the confusion likely to arise when only English names are employed in trade lists or herbal prescriptions. Several American plants which possess similar names to well-known drugs are omitted, such as American calumba, *Frasera Walteri*, and American gentian, *Gentiana Catesbæi.*

This list points in the same direction, viz., to the necessity for greater accuracy in the names given to drugs and plants used in medicine. From the remarks already made it will be seen that the suggestions made are—

(1) That wherever possible the botanical name should be the one used, the vernacular being given where necessary in brackets.

2. That in no case should the same vernacular name be applied to two distinct drugs or plants, but that where two vernacular names exist, and one of these is not applied to another plant, that one should be employed, *e.g.*, *Pyrola umbellata* should be "prince's pine" or "pipsissewa," neither of which appear to be used for other plants, and not "wintergreen," which should be confined to *Gaultheria procumbens.* To these I may add—

3. That a list of synonyms of drugs occurring in previous pharmacopœias would form a very useful appendix to the next pharmacopœia.

I believe that if these suggestions were carried into effect much inconvenience, both to the wholesale and retail trade and to consumers of drugs, would be prevented, and judging from alterations that are even now being effected, I do not think they are impracticable.

NOTE ON PHLOX CAROLINA.*

BY HENRY G. GREENISH, F.I.C.

Inquiring a few weeks ago at one of our wholesale houses for Spigelia root, I was informed that it was scarce just then, and all that they had in their possession was a broker's sample of about 4 ounces, to which I was welcome if it would be of use to me. An examination of this sample, which I accepted, disclosed points of interest that I venture to bring under your notice this evening.

On glancing at this so-called spigelia it was at once observed that for spigelia it was a bold sample. Closer inspection showed that it differed materially in its straighter, thicker and less wiry rootlets and smoother rhizome, from which the cupshaped scars that characterize true spigelia are absent, the lower portions of the aerial stems frequently remaining still attached. Moreover the cortex of the root showed a decided disposition to separate from the woody column, leaving the latter as a continuous yellow thread.

These characters led me to suspect that I was dealing with *Phlox carolina*, the root of which has been substituted for that of *Spigelia marilandica* in the United States. In 1883 Professor Maisch alluded to "the fact that the spigelia sold twenty-five years ago had entirely disappeared from the market, and its place had been taken by the much smaller roots of *Spigelia marilandica* and one or more species of *Phlox*, principally *Phlox carolina.*"

In response to a request from me, Professor Maisch was kind enough to send me a sample, remarking that it was what he received some years ago as *Phlox carolina.*

This root agreed with mine, and on comparing them with herbarium specimens in the British Museum, which unfortunately were mostly without roots, I have little doubt that they are correctly named.

From the roots of this plant Professor Trimble isolated a red crystalline body which he designated phloxol. This body passes into solution when the roots are digested with petroleum benzine, and thus furnishes us with another means of distinguishing phlox from spigelia.

But the most striking and interesting features of the root are those which are disclosed by a microscopical examination.

The transverse section of a light coloured, well-developed root shows a small central woody column enclosed within an endodermis and surrounded by a comparatively large cortex. In the latter portion of the section the eye is at once arrested by numerous stone-cells, and also by the presence in

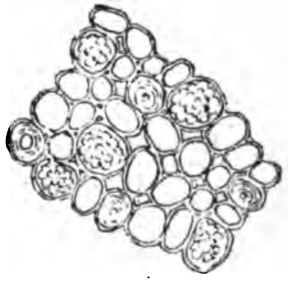

Fig. 1.—*Phlox carolina.* Transverse section.

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* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, March 11.

a number of cells of an apparently granular mass more or less completely filling them. Here and there a small fragment of red colouring matter (? phloxol) is visible.

A tangential section shows the stone cells to be of remarkable length. It also discloses the nature of the granular masses; they are large and well formed cystoliths. These are usually more or less cylindrical in shape, not acutely pointed, as is sometimes the case.

On treating a section with dilute hydrochloric acid, the calcium carbonate of which they are principally composed dissolves with effervescence, leaving the cellulose skeleton undissolved. The presence of the stone-cells and cystoliths renders the section both characteristic and interesting.

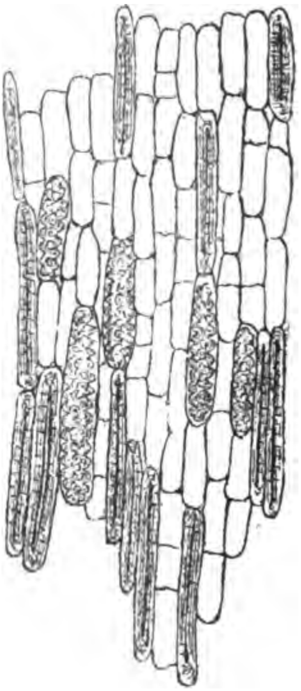

Fig. 2.—*Phlox carolina*. Longitudinal section.

Neither of them are confined to the root, but are to be found as well in the parenchymatous tissue of the rhizome and aërial stem. Here the cystolith, varying in shape with the cell which it occupies, is frequently nearly cubical, whilst the stone cells assume approximately similar dimensions.

A few years ago cystoliths were thought to be confined almost exclusively to plants belonging to the natural orders Urticaceæ, Cucurbitaceæ and Acanthaceæ. Last year Radlkofer enumerated eleven orders in which they had been found, but as far as I am aware they have not been previously observed in the Polemoniaceæ, to which order *Phlox* belongs. Nor are they often observed in the root, although it was in the root of *Rhinacanthus* that I found them some years ago, an observation which Professor Russow extended to other plants of the Acanthaceæ.

If, now, this sample of *Phlox* root be carefully examined, it will be observed that some roots appear light coloured, whilst others are dark, both externally and internally, suggesting the possibility of the sample consisting of the mixed roots of two or more species of *Phlox*.

The histological characters of this dark root are, however, identical with those of the pale as far as structure is concerned, but the parenchymatous cells of the cortex are seen to be more or less completely filled with a red amorphous mass. If a tangential section of such a root is stained with sulphate of aniline, the red colouring matter is deepened, the stone cells assume a straw-yellow tinge, whilst the cystoliths are unaffected.

On carefully examining the roots of my sample one by one, in search of an explanation of this difference, and separating the pale from the dark, I found a root which had, at some period or other of its growth, been injured; the cortex had been cut through, whilst the woody column remained intact. Above the injury the root was pale, below it nearly black; thus proving the identity of the dark root beyond doubt. Further search showed that every case of injury to the cortex was accompanied by the presence in the neighbouring tissue of an abnormal amount of colouring matter, and several portions of root were found, which were dark at one end and pale at the other.

I content myself now with recording these facts. I purpose cultivating the plants, if possible, and may therefore perchance be able to furnish later on an explanation of what must be regarded now simply as an interesting fact.

PERSISTENT DANDRUFF.

In a communication to the *Lancet* (Dec. 27), on "Persistent Dandruff, Acne and the Seborrhœa of Unna," Dr. Edward Blake makes the following remarks on the treatment of dandruff:—"There is no royal road to the cure of dandruff. To be able to cope successfully with this complaint it is needful to study its natural history. Dr. Shuldham's treatment is as follows: The head should be first well washed with hot water and alcohol soap. Alcohol soap consists of two ounces of pure soft soap, half an ounce of rectified spirit of wine, and ten minims of oil of lavender. This formula seems simple enough, but it is very difficult to get this soap properly prepared. One reason for this is that a large amount of cotton oil is now introduced into this country, and sold with the addition of a little olive oil as 'best Lucca.' The soap is afterwards carefully washed away with plenty of hot water, and the head is then thoroughly dried by means of a warm soft cloth. When the head is quite dry, a glycerole of tannin, strength from ten to thirty grains to the ounce, according to the gravity of the case, should be freely and firmly rubbed into the scalp. If tannin fail, resorcin may be tried, but the tannic acid generally does the work. This process should be repeated once, twice, or thrice a week, as the symptoms may require. After the total removal of the dandruff, a daily dressing with carbolic oil favours the growth of fresh hair: ten grains of absolute phenol, one drachm of oil of cinnamon, and one ounce of olive oil. Warm together and decant off. Apply freely every day."

In addition to the foregoing the following receipt by Mr. Purnell has been republished in the *Lancet* for the 21st February:—

"An ounce and a half of iron wine, one drachm of liquor arsenicalis, three drachms of syrup, water to two ounces. Of this one drachm is to be taken in water after meals. Then an ointment consisting of four drachms of the red oxide of mercury ointment, an ounce and a half of benzoated lard, and two minims of the essence of bergamot should be rubbed thoroughly into the roots of the hair and its use continued for some time."

The Pharmaceutical Journal,

SATURDAY, MARCH 14, 1891.

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Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE MOLECULAR THEORY OF INDUCED MAGNETISM.

Physicists are now very generally agreed that the primary elements of natural phenomena—the ultimates of scientific analysis—are mass and motion, and that all the various appearances in Nature can be ascribed to combinations of these two disparates. The sciences of heat and light have been already reduced to such terms, and even the so-called chemical elements have not escaped criticism, for their differences have been referred to different states of motion of a primordial matter. Recent researches in magnetism and electricity have led to similar conclusions, and from time to time various hypotheses concerning the nature of intermolecular magnetic forces have been put forward. Prominent amongst these is a theory published by Professor Ewing in the *Philosophical Magazine* a few months since, in which he suggests a condition of molecular constraint which seems to have in it abundant capability to account for every complexity of magnetic quality.

Weber's fundamental conception that the molecules of iron or nickel or cobalt are always magnets, and that the process of magnetizing consists in turning them from many directions towards one direction, has been strongly confirmed by the discovery of a saturation value, or finite limit to the intensity of magnetism, which may be reached or very closely approached by using a strong magnetic force. Without going further back, to inquire with Ampère how the molecules come to be magnets, this conception may be taken as the natural starting point of a theory. If each molecular magnet were perfectly free to turn, the slightest magnetic force would suffice to bring the molecules into complete parallelism, and thus to produce magnetic saturation. As this is not the case, it remains to ascertain the nature of the force which determines the directional stability. The idea suggested by many phenomena that a quasi-frictional resistance opposes the turning of the molecular magnets, accounts well for the most obvious effects of magnetic hysteresis and the reduction of hysteresis by vibration, but conflicts with the fact that even the feeblest magnetic force induces some magnetism. On the other hand, if Weber's supposition were true that a directing force acts in the original direction of the molecule's axis and continues to act as a restoring force in that direction after the molecule is disturbed, there would be no residual magnetism upon withdrawal of the deflecting force. Even Maxwell's modification of this theory, in which the further assumption is introduced that when the angle of deflexion exceeds a certain limit the molecule begins to take permanent set, does not agree well with facts upon further development.

Professor Ewing prefers an alternative hypothesis suggested but not followed up by Maxwell, in which the inertia of the molecular magnets is ascribed to the mutual action of the entire system of molecules. Several writers, notably Wiedeman and Hughes, have recognized intermolecular magnetic forces by suggesting that the molecules, when unacted on by any magnetizing force from outside, may form closed rings, or chains, so as to satisfy their mutual attraction by the shortest path. But Wiedeman expressly postulates a frictional resistance to rotation, which would prevent this arrangement from being more than approximately attained, and which may be more or less overcome by vibration. Referring to a recent observation that soft iron and other magnetic metals show a remarkably close approach to instability at certain stages in the magnetizing or demagnetizing process, and that the change of magnetism with respect to change of magnetic force may become enormous when the force attains a certain value, Mr. A. E. Kennedy has reverted to the idea of chains of magnetic molecules held together by intermolecular magnetic forces, and contends that when such a chain is ruptured by applying a sufficiently strong external magnetic force it will fall to pieces throughout, and the molecular magnets which compose the chain will take their alignments suddenly. He accordingly sketches what he calls a "chain theory" of magnetization, an adaptation of the theory of Hughes, in which, however, he postulates an electric resistance to the rotation of the molecules in addition to the constraint afforded by their mutual magnetic forces.

Ewing's model molecular structure, consisting of a large number of short steel bar magnets, strongly magnetized, each pivoted like a compass needle upon a sharp vertical centre and balanced to swing horizontally, gives a sufficiently good general idea of the nature of the equilibrium brought about by intermolecular forces, and the manner in which that equilibrium is disturbed when an external force is applied. Left after disturbance to come to rest free from external magnetic force, the magnets assume a form which has no resultant magnetic moment, but do not arrange themselves in closed chains. Subjected to an external magnetic force gradually increasing from zero, a stable deflexion of all members of the group not in the same line as the external force is produced. This results in giving a small resultant moment to the group, which at first increases at a uniform rate with the increase of the force; but when the latter attains a certain value, a part of the group becomes unstable and a marked augmentation of susceptibility begins, that is to say, a marked increase in the rate at which resultant moment is acquired. If at the end of this stage the force be removed, a very large proportion of the moment which the group has acquired remains; in other words, there is a great deal of residual magnetism. A further increase of the external magnetic force, however, creates a third stage, which consists in the closer approach to saturation, caused by the molecules being more nearly pulled into the exact line of the force, and little, if any, more residual magnetism obtains than at the end of the second stage. All these experimental results with the model agree completely with observed facts. Further, the hysteresis occurring during the removal and reapplication of magnetic force, as well as the well known general characteristics of cyclic processes can be also reproduced in the model. The chief facts of permeability and retentiveness, and hysteresis generally, are therefore at once explicable by supposing that Weber's molecular magnets are constrained by no other forces than those due to their own mutual magnetic attractions and repulsions, and no arbitrary constraining forces are required.

A regular group of elementary magnets, furnished with air-vanes to damp their swings in unstable positions, affords good illustrations of what has been called magnetic viscosity, and of other magnetic phenomena depending on the inertia of the molecules. When the imposed force reaches a critical value one of the outer members of the group become unstable, and swings slowly round; its next neighbours, finding their stability weakened, follow suit, and the disturbance spreads through the group in a way eminently suggestive of the phenomena of time-lag in magnetization. In the model the centres of rotation are fixed; in regard to the actual solid an equivalent supposition may be made, namely, that the distances between the molecular centres do not change, except in so far as they may be changed by strain. The well-known effects of mechanical vibration in augmenting magnetic susceptibility and reducing retentiveness are readily explicable if vibration be regarded as causing periodic changes in the distances between molecular centres, and the effects of heat may be in like manner traced to the expansion with rise of temperature which involves a separation of the molecular centres, and therefore a reduction of stability. As regards the sudden disappearance of magnetic quality observed at a high temperature, Professor Ewing suggests that the molecular magnets swing more or less, the violence of the swings increasing as the temperature rises, until finally *rotation* is developed. Should this happen, all trace of polarity would of course disappear.

The effects of stress and consequent elastic strain in magnetic quality are so complex and so various in iron, nickel and cobalt, that it would be premature to attempt any full discussion of these from the point of view of the theory now sketched, but some of the general features can be traced experimentally in the model by setting the supports of the magnets upon a sheet of thin india-rubber, which may be stretched or distorted to imitate the conditions of longitudinal or torsional strain.

ABSIT OMEN!

We understand that some steps are being taken with the view of establishing a charitable fund for the relief of distressed professional chemists, and that, with a singularly unhappy lack of fitness, it has been suggested that this undertaking would constitute an appropriate celebration of the jubilee of the Chemical Society. It is but charitable to assume that any proposition which involves expenditure on the part of its promoters is at least well intentioned; but in spite of that cogent reason for a favourable estimate of the step that is being taken in the future interests of professional chemists, it must be confessed that when existing conditions are considered, together with past experience, the proposal now referred to has a disagreeable prophetic suggestion that would alone make it inappropriate for being connected with the jubilee of the Chemical Society. There seems to be much greater reason for thinking that at the present time professional chemists as a body are more in want of wholesome ethical guidance, and that while most of them are individually anxious for the bread of appreciative occupation and remuneration, there are few who would be content to be awarded in its place the too stony substitute of charitable provision for their possible future necessities.

Some remarks made by a coroner at an inquest held at Sheffield last week afford a fresh illustration of the confusion that reigns in the minds of some of these officials upon the subject of the supply of poisons to the public. The deceased was shown to have purchased two-pennyworth of laudanum from a chemist, and the jury returned a verdict that death had resulted from the effects of an overdose of laudanum. The coroner took occasion to remark that the Poisons Act stood very much in need of amendment. By that Act, he is reported to have said, it is not lawful for a chemist to sell poison without making the fullest inquiry as to the use to which it is to be put, but that unfortunately the Act does not apply to laudanum. So that, according to the coroner, the Act is an elaborate farce, since he regards it as including poisons no one thinks of buying and leaving out the very preparation that is constantly being used for the purpose of self-destruction.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An Evening Meeting of the Society was held on Wednesday evening, at 17, Bloomsbury Square. The chair was taken at 8 o'clock by the President, and the first paper read was on—

THE NOMENCLATURE OF CERTAIN DRUGS.

BY E. M. HOLMES, F.L.S.

The paper is printed at p. 837, and gave rise to the following discussion:—

The **Chairman** in inviting discussion said the subject which had been so ably dealt with by Mr. Holmes was one of very considerable importance. The difficulties connected with the nomenclature of chemical substances used in medicine had been met in various ways, and many of them had had to learn their lessons in chemistry over again more than once, in order to realize the meanings of the different names given to those chemical compounds; and he was afraid that with regard to the vegetable materia medica the same thing would have to be done. At the present time there was a continually increasing number of vegetable preparations being presented to the public, coming chiefly from the United States, and the paper which had just been read showed how important it was that pharmacists should be very careful as to the names given to those preparations, and clear as to what they really meant.

Mr. **Umney** thought that the points to which attention had been drawn were of very great importance, and the paper was an exceedingly valuable one, because they could not find many of these medicines, which were largely used by the public, 'referred to in the ordinary books of materia medica. As to the Japanese belladonna, to which Mr. Holmes had referred, he was not aware of it occurring in the market. Many tons of the root of the Japanese aconite had been offered, but the Japanese belladonna root he had never seen in the market. A great deal of the belladonna root supplied to the market was grown in Germany, and lately considerable attention had been paid to the growing of it in this country. The present proprietor of the late Mr. Peter Squire's farm was now busily engaged in producing these plants and roots, and in all his experience he had never seen those products brought to greater excellence. There was a great deal of confusion at the present time with regard to coca leaves. He was afraid that Java and Ceylon, when they got anything that would grow, managed to ruin it. In Ceylon especially the ground had only to be tickled there and almost anything would grow, and coca leaves were now grown largely in Ceylon. Of course the true test of those leaves should be in their alkaloidal value, but they had not yet got to the point of standardizing coca leaves' though he should like to see it taken in hand. Already the excise authorities might be said to be dealing with it since they insisted that coca wine should not be sold as a medicine below a certain standard of alkaloidal strength. He thought that much confusion might be saved by putting in the botanical names in the way suggested by Mr. Holmes.

Mr. **Ransom** had listened to the paper with great interest, and thought the suggestions in it were of great practical value. He knew personally that great confusion was caused by the usual nomenclature. For instance, when preparations of mandrake were ordered, in many cases, even in England, preparations of podophyllum were intended, and he had seen similar confusion as to the meaning of hellebore.

Mr. **Potter** thought he might say that his experience on the question was greater than that of most of those present, inasmuch as he had had to deal with the whole of the articles mentioned in the paper, and he had found great difficulty almost daily in ascertaining what was required by chemists when they wrote for certain articles. Many of the weekly papers were now giving a number of recipes for the use of the public, many of which were in very loose terms. A short time ago oil of hemlock was largely quoted in some of those papers, and people wondered what it meant, but, as they had heard from Mr. Holmes it referred to oil of pinus. For three years there had been published a recipe for "hop bitters," which contained as an ingredient mandrake, and consequently they had had inquiries from all parts of the country for that particular article, and knowing pretty well what was wanted they had always supplied the American mandrake. Recently they were asked for myrtle berries, and on sending on the article they had in stock were told that they were not the true berries. They then wrote to New York and found that what was wanted were berries of the *Myrcia acris*, the only article used in the United States. The difficulty of the same English word representing two entirely distinct articles arose from the fact that largely the newer drugs had come from the United States, and consequently the names most in vogue there had come to be adopted. He had not been able to understand before why chirata differed so much in strength, but was glad to learn the reason, namely, that there were two different species, and it was therefore necessary to be careful as to the particular drug one was ordering. With regard to wintergreen the name was generally applied to pyrola. If the oil was asked for, they would of course understand that gaultheria was meant, but if the leaves were ordered, then pyrola would be meant. Owing to the fact that so many of these recipes were being printed for making up various preparations, especially in the North of England, there was a great need for a more distinct nomenclature, so that a chemist when asked for an article might have no doubt as to what was wanted.

Mr. **Mason** wished to know whether Mr. Potter's experience had been with botanical druggists or with pharmacists.

Mr. **Potter** said it had been with both.

Mr. H. G. **Greenish** said that a statement had been going round in the Continental journals that the coto bark was a product of a variety of *Drimys Winteri*. If that were so, the probability was that in the microscopic structure Winter's bark and coto bark might show more or less similarity. Possibly they were standing here on the verge of a little more confusion.

Mr. **Holmes**, in reply, said that he was very glad to hear that great attention was being given to aconite on Mr. Squire's farm. Specimens of belladonna prepared by Miss Squire had been shown at a previous meeting. With regard to coca he thought that if a little attention were paid to the form and colour of the leaves it would be possible to distinguish the different varieties. They might get the Java variety from the eastern part of India. The Java variety had been shown to contain more alkaloid than any other variety. With regard to the oil of bay, the oil employed for bay rum was obtained from *Myrcia acris*. The genus *Myrcia* was so closely allied to the genus *Pimenta* that it was difficult to distinguish one from the other; and on account of the great similarity he thought it would be better to drop the name *Myrcia*. *Pimenta* was the present name of the genus, so that the oil should be known as the oil of *Pimenta acris*. With regard to the names of American drugs so closely resembling those of English, which Mr. Potter had alluded to, he thought it arose from the fact when English colonists first settled in America they found certain plants used by the natives for purposes similar to which they had been accustomed to use other herbs at home, and they gave the name in use in the old country to the new plants they found in America. Mr. Holmes then pointed out that the true chirata has a thin bark and large pith, whereas the spurious chirata has a thick bark and less pith. There was also a difference in the colour, the genuine one being much darker than the other. Mr. Greenish's inquiry with reference to coto bark was another instance of the fact that a thing in one district of a country might be quite different from a thing going under the same name in another district of the same country. The coto bark which was mentioned in the German journal was that of *Drimys Winteri*, var. *granatense*. This had already been pointed out in the *Pharmaceutical Journal* (Dec. 13, 1890, p. 524). It was quite different from the true coto bark, and even under an ordinary lens it would not be possible to mistake the two.

The CHAIRMAN then moved a cordial vote of thanks to Mr. Holmes for his paper, which was carried.

The next paper read was a—

NOTE ON PHLOX CAROLINA.

BY H. G. GREENISH, F.I.C.

The paper is printed at p. 839, and gave rise to the following discussion:—

The Chairman said he did not know whether anyone present would be bold enough to criticize a note of that sort, but he should be glad to hear any remarks.

Mr. HOLMES said he thought the meeting had listened to a very interesting paper. The occurrence of cystoliths in a natural order in which they had not hitherto been noticed was an important fact added to our stock of knowledge. If they had a mixed drug and they wanted to find out what it contained, a character of that kind would enable them to narrow down the number of possible natural orders to which the drug might belong, so that they had here an additional fact which could be turned to practical account. The paper also pointed to the necessity for a much more extensive use of the microscope in detecting adulteration of drugs than had been the case hitherto. He believed that an easy means of recognizing *Phlox carolina* rhizome under the microscope had not hitherto been made known.

Mr. THOMAS GREENISH said the occurrence of cystoliths and similar formations in plants was extremely interesting. It was curious that in some cases the lime occurred as carbonate and in others as oxalate. It would be extremely interesting to find out what function they performed in the plant.

The CHAIRMAN in moving a vote of thanks for this note said Mr. Henry Greenish was peculiarly fitted for work of that kind, being both an accomplished chemist and a good histologist, a combination not very common. Mr. Greenish's early training and association were such as to lead them to hope that papers of that kind would probably place him in the first rank of British histologists before long.

The CURATOR (Mr. HOLMES) then drew attention to the specimens on the table. The actual donations during the last month were only two: (1) the Winter's bark, to which reference had been already made, and (2) the berry of the wax myrtle, or *Myrica cerifera*. The small fruit would be seen to be covered with a coating of wax. The rest of the specimens on the table were portions of the collection of gums and resins purchased by the Society about two months ago, which was so large that it was not possible to show the whole at the previous meeting. There were resins of the class of animi, which might be described as fossil resins, since they were obtained in masses from the soil and retain very little essential oil. The shagreen appearance of this kind of resin was not, however, caused by abrasion by sand, as was sometimes supposed, but was due to shrinking and resulting cracking of the surface, consequent upon the loss of the essential oil and oxidation of the surface layer of resin. There was also a number of specimens of gum copal, such as are used in varnish making. They are obtained from the tree itself and never present the curious shagreened appearance that animi does. One of the specimens was very interesting as being full of insects. They often heard of flies in amber, but these small insects did not belong to Diptera or flies, but to the beetle tribe, or Coleoptera.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 4th inst., at 11, Harcourt Street, Dublin, at 3 o'clock, the President, Mr. Charles Evans, in the chair.

The other members of the Council present were the Vice-President, Mr. Wells, Messrs. Hayes, Hodgson (Treasurer), Doran, Biggs, Gibson, Rankin, Shaw, Lyons, J. Montgomery, McNaught, Robinson, Dr. Burnes, Grindley, Simpson, Boyd and Moore.

A report of the Law Committee was adopted.

A report of the Pharmacy Act Amendment Committee stated amongst other matters that the following had been accepted for registration as having been in business as chemists and druggists prior to 1875: Michael Cusack, Mitchelstown; Florence McCarthy, 33, Arran-quay, Dublin; John F. Meldon, 107, James Street, Dublin; James Marton, Bellaghy; Anne M'Mahon Murphy, Carrick-on-Suir; William Nolan, Ballycarnew; Edward Phillips, 66, Cromac Street, Belfast; James Stewart, Bridge Street, Castledawson; George Spence, Five-mile-town; Edward Riordan, Main Street, Clogheen; Robert Clarke, Beragh; William Irwin, Dungannon: Anne McKenny, Castlecomer; Robert Kilkelly, Castlebar; Thomas McBirnie, Glenarm; Thomas Moore, Newtownbarry; John Morgan, Mount Melleck; Thomas Tierney, Ballinamore; James K. Miskelly, Cromac Street, Belfast; John Murphy, Groigne; George Hartness, Ballybay; John F. O'Neill, Carrick-on-Suir; Samuel Baker, 48, Patrick Street, Cork; John Baxter, Church Street, Ballymoney; Henry Faris, Killeshandra; Charles McAllister, Ballyconnell; H. B. McCready, High Street, Donaghadee; Thomas Maxwell, 3, Alexandra Terrace, Bray, co. Dublin; William Strahan, Kells, co. Antrim; Michael Sweeny, Loughrea; Alexander Thompson, Duke Street, Londonderry; and Robert Woods, Stewartstown.

The report was adopted.

A report from the School Committee was read and adopted.

A letter was read from Mr. J. C. Williamson, of 132, Huddersfield Road, Oldham, stating that he had been over twenty years in business in England as a chemist and druggist, and asking what were the requirements to be complied with in order to enable him to open as a registered chemist and druggist in Ireland.

Mr. Montgomery said the Pharmacy Amendment Act was only intended for the benefit of chemists and druggists in business in Ireland. If the applicant could not pass the higher examination in his own country he (Mr. Montgomery) did not see what right he had to come over here.

The President: We can receive the certificates of English chemists and druggists who have passed the higher examination in England.

Mr. Hayes: We can pass a resolution accepting any Englishman who has served his time in England, but we are not bound to do so.

Mr. Hodgson said that when they were negotiating with the Government in 1875 for the establishment of the Society Mr. Hayes and himself had interviews with the authorities at Bloomsbury Square and were pressed by them to come into their fold; but they declined to do so, as they were determined to have an independent Society. But the Bloomsbury Square gentlemen would not hear of anything like reciprocity; and that being so he did not see why English gentlemen should be allowed to come over here now, pass the Society's modified examination, and commence business here in opposition to their members. It would be hardly fair.

The Vice-President: This gentleman is a dispensing chemist in England.

Mr. Hodgson: If any of our men were allowed to go over to England and start in business there on our modified examination it would be different, but there is no reciprocity.

The Registrar was directed to reply to Mr. Williamson, stating that under the Society's present rules the Council had no power to permit him to open as a registered druggist in Ireland.

The next business on the paper was a notice of motion by Professor Tichborne, in the following terms:—"That from this date the outgoing President and Vice-President of this Society shall not be eligible for re-election after having held office for three years."

The President said that Professor Tichborne was unable to attend, and desired, with the permission of the Council, to withdraw his notice of motion. It was the impression of some of the most experienced members of the Society that the present was not a judicious time at which to tie up the hands of the Council as regarded the election of its officers.

Mr. Grindley said that in his opinion the notice should never have appeared on the agenda paper at all, because it contravened the Act of Parliament, which simply stated that the President and Vice-President were to "hold office for one year," leaving them eligible for re-election.

The President said that in 1883 a resolution was passed by the Council that the office of President should not be held by the same person for more than three consecutive years.

The notice of motion was allowed to be withdrawn.

Letters were received from the Privy Council, one of which approved of the regulations which the Council had adopted for the examinations under section 8 of the Amendment Act.

Donations were received from the Pharmaceutical Society of Great Britain of a copy of the Calendar for 1891, and from the Pharmacy Board of Victoria of a copy of the Pharmaceutical Register for 1890.

On the motion of Mr. Beggs, seconded by the Vice-President, thanks were voted to the donors.

The following letter dated February 9 was received from Dr. Heard, Secretary of the Branch Medical Council of Ireland: "Dear Sir,—In reply to your letter of the 5th instant enclosing copy of the communication from the General Medical Council Office, London, I have the pleasure to inform the President and Council of the Pharmaceutical Society of Ireland that the reason why I decline for the present to accept the Preliminary examination of their Society as qualifying for entrance upon the study of medicine, is that this Branch Council has not yet decided what value to assign to the several parts of that examination. Owing to this Branch Council not having met as expected in November last, the decision in this matter has unavoidably been postponed until it meets in May next, when I trust the question will be set at rest. To the Registrar," etc.

The President said this correspondence had arisen out of the refusal of the Branch Medical Council to accept the Preliminary examination certificate of one of the licentiates of the Society who desired to enter on studies at the College of Surgeons. He (the President) did not know whether or not the Council could do anything in the matter at present.

Mr. Boyd: Had you not better wait until the meeting of the English Medical Council in May?

Mr. Gibson said it might be better to write again to the British Medical Council in order to show that they took an interest in the matter.

Mr. Boyd: What was the object of your increasing the rigour of your Preliminary examination if it is not to be recognized?

Dr. Burnes: The change was made in consequence of a report of Dr. Duffey.

Mr. Hayes: He recommended the alterations and the Privy Council required us to make them.

Mr. Hodgson said he had heard the change very severely criticized by some former members of the Council. They said it was injurious to young men wanting to become pharmacists, and was done in the interest of the Colleges of Physicians and Surgeons.

The Vice-President: We wanted to increase our funds by examining young men who would afterwards go on to their professions.

On the motion of Mr. Hodgson, seconded by Mr. Hayes, the following resolution was unanimously adopted:—"That a copy of the letter from the Branch Medical Council of February 9, 1891, be forwarded to the Medical Council, London, with reference to acceptance of our Preliminary examination and referring to their letter of January 21, 1891, in relation to Mr. Bourke's application."

On the motion of Mr. Boyd, seconded by Mr. Robinson, Mr. Gerald L. Stack was elected a member of the Society.

A letter was read from Mr. John Francis Jessop enclosing a certificate of his having passed the Matriculation examination of the Royal University and requesting that his name should be placed on the Preliminary register of the Society.

The request was ordered to be complied with.

Mr. Rankin asked could Associate Druggists be supplied with copies of the *Pharmaceutical Journal* in the same way as members of the Pharmaceutical Society were? He thought it would be only fair that they should, as they were now paying a guinea fee as well as the members of the Society.

Mr. Hodgson said he feared there would be a difficulty about it at present. A lump sum was now paid for the supply of the *Pharmaceutical Journal* that was received; and if there should be any great increase in the number of copies required a new arrangement would have to be entered into with the Pharmaceutical Society of Great Britain. He quite agreed, however, that the Associate Druggists ought to get an equivalent for their subscriptions.

Mr. Gibson: The number of copies wanted would not be very large.

The Vice-President: We are getting more value from them than we pay for. They do not make a fraction by the arrangement. We have increased the number of copies considerably. It would be better to let the matter stand over until October, and then we can either continue the *Pharmaceutical Journal* or substitute another.

Mr. Boyd: Does the existing contract with the *Pharmaceutical Journal* terminate in October?

The Vice-President: Yes.

Mr. Hodgson said he had been opposed to the system of supplying the *Pharmaceutical Journal* to the members of the Society. The argument was that they would get no value otherwise for their guinea subscription. But it appeared to him that if a gentleman did not consider being a member of the Society and the possibility of being a member of the Council sufficient compensation for his guinea he belonged to a class of men that the Society would be just as well without. To give the Journal to those gentlemen was like bribing them to be members. But if in October next the Council should continue to be of opinion that the *Pharmaceutical Journal* should be supplied to the members of the Society most unquestionably it should also be supplied to the Associate Druggists. It would be better to let the matter lie over until October.

The President: Mr. Rankin, will you adopt Mr. Hodgson's suggestion?

Mr. Rankin said that so far as he was personally concerned he was quite satisfied to do so; but others might say that the Council was now getting plenty of money, and that it would be a very small matter to supply the *Pharmaceutical Journal* to the associate druggists until October.

The Vice-President: It would take a couple of months to arrange to do it.

Mr. Boyd said that as far as his experience went he did not think a very large number of the druggists would appreciate the *Pharmaceutical Journal*.

Mr. Hayes: Many of the pharmaceutical chemists would prefer the *Chemist and Druggist*.

Mr. Boyd: None of the Dublin druggists have raised this question at all.

Mr. Gibson: I think we will not do any harm by waiting until October.

Mr. Rankin agreed with the suggestion.

On the motion of Mr. Gibson, seconded by Mr. Shaw, Messrs. Thomas Henry Cleeve, of Sunville House, Circular Road, Limerick, Stanley Harrington, Trafalgar, Cork, and W. B. Harrington, Lee View, Cork, were elected Associate Druggists.

On the motion of Mr. Grindley, seconded by Mr. Rankin, the following gentlemen were appointed a committee to examine declarations, etc., of candidates under sections 6, 7 and 8 of the Pharmacy Amendment Act:—Messrs. Hayes and Boyd were appointed visitors to attend the druggists' examination, to be held on the following day in Dublin, and Messrs. Gibson, Johnston, Montgomery and Dr. Whittaker were appointed visitors to attend the Belfast druggists' examination on Tuesday, the 10th instant.

Some financial business having been disposed of,

The Council adjourned.

Examination for the Licence to act as Registered Druggist.

Messrs. D. J. Atcheson, Cookstown, J. F. Boyd, Newtownards, R. Braithwaite, Belfast, W. J. Busby, Belfast, J. Byers, Belfast, J. Campbell, Dublin, W. Corbett, Belfast, R. J. Davis, Londonderry, J. A. Doyle, Belfast, F. T. Gordon, Cork, J. H. Grills, Belfast, A. R. Hogg, Belfast, A. Kinkead, Belfast, W. M. Lewis, Belfast, E. Lyttle, Newtownards, E. F. McKenna, Drogheda, J. McMorran, Belfast, W. Martin, Belfast, J. Orr, Belfast, J. S. Palmer, Belfast, E. Wheeler, Belfast, W. J. Weir, Belfast, have passed and are entitled to keep open shop for the sale of poisons.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

(*Concluded from page* 819.)

Note on the Influence of Light on a Powder containing Iodoform and Calomel.

BY GEORGE ROE.

℞ Calomel,
Iodoform,
P. Amyli āā,
Mst. pulv.

Three ounces of the above was made and kept in an ordinary "shop round" on a shelf in the dispensary, the light of which was increased by means of a reflector. After a few days brown spots appeared on the surface most exposed to light, which gradually assumed a scarlet colour such as you see in the "stock bottle" shown, which has been undisturbed on the shelf for three months; a portion kept in the dark has not changed; a solution of the iodoform in ether was neutral to litmus paper, and the calomel gave no evidence of impurities. Concluding some chemical reaction had taken place I decided to try the result of mixing iodoform with other salts. A portion of each was exposed to the light for seven days, and a similar quantity kept in the dark, with the following results:

(1) Iodoform and calomel: change commenced after forty-eight hours.

(2) Iodoform and hydrarg. c. creta: change commenced after four days.

(3) Iodoform and hydrarg. perch.: no change after seven days.

(4) Iodoform calomel and boric acid: slight change after seven days.

(5) Iodoform and ung. hydrarg.: no change.

(6) Iodoform and lead acetate: no change.

(7) Iodoform and starch: no change.

The President said this was a subject important to all chemists, for they had all had experience of the influence of light upon mixtures of chemicals. The rapidity with which mercuric iodide was formed was very remarkable.

Mr. John C. Umney remarked that it was strange that the product being mercuric iodide, the change did not occur so quickly with mercuric chloride as with mercurous chloride.

Acarus Lini.

BY FREDERICK DAVIS, B.SC.

It will be remembered that during last session Mr. Strother brought forward a sample of linseed meal, or more properly speaking crushed linseed, teeming with a form of life described, if I remember rightly, both by himself and the *Lancet*, as the "young gentlemen," etc.

Since that time I have at various periods examined every sample of crushed linseed I could obtain, and have arrived at the conclusion that the "young gentlemen" referred to are a form of *Acarus*, evidently peculiar to crushed linseed, and may therefore be termed the *Acarus Lini*.

Although I examined fifty-eight samples of the crushed seed, I succeeded only in obtaining two samples infested with these *Acari*. It may not be unnecessary to remind the junior members that the Acarina are parasites not only of the vegetable kingdom but also of the animal. They are closely related to the Insecta, and in fact are frequently classed amongst the insects, but I consider they should be placed in a class or order by themselves.

With regard to the *Acarus Lini*, I may explain it resembles in some respects the *Acarus Sacchari*, and in others the *Acarus Farinæ*, but does not correspond with either in all particulars.

Acarus Lini is both oviparous and viviparous, having apparently two principal tracheæ beneath the mandibles, which evidently serve for partial breathing purposes, the remaining respiration taking place by way of the so-called skin.

It is comparatively much larger than the *Acarus Farinæ*, and has fewer and smaller pinnate setæ than the latter. The *Acarus Lini* appears to revel in samples of crushed linseed which has a portion of its natural oil extracted.

The study of the Acarina has been very much neglected, in fact there is no exhaustive work upon them. I shall be glad, therefore, if members will be good enough to forward me any form of so-called insects in drugs they may find that I may cultivate them and study their life history. Contributors will be good enough to give all particulars as far as possible relative to their occurrence.

The President thought it scarcely credible that this form of life should be found only in linseed meal, unless it was a distinct type, produced by evolution, one species of *Acarus* being developed under novel conditions into a modified variety, and if this could be proved it would be a strong point for the Darwinists. He had examined the *Acarus Lini* under the microscope and found it to be a very stout insect, but he did not think it peculiar to linseed meal.

Mr. John C. Umney said that of all drugs cantharides was more infected with insects than any other.

Mr. W. Lloyd Williams noticed that ginger and some umbelliferous fruits were especially liable to the depredations of insects.

Mr. Rogers said it was well known that no plant existed without its parasite, and he thought the most important fact to be borne in mind with regard to the *Acarus Lini* was that it appeared to revel in linseed from which a portion of the oil had been extracted.

Mr. McDiarmid referred to the insects found in the linseed used for luting purposes. He had never noticed insect life on ergot.

The President, referring to Mr. Rogers' remarks, said he believed it was usual to extract the oil from the linseed before crushing, and he did not think that the absence of oil was any evidence of its impurity.

MEDICATED GELATINES.

BY F. MC DIARMID.

The author desired to call attention to some non-fatty bases, consisting of medicated gelatine, which had lately come into use. They were all accustomed to the use of gelatine for bougies, suppositories, pill-coating, etc., but they might not all be familiar with the idea of coating the patient with gelatine. For eczema and varicose ulcers, for example, Dr. Unna recommends:—

Zinc oxide,	
Gelatine	āā 10 parts.
Glycerine,	
Water	āā 40 parts.

The first mention of the subject occurred in the *Pharmaceutical Journal*, Aug. 22, 1885. In 1887 Dr. P. G. Unna, of Hamburg, read a paper on "The more recent Improvements in the Therapeutics of the Skin"* before the British Medical Association at Dublin. In this paper he mentions three kinds of applications:—

1. Glycerine gelatines.
2. Salve mulls.
3. Plaster mulls.

In the 'Extra Pharmacopœia' of 1888 a form for gelatinum zincum is given.

Several formula from Unna's clinic are given in the *Pharmaceutical Journal*, Aug. 30, 1890, and among them

Gelatina Zinci Dura
(c. Pice, Resorcin, etc.)
Gelatina Zinci Vulgaris
(c. Ichthyol, Sulphur, etc.)

In the 'Year-Book of Pharmacy,' 1890, appeared an extract from the *Medical Chronicle* (March, 1890), on "Medicinal Gelatines."

Having thus given a short *résumé* of the literature of the subject the author discussed the advantages claimed for these preparations. Fats hindered the evaporation of fluid sweat and to a certain degree of water vapour, but in some skin diseases this was not desirable. Gelatine preparations were porous, whilst they kept in the fatty matter of the skin. They were adhesive and had a tendency to increase perspiration. They were useful for irritated skin, as they prevented it being scratched. They were especially useful in applying caustics to corns or warts; these were painted round with the gelatine, then the caustic was applied and the whole coated with gelatine. Thus the destruction of healthy tissue was avoided. Similarly an unpleasant substance such as iodoform or tar could be applied to the skin and then covered up. Lastly they were cleanly.

In reference to the pharmacy of the subject the base was rather a zinc-gelatine than a glyco-gelatine; thus:

Zinc oxide	3 parts.
Gelatine	3 ,,
Glycerine	5 ,,
Water	9 ,,

Misce secundum artem.

This preparation could be used with such things as ichthyol, thymol, resorcin, etc., though it required some amount of dexterity to incorporate it with such a substance as Indian hemp. Powders could be added up to 5 per cent., but tannin was of course incompatible.

Mode of Application.—Melt and paint on with a large brush.

The President said Mr. McDiarmid's communication was an exceedingly interesting and practical one. He gathered that these preparations were useful only in surgical cases or certain skin diseases, and would like to know how long they would keep. It was evident that as a substitute for collodion they were more tenacious and would stand more wear.

Mr. Helbing said that the gelatines were introduced in 1885 or 1886, and in 1887 he began to prepare zinc gelatine in quantities of 10 to 20 lbs. a week at the German Hospital. In 1887 or 1888 he had published a paper on the subject, giving details of preparation, but little had been publicly heard of gelatines up to the present. In the same year Dr. Phillipi read a paper before the British Medical Association on the treatment of ulcers of the leg by zinc gelatine, which attracted some attention, inquiries being sent to the hospital as the mode of preparation. He had used about equal parts of zinc, water, gelatine, and glycerine, and brought the whole down to a certain weight by evaporation. Unna, in later papers, recommended the addition of fat, as 20 to 30 per cent. could be readily mixed with the gelatine, the whole becoming more elastic. He never found the preparations decomposed. The method of application adopted in treating affections of the limbs consisted in wrapping an ordinary gauze bandage round the affected part, painting on the zinc gelatine, and then again wrapping in more bandage; the whole resembled an elastic plaster of paris casing.

Mr. Smith said he had had a great deal of experience at St. John's Hospital, and had frequently prepared gelatine from the formula given, which was found very useful. It formed a sort of skin which in about a week would peel off in large sheets. It was a mode of treatment much liked by patients. Salicylic acid as a preservative was a useful addition.

Mr. Rogers said he had had much experience with this preparation, and found that it had a tendency to get mouldy if kept any length of time. The addition of salicylic acid would prevent this. He congratulated Mr. McDiarmid on the splendid specimens he had passed round.

Mr. W. Lloyd Williams thought the subject was of physiological rather than pharmaceutical importance. He alluded to the historical instance of the gilding of a child for a carnival in Paris, and to its subsequent death, and pointed out that this fatality might have been avoided if gelatine had been used. With reference to its medicinal activity, glycerine was hygroscopic, and so might act by absorbing from the skin a large proportion of those humours which it was desirable should be thrown off from the body.

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* *British Medical Journal*, Aug. 27, 1887.

The President remarked that only a very small amount of absorption of the remedies into the blood could be expected.

Mr. McDiarmid said he gathered from Unna's papers that he first applied the drug to the skin and then put on a coating of gelatine. Although various mixtures were prescribed he scarcely thought the drugs incorporated would be absorbed. With regard to the preparations becoming mouldy, he could only attribute this to keeping in damp places, as they did not rapidly decompose. Resorcin or thymol would prevent any change or moulding.

The President added that the gelatines could without any addition be kept for years by simply covering them with a layer of spirit.

Laboratory Notes.

BY A. CAMPBELL STARK,

Pharmaceutical Chemist.

1. *Report on a New Test for Resorcinol*:—A test for resorcinol by Moore, which has lately appeared in most of the technical papers, consists in the addition of a drop of sodium hypochlorite solution to a solution of the inspected substance. Then if resorcinol be present a violet coloration is produced, changing quickly to yellow, and on heating to dark red or brown. Allied bodies, as carbolic acid, salicylic acid, do not react in this way.

The reaction affords, I find, a useful method of distinguishing the three metameric dihydroxy-benzenes. A solution of each metamer (1 in 500) gave on the addition of a drop of solution of sodium hypochlorite the following reactions:—

(*a*) *Resorcin.*—Violet coloration, quickly changing to yellow, and on heating to brown or dark red.

(*b*) *Hydroquinone.*—Brownish yellow coloration, quickly fading to yellow.

(*c*) *Pyrocatechin.*—Green coloration, quickly fading to reddish-yellow and finally to yellow.

It is important that the solutions to be tested should be dilute (1 in 500 I found to be the most suitable strength), and that not more than one or two drops of the reagent be added; as with strong solutions, or an excess of the reagent, a green coloration is produced with hydroquinone; this, however, fades much more rapidly than that afforded with pyrocatechin. The test is quite distinctive and reliable when applied in the manner recommended.

The sodium hypochlorite solution used was the pharmaceutical chlorinated soda.

2. *Report on a New Odour Reaction for Cocaine and its Salts*:—Amongst the communications to the Académie des Sciences appears a new test for cocaine discovered by M. de Silva.

A minute portion of the solid salt is evaporated to dryness over a water bath with a drop or two of strong nitric acid. The dry residue on treating with alcoholic potash evolves a strong and peculiar odour resembling, according to the author of the test, peppermint. I find this test to work satisfactorily and to be very delicate; the odour evolved, however, suggests to me citronella rather than peppermint. The test was tried on atropine, sabadilline, pilocarpine, cinchonine, eserine, veratrine, brucine, codeine, delphinine, narcotine, quinine, strychnine, quinidine. None of these were found to yield a similar reaction. Eserine treated in this way gave off an odour resembling phenylcarbylamine. Benzoic acid, which under certain conditions is formed from cocaine, I found to afford no reaction.

In view of the present unsatisfactory test for cocaine the foregoing may be useful; the odour evolved, however, is hardly distinctive enough to render the test completely reliable.

3. *Extraction of Cholesterin and Bilirubin from Gall Stones*:—The gall stones I exhibit, which are of unusual size, formed some of a large quantity found at the autopsy of a patient at a metropolitan infirmary. I extracted from them, by means of boiling methylated spirit, the sample of cholesterin shown. The cholesterin is quite pure and exhibits all the characters described in the text-books. On the filtration of the boiling alcoholic solution of cholesterin, the bilirubin shown was left behind as the residue. With boiling alcohol it dissolves very slightly, yielding a green solution, having the peculiar tint of bile. It is also slightly soluble in alkalies, with formation of the same colour. I have tried nearly every solvent for this body with a view to crystallizing it, but have found it not sufficiently soluble for this purpose in any. In chloroform and carbon disulphide, in which it is stated to be easily soluble (Tilden's 'Organic Chemistry,' p. [illegible]) it does not appear to me to dissolve at all. It possesses all the other characters given for bilirubin.

Mr. Rogers (who had assumed the chair temporarily) said he had listened with pleasure to Mr. Stark's interesting notes. The test for cocaine was particularly useful and one that could be readily applied at the dispensing counter.

Mr. W. Lloyd Williams, in reference to the smell of the cocaine reaction, said he regarded it as resembling a mixture of oil of wintergreen and iodoform. He would like to know if Mr. Stark had tried piperazidine as a solvent for bilirubin.

Mr. McDiarmid said he agreed with Mr. Williams's description of the smell in the reaction for cocaine. Had the author noticed the change in colour in ointments containing resorcin? Glycerinum saponatum had been used as an ointment base, but ointments prepared with it, if resorcin were present, assumed a red and sometimes a green colour. What was the best solvent for cholesterin? He recently had occasion to examine what he supposed to be a gall-stone, weighing about 160 grains; but by boiling it in turn with alcohol, chloroform and benzene, he could abstract nothing from it that resembled cholesterin, and had therefore concluded it was not a gall-stone.

Mr. Stark, in reply, said that opinions differed as to the distinctive odour of the cocaine reaction. Several in the room had said it resembled gaultheria, and a friend who entered when he was making the test remarked on the strong smell of wintergreen. Mr. Stark thanked Mr. Williams for his suggestion, and would certainly try the efficiency of piperazidine as a solvent for bilirubin. He had not noticed the change Mr. McDiarmid had referred to in resorcin ointments. Cholesterin was soluble in spirit, and gall-stones should be invariably rubbed down in a mortar. The subject of Mr. McDiarmid's experiments was certainly not a gall-stone. When boiled with methylated spirit, true gall-stones gave a green coloured solution, which filtered colourless, and the filtrate when evaporated and set aside would deposit cholesterin in the pure state.

ROYAL INSTITUTION.

Dr. Klein on Infectious Diseases.

The nature of the curative treatment of tuberculosis recently introduced by Dr. Koch has awakened renewed interest in the study of bacteriology not only in scientific but also in lay circles. The report of a lecture on "Infectious Diseases, their Nature, Cause, and Mode of Spread," delivered at the Royal Institution on Friday, February 20, by Dr. E. Klein, will therefore no doubt be acceptable as a concise account of the more recent developments of the science and an expression of the opinions of a most eminent authority ith regard to the scientific methods of coping with ontagious and infectious diseases. The lecturer inroduced his subject with the classical reference to omer's description of the plagues sent by the offended pollo upon the Grecian armies before Troy as a poetical escription of the armies of bacilli that at the comand of the offended deity of cleanliness invade comunities which attempt to evade the laws of health, nd produce epidemics which bring death alike to an and beast. Nowadays these evils are recognized s the outcome of negligence and indifference towards anitary matters and not the result of spells and inantations. Although the infectiousness of various iseases is not a modern conception, different views ith regard to the mode of spread have prevailed in ifferent ages, but it is only within the last quarter of century that certain lower organisms have been dentified with certain diseases and the study of artiicial cultivations of these bacilli has elucidated the onditions determining their growth and the best eans for the neutralization of their effects, and emonstrated the true nature and methods of preention of infectious diseases. Not only, however, has his been the case with diseases of recognized infecious nature, but other disorders, hitherto unsuspected, ave been included in the category and subjected to ike searching examination. Thus the malignant nthrax, splenic fever or splenic apoplexy, to which ool-sorters and hide curers are subject, has been raced to the activity of *Bacillus anthracis*, whose apid multiplication in the blood and spleen is accomanied with fatal consequences to sheep and cattle nd serious illness to man. The study of pure cultures f this bacillus has shown that certain chemicals exert n antiseptic influence, but that the organism is apable of producing seeds or spores offering great esistance to inimical conditions. The introduction of *B. anthracis* in a vigorous condition into the animal ystem produces at first a local effect, and the carbuncle s followed, with more or less celerity, by general and atal effects. But Pasteur has shown that germs subjected radually to abnormally high temperatures become ttenuated, and then produce merely a mild, transitory llness, after which the animal possesses for some time mmunity from infection. Similar results have been btained in the investigation of glanders, fowl cholera, carlet fever, etc., and even when sufficient knowledge as not been attained to effect prevention or cure, the nformation acquired has been of inestimable value in stablishing correct diagnoses. Professor Klein illusrated his remarks with numerous microscopic lantern lides of various bacilli grown under different condiions, which, although presenting great resemblance n form to the casual observer, possess points of differnce that render the different species easily recognizble by the specialist. Among these illustrations may e mentioned specimens of Koch's cholera bacillus, the acilli of fowl cholera, fowl enteritis and grouse disease, he cocci of acute and epidemic pneumonia and the acteria of diphtheria, glanders, tuberculosis and etanus, both as obtained from artificial cultivations nd from diseased tissue. As the conditions of growth roduce marked differences in the form of the baceria, observations of the form assumed by the colonies t various stages in different nutritive media, as broth, elatine and agar-agar, and of the rate of liquefaction f gelatine and agar-agar also aid greatly in idenification, although in some cases distinctive colours btain, as in the red *B. prodigiosus*, the yellow *Stahyllococcus aureus*, and the green blue *B. pyocyaneus*. urther it is well to remember that not all infectious iseases are due to the activity of bacteria or fissure ungi, since in some instances the disorder has been raced to protozoa and higher fungi, as species of *Actiomycetes*, whilst in other cases, like hydrophobia, yellow ever, whooping cough, etc., the nature of the contagious element has not yet been discovered. Among the more recent discoveries has been that of the bacillus of tuberculosis by Koch in 1882, and its recognition as the true cause of the disease. The presence of this bacilli in chronic patients can be easily recognized by examination of the expectorations, and the disease is communicable to susceptible persons by the ingestion, inspiration, or injection of these bacilli into the system. Tetanus is likewise brought about by a bacillus that takes up its abode in the ramifications of the bronchial system, where it elaborates a poison producing nervous disorders, and this disease may also be communicated both by direct and indirect inoculation. In fact Dr. Klein pointed out that the proper classification into contagious and infectious diseases is to a very small extent correct, since the contagious disease diphtheria is frequently communicated by infected milk, the spores of malignant anthrax may be conveyed into the system by the air, water, or food, and the bacillus of tuberculosis produces a local or general disorder in a susceptible person, according to the mode of inoculation. The distinction therefore resolves itself into a consideration of the mode of entrance into the system, *i.e.*, by the alimentary canal, by abrasions, or by the respiratory organs, most commonly effected by the various bacilli under natural conditions. How rapid is their multiplication in favourable subjects when entrance is once effected is illustrated by an instance cited by Dr. Klein of a pigeon inoculated with 20,000 bacilli of fowl cholera. After the death of the bird at the end of twenty hours the number of bacilli was estimated at twelve hundred millions, a reproduction of 60,000 bacilli by each bacillus introduced. One of the earliest and most important discoveries connected with the treatment of infectious diseases was Pasteur's method of attenuating the bacilli by cultivation under abnormal conditions and thus decreasing their virulence. This fundamental idea may be recognized in the treatment of smallpox, advocated by Jenner, and of several other diseases by Pasteur. The study of artificial cultivations has also not only led to the recognition of distinct morphological and cultural characters possessed by bacilli, but also rendered possible a chemical examination of the products of their activity. Saprogenic bacteria have been found to be capable of elaborating toxalbumines, or toxines, that produce effects in the animal system identical with those previously ascribed to the bacilli themselves. It would appear, therefore, that the intensity of any infectious disease depends upon the rapidity of multiplication of the microbes and of the consequent manufacture of poisonous toxines, since the system is capable of defending itself from attacks if the bacilli be introduced at first in small quantities and especially in attenuated condition. Upon these facts have been based the simple and fantastical theory of phagocytes, microscopic corpuscles, possessed of spontaneous or amœboid motion, occurring in the blood, which are described, under the names of lymph cells, white blood cells, leucocytes, and round cells, as acting the part of sanitary police by arresting, imprisoning, and destroying bacteria found in the blood. According to this theory, in persons susceptible to disease the phagocytes do not move sufficiently briskly, or are not able to cope with or are even indifferent to the presence of their enemies; but they may be trained to do their duty by pitting them at first against bacilli in weak health. The whole theory possesses, however, Dr. Klein said, slender supports, and is based principally upon the observations of Mechlekoff with respect to the behaviour of the anthrax bacillus in the frog. The appearance of bacteria in the lymph cells may be accounted for either by the assumption that the lymph cells are the enemies or guardians of the bacilli, and overwhelming evidence is now adduced in favour of the latter character. Dr. Klein said that he himself believed the fluid part of the blood has great germicidal action, and that as the bacteria cannot exist in the fluid they take refuge in the lymph cells as a last resort and there exist for a time. Further he considered that different degrees of germicidal activity occur in the blood of different classes of animals, since although anthrax is fatal to mice, it is not so to the frog or dog, and while guineapigs are attacked virulently by diphtheria rats are immune, and whilst mice are affected fatally by tetanus rabbits are not seriously inconvenienced. This view is strengthened by the fact that if blood of refractory animals be injected into susceptible animals immediately before or after inoculation immunity is secured. The same effect is also frequently produced by a subsequent inoculation with a different bacillus, probably due to the neutralization of one toxine by another, so that in combating infectious diseases the physician can count the germicidal action of the blood and the antagonism of bacilli, besides numerous chemical substances, as his allies. In reference to Koch's remedy for tuberculosis, Dr. Klein said that as the tubercular tissue was rendered necrotic by the chemical substances injected, the treatment was a valuable one in cases where the necrotic tissue could be eliminated with or without surgical aid, and might be regarded as an immense advance in lupus and tuberculosis of bone. In conclusion, Dr. Klein remarked that he had often heard the remark that ignorance is bliss made in connection with the subject of bacteriology, but it is the wise man who, knowing and recognizing dangers, is capable of avoiding and preventing them. In the treatment of infectious diseases he believes in the maxim that he who cures a disease may be the skilfullest, but he who prevents one is the safest physician.

THE WESTERN CHEMISTS' ASSOCIATION (OF LONDON).

A meeting of the Western Chemists' Association (of London) was held at the Westbourne Restaurant on the evening of Wednesday, February 25th. Twenty members were present and several new members were elected.

The President (Mr. Long) took the chair, and read a paper on "Pharmacy Past and Present." Premising that his paper was principally drawn from one by Professor Redwood, he briefly traced the progress of pharmacy from the earliest times, and dwelling earnestly upon the fact that the success of the pharmacist of the present day depended upon his being well-furnished with both theoretical and practical knowledge, concluded by observing that though he did not think there would in the future be occupation for so many chemists as in the past, he was confident that the fittest would survive and flourish.

Mr. Hyslop followed with a very interesting speech, causing considerable amusement by reading from an old dispensatory the directions for making some of their compounds, and concluding with an eloquent comparison of the ignorant pharmacy of those times with the science and skill now brought to bear upon the subject.

Mr. Pickard and other gentlemen having spoken, a vote of thanks was passed to the Chairman, and it was announced that at the next meeting of the Association the Honorary Secretary would open the discussion with some remarks on pharmaceutical ethics.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the monthly technical meeting, held on Tuesday, February 24, Mr. Leon Warnerke, Vice-President, in the chair, Mr. G. F. Hayward exhibited some Daguerreotypes taken in 1842-43 and a positive taken about 1844.

Mr. W. E. Debenham then opened a discussion upon the "Dark Room and its Fittings." He first described the window of the Society's dark room. A sheet of pale yellow is fixed in the window; inside that are a series of sliding panels filled with ruby fabric, golden fabric, a yellowish green glass and a deep ruby glass. He then described a number of lamps exhibited by various firms, and said that another useful addition to a dark room was a drying box, for drying plates that had been backed.

The Chairman said that for backing plates he used a mixture of glycerine and gelatine, such as is sold for copying purposes.

Mr. E. Clifton thought it was impossible to obtain optical contact in this way; he found ordinary Brunswick black made a good backing.

Mr. W. E. Debenham considered the worst black of all was bitumen and lamp black ground together.

Mr. E. Clifton considered that a plate rocker was extremely useful in the dark room, as it enabled one to go on with other work while a plate was developing.

The Chairman described a lamp he used when travelling.

Mr. W. E. Debenham drew attention to some celluloid dishes that were exhibited.

Mr. E. Clifton mentioned that such dishes softened if used with methylated spirit.

Mr. W. England then showed his travelling dark tent.

The Chairman then referred to Lipmann's photography in colours, and having given a *résumé* of the various articles that have appeared, described a number of experiments he had made which gave negative results.

A discussion ensued, in which Messrs. Debenham and Lawrance took part.

The following is the list of exhibits:—Messrs. Vevers, Leeds—Simple folding lamp, dropping tube and minim measure, Kinnear's gas tap and plate lifter; Messrs. J. Preston, Leeds—Chameleon lamp for oil and gas, argand burner with ruby chimney and celluloid dishes; Messrs. Reynolds and Branson—Lamp, giving white or ruby light at will; Messrs. Benham and Froud — Candle lamps; Messrs. the London Stereoscopic Co.—A large dark room lantern; Messrs. J. J. Griffin—Celluloid dishes, weights and measures.

On Wednesday, March 4, Mr. J. Glaisher, F.R.S., President, being in the chair, Mr. Leon Warnerke delivered a lecture on a "Simplified Photo-collographic Process" to a crowded audience. Instead of a glass or metal plate, as is usual in the collotype process, Mr. Warnerke makes use of a gelatine film supported upon vegetable parchment. He demonstrated the method of sensitizing and drying the film, explained the process of printing, and passed round for inspection before and after printing, and after washing with water. He then demonstrated the method of printing and showed its application to wood engraving, to canvass and to the decoration of china and porcelain.

A short discussion ensued in which Messrs. J. Spiller, J. D. England, V. Blanchard and the lecturer took part.

The walls of the room were hung with between two and three hundred examples of collotype printing kindly sent for exhibition by Messrs. The Autotype Company, Bemrose and Sons, of Derby, the London Stereoscopic Company, Rommler and Jonas, of Dresden, L. Romillé, of Paris, F. Thevoy and Co., of Geneva, and Waterlow and Sons.

It was announced that the exhibition would remain open for a month.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, Feb. 26, Mr. J. C. Umney, Vice-President, in the chair.

Mr. H. Garnett read a paper on—

Field Botany.

The author commenced by stating that his object in writing the paper was to stimulate, if possible, in his audience a taste for the study of field botany. After enumerating some of the advantages that result from the study he classified the methods under two heads, (1) collection and examination of plants, and (2) their preservation for future reference. It was pointed out that in collecting it is most important to select typical specimens, and that at the same time it is well to gather for comparison different specimens of the same species. When convenient the entire plant should be taken, or if this be impracticable on account of size, specimens of the inflorescence should be selected as well as some of the lower and upper leaves. If possible, also, samples should be obtained of the flower and fruit in different stages of development. Directions were then given for the examination of a plant with a view to its classification, the use of Holmes's 'Botanical Note Book' as an aid being recommended. Some details were then given as to the different systems of classification, and the paper concluded with directions for the drying and mounting of plants with a view to their preservation in a herbarium.

A discussion followed in which the Chairman, Secretary, Messrs. Browne, Harrison, Morley, B. Brooke, Shepheard, Gare, Roberts, and Dunning took part.

Mr. Shepheard then read a :—

Report on Analytical Chemistry.

Boric Acid and its Uses.—The first note related to the use of boric acid as a preservative of food. The reporter referred to milk especially as an article which through successive additions of boric acid as it passed from dealer to retailer might be brought into a very objectionable condition. Some information as to the use of boric acid in the preservation of specimens for museums was then given, and it was stated that good results in the preservation of marine specimens had been obtained with a mixture consisting of :—

Boric acid	6 parts.
Glycerine	6 parts.
Water	6 parts.
Methylated spirit	12 parts.

A weaker solution, in which the above proportions of water and methylated spirit were reversed, had also been found useful for the more delicate specimens.

Detection and Estimation of Boric Acid in Milk and Cream (Charles E. Cassall).—The detection of boric acid is familiar to you all, and can be applied in milk and cream by evaporating to dryness and treating the ash, using either turmeric paper or the alcohol lame test. The ash is treated with water and made ust acid with HCl. Slips of turmeric paper are moistened half way with the solution and dried, or a few drops of turmeric solution are added to the acidified ash and evaporated to dryness in a porcelain capsule. On moistening with an alkali a dark blue colour is produced either on the paper or porcelain capsule if boric acid is present. For the flame test the acidified ash is simply treated with alcohol and ignited, when, f boric acid is present, it will burn with a green flame. n the estimation, advantage is here taken of the fact that boric acid volatilizes with methyl alcohol. It is lso found that the crystalline form volatilizes more asily than the anhydrous. Fifty grams of cream or 00 of milk are rendered alkaline with NaOH evaporated to dryness and incinerated. The ash is transferred to a flask of from 200 c.c. to 300 c.c. capacity, care being taken to wash all the contents into the flask with methyl alcohol and a few drops of water. The flask is connected with a condenser and a stopcock funnel containing more methyl alcohol. Now the contents of the flask are acidified with acetic acid, and about 5 c.c. of methyl alcohol are run in at a time and distilled, about ten such distillations generally being quite sufficient for all ordinary purposes. The distillate is received in a weighed amount of pure lime (ignited to constant weight). The lime is contained in a platinum dish capable of holding about 70 c.c., which is placed in a glass receiver. The receiver is covered with a perforated ground glass plate. The end of the condenser passes through a grooved or loosely fitting cork, and terminates just above the line in the platinum dish. A gelatinous mixture is obtained which is well stirred and allowed to stand some minutes, then evaporated on an oil bath, and finally heated over a blowpipe flame to constant weight. The increase of weight is boric acid, and the error does not amount to more than 1 milligram plus when dealing with from ·1 to ·2502·3 grams of anhydrous boric acid. The residue in the flask is, of course, tested to make sure all the boric acid has been volatilized.

Detection of Paraffin in Beeswax.—A few grams of the substance in fine, air-dried shavings is gradually heated in a small capsule until fumes begin to rise. A half-litre wide mouthed bottle is then inverted upon the capsule, and when filled with white vapours is closed and set aside until the fumes have condensed upon its walls. The sublimate is then dissolved in 3 c.c. of chloroform, and the chloroform evaporated in a test tube, and the residue boiled with 4 c.c. of soda solution. If paraffin was present it will after cooling be found floating on the clear solution. A drop of chloroform solution when evaporated may also be examined microscopically. Fumes from pure beeswax are not so white as from paraffin, and are only obtained at a higher temperature (300° C.). The sublimate gives a coloured solution with chloroform, and a coloured turbid solution with soda (pure beeswax colourless and clear). Residue from chloroform solution is a dull film; paraffin gives separate grains in a clear field.

Detection of Arsenic by Fleetmann's Test.—The use of aluminium for zinc has been shown to be a great advantage, as commercial aluminium never contains arsenic; while it is very difficult to get zinc without this impurity. The evolution of hydrogen from aluminium and potassium hydrate also proceeds with great regularity and without much heat.

Estimation of Free Hydrochloric Acid in Stannous Chloride Solutions.—100 c.c. of $SnCl_2$ solution is saturated hot with hydrosulphuric acid (H_2S) and filtered. Half the filtrate is boiled to expel hydrosulphuric acid, and the total acid is then titrated with standard alkali solution. The amount of tin is now ascertained by titration with iodine and the corresponding quantity of HCl deducted from the total.

Detection of Traces of Iodine in much Chlorine (A. Johnstone).—The solution to be tested is treated with a saturated solution of silver nitrate in strong ammonia; a yellow precipitate indicates the presence of an iodide. To confirm this, add concentrated sulphuric acid and agitate with carbon bisulphide; the latter becomes coloured by any liberated iodine.

Estimation of Water in Superphosphates (J. Stoklasa).—Pure monocalcium tetrahydrogen phosphate $CaH_4 2PO_4 + H_2O$ loses its water of crystallization at 100° C., but only completely after forty hours. It may be kept at 105° for twenty hours with but little change, but on longer heating at the same temperature begins to show decomposition. At higher temperatures the amount of change is dependent not alone on the temperature but also on the time of drying. On drying for one hour at 200° C. one half of the monocalcium phosphate undergoes decomposition, thus :—

$$4CaH_4 2PO_4 = Ca_2P_2O_7 + Ca(PO_3)_2 +$$

Pyrophosphate. Metaphosphate.

$$CaH_2P_2O_7 + 2H_3PO_4 + 4H_2O.$$

Acid pyrophosphate.

At lower temperatures for the same length of time, the proportion decomposed is smaller, but if the time is prolonged, a further decomposition takes place even at 150° C. and less free phosphoric acid is found in the soluble part. A temperature of 200° C., sufficiently prolonged, results in the following decomposition :—

$$4CaH_4 2PO_4 = 3Ca(PO_3)_2 + CaH_2P_2O_7 + 7H_2O$$

Metaphosphate Acid pyrophosphate.

whilst at 210° C there remains nothing but insoluble glassy metaphosphate of calcium ($Ca2PO_3$). In the presence of free phosphoric acid the contrary action may on heating take place, thus :—

$Ca_2P_2O_7 + 2H_3PO_4 = 2CaH_2P_2O_7 + H_2O$, and thus the soluble phosphoric acids actually undergo increase.

New Method of Treatment of Insoluble Silicates :—In silicates, which under ordinary conditions are not soluble in HCl, the SiO_2 must be estimated by fusion with Na_2CO_3 and the alkali by special treatment with HF and H_2SO_4. Paul Jannasch has introduced a simpler method by heating the silicate under pressure at high temperatures with HCl. And since this treatment would effect glass he employs platinum tubes. The finely powdered silicate is mixed with HCl (in the proportion of 4 parts HCl to 1 H_2O), and heated for ten or twelve hours at 190–210° C. Under these conditions a small quantity of platinum is dissolved, but the solvent action is minimized by removal of any air from the platinum tube before sealing by means of a current of CO_2, and also by first treating the HCl employed with the same gas in order to remove traces of chlorine.

The report gave rise to a discussion, in which the Chairman, Messrs. Browne, Garnett, Roberts, Riches, Davies and the Secretary joined.

The meeting then adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eighth meeting of the thirteenth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, February 25, at 9.15 p.m. Mr. Donald McEwan, President, in the chair.

The meeting was specially set apart for apprentices, and the minutes of last meeting having been read and approved the following papers by apprentice members were read :

NOTE ON SEIDLITZ POWDERS.

BY THOMAS WEIR.

In the recently issued 'Addendum to the B.P.' there is a preparation possessing the euphonious name of pulvis sodæ tartaratæ effervescens, and this is described in a foot-note as "seidlitz powder." There are, however, powders of two strengths in common use, but a formula for one only is given in the 'Addendum,' and that is what is generally known as "single seidlitz powder."

I would suggest that the word "single" be attached to the present formula and the following, to which might be attached the word "double," added :—

Take of :—

Tartarated soda, in dry powder . .	240 grs.
Bicarbonate of soda, in dry powder .	40 grs.

Mix and wrap in blue paper :—

Tartaric acid, in dry powder . . .	38 grs.

Wrap in white paper.

Or the one at present official might be called "pulvis sodæ tartaratæ effervescens or seidlitz powder," and the one I suggest could be called "pulvis sodæ tartaratæ effervescens fortior" or "stronger seidlitz powder." The "stronger" or "double" seidlitz powders are much more commonly sold in Edinburgh than the "single," and therefore the necessity for a definite formula for the former is even greater than in the case of the latter.

It might be more satisfactory if the synonym "seidlitz powder" were removed from the somewhat hidden position which it at present occupies and placed in the line immediately following the name.

In the next paper, entitled "A Visit to a Sulphuric Acid Factory," Mr. James B. McLaren described a recent visit to the works of Messrs. J. and J. Cunningham, Leith. Mr. McLaren gave an interesting description of the apparatus and process of manufacture, his paper being admirably illustrated by a series of well-executed drawings of the apparatus and specimens of burned and unburned pyrites, and samples showing the different stages of the process.

Mr. William Smith then read a paper on "Our Prize Schemes," in which he suggested that English, arithmetic and pharmacy should be deleted from the "Association Prizes Competition," and that it should include Latin, elementary chemistry and elementary botany.

It was agreed to remit the paper to the Prize Committee for consideration.

In a paper entitled "A Visit to a Distillery," Mr. Alexander Murray gave an interesting description of a visit recently paid to a malt spirit distillery at Linlithgow, the paper being illustrated by specimens showing the different stages in the process of manufacture. The yeast plant was also shown under the microscope.

The meeting concluded with a series of "Atmospheric Experiments," by Mr. Rutherford Hill, illustrating the physical properties of the atmosphere and the various ways in which these properties are taken advantage of for technical and scientific purposes.

The discussion was taken part in by Messrs. Henry, Hill, McEwan, McLaren, Murray and Weir, and on the motion of the Chairman cordial votes of thanks were awarded to the authors of papers and Mr. Hill, who had charge of the arrangements.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The usual weekly meeting of this Association was held on Thursday evening, 26th ult., Mr. George Little, A.P.S., Vice-President, in the chair. Mr. William G. Smith, B.Sc., read an interesting paper on "Common Parasites," which was illustrated by means of diagrams and microscopic objects. The various parasites which infest the human organism were chiefly dealt with, the nature of ringworm, among other external parasites, being minutely detailed, The life-history of the trichina, giving rise to the disease trichiniasis, was also fully described. It was shown that this parasite is frequently found in meat of different kinds, which, if improperly cooked would lead to dangerous results. Among other interesting specimens exhibited was a very complete tapeworm, the structure of which was also described.

Mr. Smith was awarded a vote of thanks for his excellent lecture, and a similar compliment to the Chairman concluded the meeting.

At a largely attended meeting of assistants and apprentices, held in the rooms of the Association on Thursday, March 5, Mr. J. Rutherford Hill, Secretary to the Pharmaceutical Society in Scotland, delivered an address, entitled "Practical Hints for Pharmacy Students." Councillor Ferrier, one of the Hon. Vice-

Presidents, occupied the chair, and was supported by Mr. James Miller-Hardie, Mr. J. Braik Mason, F.C.S., Mr. John Doig, etc.

Councillor Ferrier, in the course of a few introductory remarks, said:—"It afforded him great pleasure to preside at so well an attended meeting. They were met to-night to hear an address from one who was respected and esteemed by all connected with pharmacy. He had not the honour of knowing Mr. Hill personally, but from what he had read and heard of him he was sure they would not be disappointed by his remarks.

He was glad to see the younger members of the craft taking an interest in such meetings; it was only by regular attendance that any true good would be derived by which they would become benefited in after years. He had now great pleasure in calling on Mr. Hill to address them.

Mr. Hill, who was cordially received, read the following:—

Practical Hints for Pharmacy Students.

BY J. RUTHERFORD HILL.

I regret to say that the thoughts to which I am about to give expression were only put in shape during my journey from Edinburgh to Dundee this afternoon, and they might very literally be described as "Railway Jottings." It has been my privilege to become personally acquainted with some of the most active members of your Association, and that is probably why I find myself here to-night. It is only necessary to glance at your syllabus to see that good work is being done. I cordially congratulate you on the energy and success with which this Association has been conducted, and I feel assured you will go on and prosper. I had the pleasure of meeting the Glasgow Association a few weeks ago, when I addressed them on some topics very similar to those I am to discuss to-night. I should like to invite your attention to the published report of what I said on that occasion in the hope that it may be in some small measure a help in your work. I promise that though the title of my remarks to-night is very similar to that given to my remarks in Glasgow the subject shall be different. I asked a Dundee assistant what I should speak to you about, and he said, "We would like to hear something about the new examination schedule for the Minor." I am interviewed at present almost daily about this very subject, and I am glad to give what information I can in my office, but as I am an official of the Society, I feel it would be a little out of place to give a lecture on this topic from a public platform. You will forgive me therefore if I only refer in a general way to one or two outstanding features that occur to me.

Speaking generally, I believe the new Schedule will be, and indeed has already proved, a great advantage to every student of pharmacy. In the department of pharmacy proper it will be noted that mere memory work is relegated to a subordinate place, and greater prominence is given to a practical knowledge of the processes and the principles of the processes pertaining to pharmacy. In materia medica the scope of the examination and the drugs to be recognized are more definitely specified. In botany the student is required to have some knowledge of the classification of plants. This puts an end to what has always appeared to me to be an inconsistency. In the department of materia medica a student says *Aconitum Napellus* belongs to the natural order Ranunculaceæ. But he does not know what a natural order is, and therefore the answer has no meaning to him at all. With a knowledge of systematic botany he will be able to use such words intelligently. The use of the microscope is also introduced. I said at Glasgow that no one could learn botany without examining living plants, and I may now add that neither can he do so without using a microscope. Another gain to the student is the definite list of plants for recognition. In the department of chemistry and physics the scope of the latter subject, and indeed of both, is much more clearly defined. Considering the increased importance of organic chemistry it is very appropriately introduced, and with it a knowledge of the methods of preparing and testing organic substances. Volumetric testing is also introduced. I have been frequently struck with the fact, that many pharmacy students regard this method of testing with a feeling of strong aversion, from an utterly erroneous belief that it is difficult and complicated. The very opposite is the truth, and its most conspicuous advantages are its simplicity and the facility with which the tests can be applied. When we consider the important place occupied by this method among official tests, it is plain that every chemist and druggist should be acquainted with it. The candidate is also required to have a knowledge of the official processes of alkaloid assay in the case of cinchona, nux vomica and opium. These processes are also extremely simple in practice and such as every chemist and druggist ought to be able to perform. One student who called upon me to-day, said he thought it would be a very great advantage if he could get "through" the "Minor" in July. I said I was not quite sure that I could agree with him. It might be easier, but that is rather a doubtful advantage. The man who passes under the new schedule, will, in my opinion, be a more accomplished chemist and druggist, and I rather think all the real advantage is on the side of the man who passes after July. While the course of study under the new schedule will be different from the old, I do not think it will be more difficult. It is more logical, will be more in accordance with modern requirements, and will give a better guarantee that the man who holds the "Minor" certificate is a competent chemist and druggist.

One of my Dundee correspondents suggests that I should make some reference to the Major examination. I said something on this subject at Glasgow to which I beg to direct your attention. I notice that a large amount of energy, enthusiasm and time is devoted by many students to cricket, or football, or volunteering. These are all right in their own place. I would like to suggest that some of this energy, and enthusiasm and spare time might very wisely be devoted to mastering the work of the "Major." There is in the character of every healthy young man a combative element which finds it a positive recreation to remove obstacles and conquer difficulties, and the effort to do so developes muscle and brain and becomes a source of strength. Why not make the title of "pharmaceutical chemist" one of your goals and aim at it with all your might? The man who passes the Minor examination is, in the eye of the law, sufficiently qualified to be a safe dispenser and dealer in poisons, but he is certainly not master of his profession if he does not know more than is requisite for the passing of the Minor. If he aspire to the position of being a thorough master of his profession he must go on to the higher grade of the Major. By so doing he also certainly increases his self-respect, and while self-conceit may be a bad thing self-respect lies at the very foundation of a man's integrity and honour. Moreover, let me repeat what I have often said before, the honourable distinction of being a pharmaceutical chemist is easily attainable. I do not mean that it does not require hard work. I have great difficulty in making any suggestion to any pharmacy student who fears hard work. But with hard work and average ability the end in view is easily reached.

It is to be remembered, too, that the whole pharmaceutical caste or community of registered chemists is rapidly changing. In 1868 a very large number of men and women who, though they had been in some measure dealing in drugs, and on rare occasions, perhaps, attempting to dispense prescriptions, were nevertheless in no way specially educated or qualified to be either chemists or druggists in the modern sense, were put upon the register of chemists and druggists because their vested interests had to be recognized, and, as in all such legislation, very liberally acknowledged. The inevitable effect of giving a legal status to so large a number of people possessing no special education or scientific training was to degrade the educational and scientific character and reputation of the whole pharmaceutical community. It therefore requires a generation to reveal the full influence and extent of the change produced by the Act of 1868. The required period is now near at hand, and in a very few years the community of registered chemists will consist exclusively of persons who have gone through a curriculum of study and passed a scientific examination. When that time comes the educational and professional status of the whole body will obviously be very greatly raised, and therefore he who is wise will endeavour to keep himself in the front rank.

And again it is noteworthy that on account of the advance of science and the amount of time required for other departments, the subjects of botany and even chemistry are being relegated to a very subordinate place in the curriculum of medical students. Some medical educationists have indeed urged that the former should be struck out of the medical course altogether. The result must be that those parts of medical science specially requiring a knowledge of botany and chemistry will more and more fall into the hands of pharmacists. There is, I think, a very good illustration of that in the fact that a committee of the Pharmaceutical Society was recently entrusted with so large a share in the preparation of 'Additions' to the Pharmacopœia. The reason for this altered state of affairs is that such men as Duncan, Christison and Pereira are scarcely to be met with now in the ranks of the medical profession. For the same reason it is becoming much more common for medical practitioners to rely upon the pharmacist for information as to the dose; the physical characters, such as colour, odour, taste and solubilities; the chemical characters, such as constitution, decompositions, and incompatibilities, and the pharmaceutical characters, such as whether it is generally prescribed in powder, pill, or mixture form of the many new remedies now coming into use. Then again it is to be borne in mind that trade in soaps, perfumes, brushes, aerated waters and a great many similar articles has largely passed into the hands of tradesmen who can sell them at lower prices. The effect must be to force the chemist to cultivate those departments which require the exercise of his superior scientific knowledge. The department of analysis, for instance, is one which many chemists whom I know have turned to good advantage. Urine analysis, for example, is remunerative in some districts. In some places analysis of bleaching powder pays well. And so on with many others, such as soaps, animal or vegetable fibres and textile fabrics, agricultural manures and soils, water supplies, etc. The extensive development of photography has also given rise to a widespread demand for photographic chemicals and apparatus, which the pharmacist is specially well-fitted to supply.

If the pharmacist is successfully to occupy the ground, and to discharge the functions I have thus briefly outlined, I think it is essential that he should pass the Major examination. If he does, then I think he will be quite competent to undertake such work as I have suggested, and I would recommend pharmacy students to embrace every opportunity of gaining experience on the lines indicated.

I will be met, as I am constantly met, with the reminder that it is really a good commercial or trading qualification that a pharmacist needs. There is, of course, a great deal of truth in the assertion. But it is only half the truth. The ideal pharmacist is one in whom the scientific and commercial qualifications are so happily blended that they work harmoniously and successfully side by side. But the thought that the pharmacy student must also be a merchant is so much in his mind that study is apt to bear the aspect of a laborious drudgery. By a little perseverance, however, the habit of study is soon acquired; and it will remain and increase if constantly cultivated. I notice with pleasure that you are about to start classes for students under the direction of members of your association. These classes will provide good opportunities for forming yourselves into groups for purposes of study. I strongly recommend you to do so. Get together and cross-examine one another on the various subjects of study. In so doing you not only ascertain what progress you are making, but you acquire the power of expressing in words the knowledge acquired, new interest is awakened and the drudgery of the thing entirely disappears. It is well to cultivate the enthusiasm generated by association with those aiming at the same results, for thereby the burden is lightened and task becomes pleasant. It is a good plan to keep in mind the precise nature of your studies and limit the range to the qualification you seek to acquire. Do not suppose I want to suggest that you should merely "cram" for examination. Get up thoroughly and intelligently what you do require, but restrict your studies to these limited departments till the examination is successfully passed. In those happy days when there are no more examinations to face there is nothing more profitable or delightful than to return to the subject and go in for more elaborate study in a specially congenial department. It adds immensely to one's grasp of the great facts and principles of natural science to trace the history of their discovery from the earliest beginnings. Take for instance as simple an instance as the chemical symbol or formula $KClO_3$. To a chemist there is no more profoundly interesting study than that involved in an attempt to get a full answer to the question, How did men ever come to write down such a symbol, and what investigations and discoveries does it summarise and express? But all such interesting inquiries must be deferred till examinations are a thing of the past. I remember once, when employed as a teacher, having a student who had never opened a botanical book till he began his studies at my classes. I was disappointed to find that he made very little progress with any of the subjects. On inquiry I discovered that he had a perfect passion for botany, and was so fascinated by the subject that he treated himself to as many as four botanical excursions in one week. I found it necessary to restrain his botanical enthusiasm and remind him that a candidate must pass in all the subjects. The hint will perhaps not be thrown away on any of you who feel yourselves specially drawn towards some particular line of study.

In pharmacy it is pre-eminently true that the student's abstract knowledge should be capable of practical application. It must, therefore, be definite, clear, accurate, and unequivocal. To this end the student must be careful to understand thoroughly the use and application of words. Words are very often a snare to those who use them glibly without an intelligent apprehension of the idea or fact that lies behind them. Let me illustrate this by means of this piece of gamboge which I hold in my hand. On referring to the Pharmacopœia we find it is described as being "longitudinally striated." These words obviously apply to those characteristic markings or lines or striæ in the direction of its length. Then it is said to break with a "conchoidal fracture." The word "conchoidal" erived from conch, a bivalve shell and eidos, likeness : form. It therefore means that the fracture presents ie appearance of a marine shell, such as an oyster iell. It is not straight or marked by sharp angles, it has convex elevations and concave depressions, as ou see in this specimen. Or, again, here I have a iece of white arsenic or arsenious acid. The Phar- acopœia describes it as a "sublimed mass presenting stratified appearance caused by the existence of parate layers differing from each other in degrees of pacity." These different layers are produced by varia- ons of temperature during the process of sublimation. hey are very clearly seen on this specimen, and once ou have seen them the official description and the pplicability of the words used become perfectly ovious. It is very important to pay such close atten- on to the actual meaning and use of the words em- oyed, that when you read a description of any drug a book you may be able to form in your mind a orrect picture or ideal of the actual substance de- ribed, although you may never have seen it. It is ly by very careful reading and experience that this ower can be acquired, but it is well worth trying to tain. By so doing one is enabled to identify and dge of the quality and freedom from adulteration of e various articles of the materia medica, even al- ough they may never have been seen by us before. hen we discover that we have acquired such power e may be sure that our studies have been to good irpose. I would also like to suggest the use of a ethod which I have found in my case practically dispensable. Here I have a small book lettered as i ordinary index book. The purpose of it is to take reference note of any new information about any rug or other point of importance to which I might ish to refer at a future time. It saves a great deal time and trouble to be thus enabled to lay one's indy readily on any reference when it is required. I id, too, that the mere noting down of the reference tes the fact on the memory, so that if a question is ised about any such point I can tell at once whether not I have any record of it.

And now I must conclude. There are some who ink an assistant does not become a pharmacy stu- ent till he goes to a school of pharmacy, there are any more who think he ceases to be a pharmacy stu- ent when he passes his examinations. Both opinions e, in my estimation, entirely erroneous. I believe e best motto is "Once a student, always a student," d therefore I say, go on and keep alive the habit of idy. If you do not, then you cannot hope to keep ce with the times. You will inevitably become a ssil, and while fossils may be very useful ornaments a museum of antiquities, they are of very little value practical life, and a pharmaceutical fossil is just as eless as any other species. Cultivate then habits of servation. Do not be content with merely seeing, but ok with that desire to understand and appreciate iich constitutes observation. I would suggest also that u should record your observations. Many discoveries d happy thoughts and interesting facts are wholly t, because this little point of making a record has t been attended to. Moreover a pharmacist very quently comes across a point of interest in his rk which, if followed up, might lead to valuable ults. But there is no time to investigate at the oment and the incident is allowed to pass. It is ich wiser to keep a note and return to the subject at ne more convenient time. And then when some eful result has been attained, I would suggest that ans should be taken for adding it to the accumulated id of human knowledge. This can be done by orting to such an association as this, or through ne other channel. Nowadays it is very much the hion to turn all new discoveries into money and th this view the discovery is not publicly disclosed. That I think is perfectly fair, but there should be some provision, whereby such knowledge shall ultimately become the common property of mankind. Every man who succeeds in unlocking one of nature's secrets incurs a responsibility which can only be discharged by ultimately adding this knowledge to the common stock of human wisdom.

Mr. J. Miller Hardie said he fully endorsed Mr. Hill's remarks. He advised every student to pass the "Major." It required no brilliant talent, but steady, persevering work. By doing so they would tend to raise the status of their profession, and fit themselves for a useful career afterwards.

Mr. J. Braik Mason, F.C.S., also referred in a complimentary manner to Mr. Hill's address.

Mr. Wm. Mair moved, and Mr. R. M. Lindsay seconded, the thanks of the Association to Mr. Hill for his valuable address.

Mr. George Little moved a similar compliment to the Chairman, which terminated the proceedings.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The Association held its usual fortnightly meeting on the evening of Wednesday, the 4th inst.

Mr. J. G. Gilmour presided, and in lieu of the subject on the syllabus Mr. Robb read a paper entitled "A Patient Investigator," dealing with the unwearied and painstaking nature of Darwin's work. After briefly referring to the favourable circumstances of Darwin in not being obliged to earn a living the essayist illustrated his subject by reference to the various inquiries he conducted and by extracts from several of his later works, and said that Darwin showed the truly patient spirit which should actuate every inquirer. It was on account of his well known character for patient and correct observation that the theories which he advanced were received even by those least willing to accept them.

After observations by several members—

Mr. Gilmour, in proposing a vote of thanks, said that a good example of Darwin's patience was to be found in the readiness with which he was wont to listen to anyone who called on him for the purpose of propounding or illustrating some matter on which Darwin was probably the better informed of the two. His nature was devoid of the acrimony which often characterizes scientists in their discussions.

LIVERPOOL CHEMISTS' ASSOCIATION.

An interesting gathering took place on Thursday evening, March 5, at the Royal Institution, Colquitt Street, on the occasion of a conversazione given by the Liverpool Chemists' Association. Mr. Charles Symes, Ph.D., the President of the Society, and the Committee, consisting of Messrs. T. F. Abraham, J. S. Ward, F.C.S., M. Conroy, F.C.S., J. Bain, R. Parkinson, and A. S. Buck, honorary secretary, received the visitors as they came in, after which an attractive programme, comprising vocal and instrumental music, was gone through.

Amongst a number of interesting exhibits which were on view during the evening, Messrs. Ayrton and Saunders's practical illustration of the method of blowing glass was greatly appreciated. Dr. Charles Syme's exhibit of Giessler's tubes, microscopes, etc., was also of particular interest, as was Mr. C. Troughton's old pharmaceutical jars. Mr. W. A. Smith exhibited 'Gerarde's Herball,' 1597; Miss A. G. Burton, some beautifully mounted wild plants; Mr. Hocken, a number of mummified cats; and Messrs. J. T. Conroy and A. S. Buck, microscopes.

A most enjoyable evening was spent in social conversation and in listening to the excellent items of the musical programme.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The tenth meeting of the second session was held in Lockhart's Café, St. Nicholas Square, on Wednesday evening, March 4, at a quarter-past eight o'clock, Mr. F. Park, President, in the chair. There was a fair attendance.

The usual preliminary business having been transacted, a paper was read on:—

The Chemistry of Beer-Making.

BY T. MALTBY CLAGUE.

The author, who handled his subject in an exceedingly able and most interesting manner, commenced with the early history of fermented liquors of the nature of beer, and then went on to describe minutely and in sequence the various processes, steeping, growing, drying in air, drying in kiln, grinding, mashing, boiling, fermenting, fining, etc., to which the grain was subjected in the process of beer-making, the scientific side of the process being specially noted, and samples of grain shown in the various stages. The various methods of treatment for the production of light and heavy, pale and dark ales and stout were detailed, and tables of the alcoholic strengths of commercial beers, together with analytical tables of the composition of grain, hops, etc., were shown. The fact that hard water made a much superior article with a great deal less trouble, was put forward by Mr. Clague as being due to the lime salts in solution contained in the water being deposited as phosphate in the course of "mashing," and so more rapidly carrying down suspended matter and clarifying the liquid.

This view of the matter was endorsed by Mr. Merson, who had noticed that a sample of a concentrated vegetable infusion was much more rapidly filtered bright when made with tap water containing a considerable percentage of lime, than when distilled water had been used in the operation.

Mr. Peter Bell noted the fact that the quantity of isinglass required to "fine" mild ale was much less than that necessary for bitter beer, and Mr. Clague pointed out that the astringent matter in hops (a much larger quantity of which entered into the composition of the latter than of the former) rendered a certain quantity of the isinglass inert, thus necessitating a much larger addition to effect clarification. The residue or "extract" from a pint of ordinary bitter beer was shown, but was meagre in quantity and unpleasant in smell and taste, showing that beer is, as a digestive agent, practically useless, the solvent properties of the malt being destroyed in the later stages of manufacture. The percentage of alcohol in a sample of beer was estimated practically during the evening by means of a retort and condenser on the table. The quantity of cocculus indicus imported annually was remarked upon by Mr. Clague, and curiosity expressed as to what became of it all, seeing that the sale of it for trade purposes was illegal. In closing, a list of "brewers' sundries" from a trade price-list was enumerated. The following are a few items:—Acid acetic glacial, ac. citric, ac. salicylic, ac. sulphurous, ac. tartaric, ale finings, antacid, bisulphite of lime, burton salts, bisulphite of soda sol., caramel, catechu, chiretta, disinfecting powder, glucose, heading powder, hop essence, hop substitute, six varieties of isinglass, potass. bicarb., quassia chips, soda sulphite, sulphur roll and flowers, etc.

The President, in moving a vote of thanks to Mr. Clague, expressed the great pleasure he had experienced in listening to the paper.

The next meeting will be held as usual on Wednesday evening, March 18, when Mr. George Weddell will read a paper on "Some Dangers of Pharmacy."

Obituary.

Notice has been received of the death of the following:—

On the 22nd of February, Mr. Robert George Bumpstead, Pharmaceutical Chemist, North Quay, Great Yarmouth. Aged 38 years. Mr. Bumpstead had been a member of the Pharmaceutical Society since 1876.

On the 24th of February, Mr. Charles Butterworth, Chemist and Druggist, late of Oldham. Aged 72 years.

On the 27th of February, Mr. John Frederick Langfield, Chemist and Druggist, North Malvern. Aged 65.

On the 28th of February, Mr. Joseph Clement, Chemist and Druggist, Victoria Dock Road, Canning Town, E. Aged 40 years.

On the 28th of February, Mr. James Geddes, Chemist and Druggist, Cornely Park Street, Glasgow. Aged 84 years.

Correspondence.

The Benevolent Fund—A Suggestion.

Sir,—It has often been a matter of surprise to me that the Society does not adopt a method similar to that adopted by the various hospitals for increasing the above fund. I refer to the small contribution boxes which are to be seen in three-fourths of the London shops. By placing one of these boxes in every chemist's shop (whether connected with the Society or not) I feel sure that there would be a considerable increase in the donations; inasmuch as contributions would be forthcoming from assistants and apprentices, who would think twice before subscribing ten or twenty shillings "down," but would not object to placing sixpence or one shilling in these boxes every month. The outlay for the boxes would be comparatively small, and would, I feel sure, be very soon amply repaid by the increased donations. I earnestly recommend this suggestion to the favourable notice of the Society.

Bayswater, W. E. H. G.

NOTICES OF MEETINGS.

Society of Chemical Industry (London Section).—Monday, March 16. (1) "Observations made in the Working of Vitriol Chambers," by Mr. W. Crowder. (2) "The Chemistry of Whiskey and Allied Products," by Mr. A. H. Allen.

Midland Counties Chemists' Association.—Wednesday, March 18. Social and musical evening at the Midland Hotel, Birmingham.

Chemical Society.—Thursday, March 19. (1) "The Molecular Refraction and Dispersion of various Substances," by Dr. J. H. Gladstone, F.R.S. (2) "Contributions to Our Knowledge of the Aconite Alkaloids: Part 1. The Crystalline Alkaloid of *Aconitum Napellus*," by Professor Dunstan and Dr. W. H. Ince. (3) "The Crystallographic Character of Aconitine from *Aconitum Napellus*," by A. E. Tutton.

Chemists' Assistants' Asociation.—Thursday, March 19. Paper on "Elementary Pharmaceutical Latin and Neo-Latin," by Mr. Joseph Ince.

G. H.—(1) Sach's 'Text-Book of Botany,' translated and annotated by G. W. Bennett, or Prantl's 'Elementary Text-Book of Botany,' revised by Vines. (2) Stillé and Maisch's 'National Dispensatory.'

W. G. T.—(1) There would be no risk in selling the stronger powder if the fact were distinctly stated on the label. (2) See the "Table Polyglotte" in Dorvault's 'L'Officine.' (3) The official directions at present read, "*Mix* the soap with the water," etc. (4) The method of heating, straining of the coagulum and storing in well-secured bottles has been recommended.

Communications, Letters, etc., have been received from Messrs. Barclay, Grierson, Wright, Farr, Humphrey, Pears.

CONTRIBUTIONS TO OUR KNOWLEDGE OF THE ACONITE ALKALOIDS.

PART I. ON THE CRYSTALLINE ALKALOID OF ACONITUM NAPELLUS.*

[*From the Research Laboratory of the Pharmaceutical Society*].

BY WYNDHAM R. DUNSTAN AND W. H. INCE, PH.D.

The authors have investigated the properties of a crystalline alkaloid obtained from the root of *Aconitum Napellus* by extraction with amyl alcohol, as suggested by the late Mr. John Williams (*Pharm. Journ.* [3] xviii., 238). For a supply of the material they are indebted to the kindness of Messrs. Howards and Sons of Stratford.

The yellowish indistinct crystals melted at 188·4° (corr.) and by crystallization from alcoholic solution were proved to be associated with a small quantity of a gummy amorphous base. On combustion the original substance gave numbers agreeing fairly well with the formula $C_{33}H_{43}NO_{12}$ which is that proposed for aconitine by Wright and Luff (*Journ. Chem. Soc.*, 1879). The alkaloid was purified by repeated crystallization from a mixture of alcohol and ether, or more readily by conversion into its hydrobromide and regeneration of the alkaloid from this salt or by regeneration from its crystalline aurochloride. It crystallizes in tabular prisms belonging to the rhombic system; the crystallography of the substance has formed the subject of a separate inquiry by Mr. Tutton. The crystals are very slightly soluble in water and light petroleum, more soluble in ether and alcohol, most soluble in benzene and chloroform. They melt at 188·5° (corr.). Contrary to the statements of previous observers, who found aconitine to be lævo-rotatory, the authors found an alcoholic solution to be *dextro-rotatory* $[\alpha]_D + 10{\cdot}78°$; the aqueous solution of the hydrobromide is, however, lævo-rotatory $[\alpha]_D - 30{\cdot}47°$. On analysis the pure alkaloid afforded results which agreed best with the formula $C_{33}H_{45}NO_{12}$.

Two crystalline *aurochlorides* were obtained. One ($C_{33}H_{45}NO_{12}HAuCl_4$) melts at 135·5° (corr.); the other, a basic aurochloride ($C_{33}H_{45}NO_{12}AuCl_3$), melts at 129° (corr.). These compounds are obtained without difficulty, and afford trustworthy means of identifying aconitine. The alkaloid may be readily recovered from them in a pure state.

Aconitine is not appreciably affected by heating at a temperature below its melting point, but at this temperature it is gradually converted into the uncrystallizable base aconine. Prolonged boiling in aqueous solution induces a similar change, but not to the same extent, unless an alkali is present. Boiling with water acidulated with hydrochloric acid also produces decomposition of the alkaloid.

Dehydraconitine or *apoaconitine* is a base differing from aconitine by the absence of a molecular proportion of water, which was first obtained by Wright and Luff by acting on aconitine with acids. Its existence has, however, been questioned by later workers. The authors find that such a substance may be readily procured by heating aconitine with saturated aqueous tartaric acid in closed tubes, as recommended by Wright and Luff. The crystals of this substance melt at 186·5° (corr.). It forms crystalline salts, and in other respects closely resembles the parent alkaloid. The results of analyses agree well with the formula $C_{33}H_{43}NO_{11}$. Three *aurochlorides* were obtained. One ($C_{33}H_{43}NO_{11}HAuCl_4$) melts at 141° (corr.). This salt, when crystallized from aqueous alcohol, becomes a hydrate—

$$(C_{33}H_{43}NO_{11}HAuCl_4H_2O.)$$

melting at 129° (corr.), isomeric with aconitine aurochloride, into which, indeed, it very readily changes. The third aurochloride is a direct compound of the alkaloid with auric chloride ($C_{33}H_{43}NO_{11}AuCl_3$); it melts at 147·5° (corr.).

An *amorphous base* was obtained from aconitine, together with benzoic acid, by prolonged heating with water in a closed tube. It appears to be identical with the *aconine* of Wright and Luff. The same substance is formed together with a resinous substance when aconitine is heated with an alkali. Neither aconine nor its salts could be crystallized. The amorphous base, after purification, and its amorphous aurochloride, afforded analytical data agreeing respectively with the formulæ $C_{26}H_{41}NO_{11}$ and $C_{26}H_{41}NO_{11}\cdot HAuCl_4$.

A further study is being made of aconine and of the question as to the existence of other alkaloids in the root of *Aconitum Napellus*.

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* The substance of a communication made to the Chemical Society on Thursday, March 19.

THE SOLVENT ACTION OF ALCOHOL OF DIFFERENT DEGREES OF STRENGTH ON SOME OF THE DRUGS USED IN MAKING PHARMACOPŒIAL TINCTURES.

BY E. H. FARR AND R. WRIGHT.

For some time past we have been engaged upon a study of the above subject, and the results of the first portion of our work were communicated to the Leeds Meeting of the Pharmaceutical Conference in the form of two papers.

The first of these, by Mr. Wright, dealt with all the B.P. tinctures which were capable of such treatment as was involved in the work, and the results given upon the tables drawn up to illustrate the paper showed the amount of extract, in grains, yielded by a fluid ounce of each tincture, and also the quantity of alkaloid, in grams per fluid ounce, obtained from each of the alkaloidal tinctures.

The paper by Mr. Farr dealt only with the alkaloidal tinctures (*plus* digitalis), and the results given showed the percentage yield of extractive and alkaloid; with notes on the miscibility of each sample with water and alcohol, and the keeping properties of the tinctures.

In the discussion which followed the reading of the papers, great difficulty was experienced in instituting any comparison between the results obtained, seeing that owing to the fact that each had worked quite independently of the other, the strength of the menstrua used, the processes followed in making and estimating the tinctures, and also the method of expressing results, varied to a very considerable extent.

While, therefore, the value of the work was fully recognized, and the results obtained were thought sufficiently striking to encourage further work, it was still felt that additional evidence was needed before those results could be accepted as reliable, or could in any way serve as a basis for the modification either of the strength of the menstrua, or of the processes employed in making B.P. tinctures.

For these reasons, and after an interchange of ideas on the subject, we agreed to continue the investigation; but in order to avoid error and prevent misrepresentation, it was thought desirable that each should work upon the same lines, and should use the same processes for making and estimating the tinctures.

We intend to confine our attention, in the first place, to the alkaloidal tinctures, and subsequently, if time and opportunity serve, to take up the study of those, the active ingredients in which are of a non-alkaloidal nature.

NOTE I. ON TINCTURE OF CONIUM.

Eleven samples of conium fruits, described as of 1890 growth, were obtained from some of the leading wholesale houses in the country. Of these, one was of English growth, eight were German, and as to the source of the other two samples no definite information could be gained. Probably both were of German origin. These were reduced to powder, and a series of tinctures made from each sample with alcohol of 90, 80, 70, 60, 50 per cent. strength (by volume).

The only departure from official instructions consisted in percolating with the menstruum until the requisite amount of tincture was obtained, as expression with such small quantities of material was out of the question. In preparing the tinctures, attention was directed incidentally to the following questions :—

1. Whether the temperature at which percolation was conducted had any controlling effect upon the strength of the tincture.
2. Whether any definite relation existed between the rate at which percolation went on with alcohol of different degrees of strength.
3. Whether the yield of alkaloid and extractive was affected by using powdered fruits of varying degrees of fineness, and, if so, to what extent.

In order to test this practically, the temperature was checked each day; the rapidity with which percolation took place was carefully noted, and separate batches of the tinctures were made from drugs in fine and coarser powder.

These observations will be continued throughout the whole of our experiments, and should the results be considered of sufficient interest and importance, they will form the subject of a separate paper, when the required data will be given.

For the present it will suffice to say that the evidence already to hand tends to show that a difference of several degrees in temperature during percolation has little effect upon the strength of the tinctures; that the rapidity of percolation was affected more by a slight variation in the firmness of the packing than by a difference of a few degrees in the alcoholic strength of the menstruum employed, and that while the amount of extractive was considerably affected by the degree of fineness of the powdered drug, this had little or no appreciable effect upon the yield of alkaloid.

Before proceeding to record the quantitative results of our experiments, a brief reference to standard literature bearing upon the subject of conium fruits may not be out of place.

In 'Pharmacographia,' p. 267, it is stated that "the cells of the endocarp are loaded with a brown liquid consisting chiefly of conine and essential oil." With regard to the horny albumen there is nothing to show that it contains any active constituents. The B.P. directs the fruits used for the preparation of the tincture to be "finely comminuted," but it is doubtful if it be desirable to carry the comminution too far. A reference to the table of results will show, as already stated, that whilst the very finely powdered drug gives a greater yield of extractive, the coarser affords a product quite as rich in alkaloid. In an experiment in which the whole fruits were used, however, the tincture gave a very low yield both of extractive and alkaloid.

The horny albumen in the fruit is not readily reduced to fine powder without a fair amount of previous heating, and it is evident that heat should be avoided if possible. The outer portion of the fruit, on the other hand, is easily powdered. The fruits from which No. 8 series of tinctures was made were in very fine powder when purchased, and had evidently been spoilt by over-heating in the process of drying before being reduced to powder.

Christison, Smith and Harley have proved that the green, unripe fruits possess the active medicinal properties of the plant in the most marked degree, and further, that they can be dried without losing their activity. It would appear, from the same authorities, that the ripe fruit is much less active, and a reference to our results proves this to be the case. It is noteworthy that the tinctures which gave the greatest yield of alkaloid had a distinct green shade, the amount obtained from the golden yellow tinctures prepared from the fully ripe fruits being very much less. The quantity of conine in conium fruit is said to vary up to ·8 per cent., and allowance being made for the other alkaloids present, the tincture (1 in 8) should therefore contain about ·1 per cent. total alkaloid.

The colour of the fruit for official use, as described in the B.P., should be "dull greenish grey." The sample from which No. 1 series of tinctures was made answered strictly to the B.P. characters, but all the other samples contained a greater or less proportion of fruits having a dull "brownish" grey appearance, and one or two consisted entirely of the latter. These were of German origin. No. 1 was a carefully dried English sample. Harley states (Royle's 'Materia Medica,' p. 586) that "the fruit undergoes such rapid deterioration by keeping, that the commercial article, which is derived chiefly from the continent, is almost destitute of the active principle." In this we cannot agree with him, for a sample of German fruits, season 1889, examined by one of us, after being in stock for twelve months, afforded a tincture yielding ·09 per cent. alkaloidal hydrochlorates, whereas tinctures made from other samples, examined shortly after importation, only gave ·06 to ·07 per cent.

Harley himself states that the carefully dried green fruits will retain their virtues unimpaired for more than a year if kept in well-closed tin canisters.

In selecting a process for the isolation and estimation of the alkaloids the principal object aimed at was to obtain one which should combine accuracy of result with simplicity of working. It was therefore felt desirable to exclude those processes which necessitate distillation, or involve the exposure of the volatile alkaloid conine to atmospheric influences. Professor Dragendorff ('Plant Analysis,' p. 61 and 183) states that he has used Mayer's reagent for the estimation of conine, but says that the results come out far too low.

Table I. Showing Results obtained with Samples of Tincture of Conium.

No.	Amount of alkaloid in grams from 100 c.c. tincture.					Amount of extractive in grams from 100 c.c. tincture.				
	90 p. c. tincture.	80 p. c. tincture.	70 p. c. tincture.	60 p. c. tincture.	50 p. c. tincture.	90 p. c. tincture.	80 p. c. tincture.	70 p. c. tincture.	60 p. c. tincture.	50 p. c. tincture.
1	·141	·157	·158	·163	·140	·64	·96	1·06	1·32	1·28
2	·069	·071	·075	·071	·069	·40	·52	·80	·86	·82
3	·062	·064	·062	·058	·054	·36	·54	·66	·72	·84
4	·064	·065	·071	·070	·067	·46	·64	·82	·84	·86
5	·083	·090	·104	·083	·075	·44	·56	·66	·86	·94
6	·092	·102	·100	·100	·082	1·22	1·34	1·60	1·76	1·88
7	·082	·100	·090	·098	·094	1·32	1·54	1·78	1·86	1·96
8	·010	·012	·010	·008	·006	1·84	2·44	3·28	3·56	3·78
9	·072	·096	·081	·084	·090	2·58	2·84	3·00	2·94	3·00
10	·092	·100	·098	·088	·074	2·58	2·94	3·04	3·12	3·08
11	·100	·096	·098	·090	·086	2·44	2·92	3·00	3·00	3·06
Average. .	·788	·866	·860	·830	·760	1·29	1·56	1·79	1·89	1·95

The above results represent the mean of two estimations in each case. No. 6 to 11 were prepared from the finely powdered drugs.

Farr's results. British Pharmaceutical Conference.

·088	—	·086	—	·080	·56	—	1·16	—	1·44

Wright's results. British Pharmaceutical Conference.

·125	—	·159	·155	·157	1·29	—	1·29	1·39	1·72

Table II.—Showing miscibility of samples with Water and Alcohol.

No.	Result when 1 vol. of tincture is mixed with 2 vols. water.					Result when 1 vol of tincture is mixed with 3 vols. alcohol.				
	90 per cent. tincture.	80 per cent. tincture.	70 per cent. tincture.	60 per cent. tincture.	50 per cent. tincture.	90 per cent. tincture.	80 per cent. tincture.	70 per cent. tincture.	60 per cent. tincture.	50 per cent. tincture.
1	Cloudy	Clo. opal.	Opalescent	Opalescent	As clear as orig. diluted	Clear	Clear	Sl. cloudy	Sl fl precip.	Flo. precip.
2	Sl. Cloudy	Opalescent	Opalescent	Sl. opal.	,,	Clear	Clear	Faint. clo.	Sl. cloudy	Sl. cloudy
3	Sl. Cloudy	Sl. opal.	Barely opal.	Barely opal.	,,	Clear	Clear	Nearly clear	Sl. cloudy	Cloudy
4	Cloudy	Sl. cloudy	Cloudy	Cloudy	,,	Clear	Opalescent	Cloudy opal.	Sl. cloudy	Sl cloudy
5	Slightly opalescent	Sl. opal.	Sl. opal.	Sl. opal.	,,	Clear	Opalescent	Opalescent	Sl. cloudy	Cloudy
6	Clo. opaque	Opalescent	Clo. opaque	Opalescent	Sl. opal.	Clear	Sl. flo. ppt.	Grey fl. ppt.	Grey fl. ppt.	B'lky fl. ppt.
7	Opalescent	Opal. slight flocc. ppt.	Very opal.	fairly opal.	Faint. opal.	Clear	Sl. flo. ppt.	Grey fl. ppt.	Grey fl. ppt.	B'lky fl. ppt.
8	Dark flocculent ppt.	dark flo. ppt.	dark flo. ppt.	dark flo. ppt.	Opalescent	Clear	Sl. flo. ppt.	Opal. and sli. br. depos.	Opal. slight br. deposit	Turbid bro. deposit
9	Opalescent	Opalescent	Very opal.	Opalescent	Faint. opal.	Clear	Very sl. ppt.	Wh. flo ppt	Wh. flo. ppt.	B'lky fl. ppt.
10	Clo. opaque	Clo. opaque	Opalescent	Sl. opal.	Faint. opal.	Clear	Sl. white flo. ppt.	Wh. flo. ppt	Grey fl. ppt.	Grey fl. ppt
11	Opalescent	Clo. opaque	Clo. opaque	Opalescent	Faint. opal.	Clear	Very sl. ppt	Sl. flo. ppt.	Grey fl. ppt	Balky ppt.

He also speaks (p. 189) of phosphomolybdic acid as giving good results in estimating the amount of alkaloid in solutions of the pure substance, but states that the process is unreliable when other bodies are present.

Mention is also made of the estimation of conine as hydrochlorate, but the process is condemned on account of the supposed easy volatilization of hydrochlorate of conine. Mr. R. A. Cripps, however, has shown (*Pharm. Journ.*, [3], xviii., 511) that an ethereal or chloroformic solution of the hydrochlorate may be evaporated without loss of conine, and also that the dry salt may be heated for hours at a temperature not exceeding 90° C. without suffering decomposition or volatilization. We have made some confirmatory experiments and have thoroughly proved the accuracy of Mr. Cripps's observations.

The following method was eventually adopted for the estimation of the tinctures:—

Fifty c.c. of the sample is introduced into a porcelain dish, 1 c.c. of normal sulphuric acid added, and the mixture evaporated to low bulk over a water-bath with constant stirring. A little distilled water is then added if necessary, and the evaporation continued until all the spirit is driven off. The solution is then poured into a separating funnel, and the dish rinsed out with 15 c.c. chloroform and afterwards with a little distilled water. These are added to the solution in the separating funnel, the whole well shaken and allowed to stand until the chloroform has subsided. The chloroformic layer is then drawn off and the process repeated with a second 15 c.c. chloroform. The acid solution is now shaken up with 2 c.c. B.P. liq. ammoniæ, and the liberated alkaloids taken out by shaking first with 15 c.c. and afterwards with 10 c.c. chloroform. The chloroformic alkaloidal solution is washed with a little distilled water (to free it from traces of ammonia), and is then run into 10 c.c. of a saturated solution of dry hydrochloric acid gas in chloroform, the end of the funnel tube being allowed to dip beneath the surface of the acid chloroform. The chloroformic solution is alowed to evaporate in a current of air, and the residue heated in a water oven at a temperature not exceeding 90° C., until it ceases to lose weight on further exposure.

The percentage amount of extractive was obtained by evaporating 10 c.c. of the tincture to dryness in tared dish over a water bath and exposing the residue in a water oven at a temperature of 100°C. until the weight became constant. The amount of dry extract, multiplied by ten, gives the percentage amount.

The behaviour of the tinctures on admixture—(1) with water and (2) with 90 per cent. alcohol was noted, and the results are given in Table II.

The general evidence afforded by a study of Table I goes to show that a tincture of conium of maximum strength may be obtained by the use of a 70 or 80 per cent. menstruum. It was found impossible to get a clear tincture with either a 50 or 60 per cent. menstruum, and it was noticed that one or two of the 70 per cent. tinctures became slightly opalescent when kept.

It is a question worthy of consideration whether this tincture might not with advantage be made from the green fresh fruit, in which case an 80 per cent. menstruum would answer better than one of 70 per cent. strength.

The alkaloidal yield of the tinctures discloses a remarkable difference in strength, the amount ranging between the limits of ·06 and ·16 per cent. This difference in the case of tinctures of a poisonous drug like conium, made from well authenticated samples of fruits, shows the necessity of a definite standard of strength being fixed for the B.P. tincture. No. 1 series of tinctures probably represent the maximum strength attainable, but it is very questionable whether even with genuine specimens of unripe English grown fruits it could with certainty be generally obtained. Much might be said in favour of a ·1 per cent. standard, though an allowable minimum of ·08 would probably exclude all bad samples of drug.

Having ascertained by experiment the most suitable menstruum and also the average strength of the tinctures, it was thought expedient to try the comparative effect of the use of different processes upon the yield of extractive and alkaloid.

For this purpose two samples of drug were taken, one in fine and the other in somewhat coarse powder, and four tinctures made from each, with a 70 per cent. menstruum, by the following processes.

1. An ounce of the powdered drug was macerated with 8 ounces of menstruum, in the case of No. 2 for seven days, in No. 1 for forty-eight hours, with occasional agitation, the whole filtered, and a sufficiency of menstruum poured over the marc to make 8 fluid ounces of tincture.

2. The B.P. process: maceration and percolation—displacing the last portion of the spirit.

3. An ounce of powdered drug was moistened with 2 fluid drachms menstruum and packed in a percolator; spirit was then added and percolation allowed to proceed continuously but slowly until 8 fluid ounces of tincture had been obtained.

4. An ounce of powdered drug was macerated with 4 fluid ounces of menstruum for forty-eight hours with occasional agitation. It was then filtered, the marc macerated with the remainder of the menstruum for twenty-four hours, and then thrown upon a filter, a sufficient quantity of spirit being subsequently poured over the marc on the filter to make the volume of the mixed filtrates up to 8 fluid ounces.

The tinctures thus obtained were estimated by the process already given, and the results came out as follows:—

Alkaloid Per Cent.

	By simple maceration	Double macration.	B.P. process.	Continuous percolation.
No. 1. . . .	·072	·074	·078	·082
No. 2. . . .	·091	·087	·098	·100

Extractive Per Cent.

No. 1. . . .	·52	·58	·62	·66
No. 2. . . .	2·24	2·32	2·76	2·68

These results show that the process of percolation is better adapted for the exhaustion of conium fruits than one of maceration; and that the B.P. process possesses no advantage over one of continuous percolation without prior maceration.

(*To be continued.*)

DIPHTHERIA GERMICIDES.

In a communication upon the therapy of diphtheria, Professor F. Loeffler has put on record the results of experiments made to determine the relative effect upon the characteristic bacillus of a very large number of substances that have been recommended for the local treatment of that disease (*Deutsch. med. Wochens.* March 5, p. 353). The method adopted was to allow the substance in solution or as vapour to come into contact with a blood serum mixture inoculated with the bacilli of diphtheria. This was done both soon after the inoculation, whilst a "sowing" was still superficial, and when a "cultivation" had had time to develope, since it was found that the same substance, or even the same degree of concentration, was not always equally effective in both stages.

It was found that of the inorganic compounds a solution of corrosive sublimate 1 in 10,000 destroyed instantaneously all the germs in a superficial sowing, and one of 1 in 20,000 left comparatively only a few germs intact, but from these vigorous colonies developed in a day or two. This agent, however, produced essentially less effect upon a cultivation, a solution of 1 in 2000 not penetrating to the deeper layers of bacilli in twenty seconds; one of 1 in 1000 left very few germs undestroyed at the end of twenty seconds, and with still stronger solutions the work was complete. Mercuric cyanide proved less effective, the germs on a sown serum surface being first instantaneously destroyed by a 1 in 800 solution, whilst it required a 1 in 200 solution to kill all the germs in a cultivation in twenty seconds. Silver nitrate solution of less strength than 1 in 150 was insufficient to render a superficial sowing sterile, whilst it was without effect upon a cultivation in twenty seconds. Silver chloride dissolved in sodium hyposulphite was practically not much more effective. With potassium permanganate a 2 per cent. solution sterilized a surface sowing, and a 5 per cent. solution a cultivation in twenty seconds. Potassium chlorate (5 p.c.), saturated lime water, hydrogen peroxide (1 p.c.), sulphuric acid (2·25 p.c.), formic acid (1 p.c.) and lactic acid (1 p.c.) were perfectly inactive in ten seconds' contact. Iodine in aqueous solution was inactive, but iodine 5 parts and potassium iodide 10 parts in water 300 parts killed cultivations in twenty seconds. Bromine in 1 in 1000 solution acted powerfully upon a sowing, but only a saturated solution (2·5 p.c.) killed cultivations in twenty seconds. Chlorine water (1 in 1100) killed sowings in ten seconds, and ten times that strength sterilized cultivations in twenty seconds. A saturated filtered solution of chloride of lime was equally effective upon cultivations, whilst it still destroyed superficial sowings when diluted twenty-five times. Iodine trichloride in 1 in 1000 solution sterilized sowings, but did not produce the same effect on cultivations with certainty in 1 in 100 solution.

Of organic compounds absolute alcohol destroyed sowings by momentary contact almost completely, but a 50 per cent. by volume spirit showed quite a weak action. Ether behaved similarly. A mixture of alcohol 50 parts, ether 25 parts, and water 25 parts, was very effective in ten seconds' contact. Cultivations were sterilized by absolute alcohol or by ether in twenty seconds. Allyl alcohol, which in extraordinarily small quantities inhibits the growth of the anthrax bacillus, showed in 5 per cent. solution only a slight effect upon sowings of the diphtheritic bacillus in ten seconds. Benzyl alcohol, on the other hand, in aqueous solution sterilized the surface with certainty in ten seconds and chloroform water showed itself remarkably active upon sowings. Carbolic acid was in 1 per cent. solution inactive; in 2 per cent. solution it showed a distinct action; but it first became capable of destroying sowings instantaneously in 3 to 4 per cent. solution. By the addition of 30 to 40 per cent. of alcohol the action of a 2 per cent. solution was rendered complete. Cultivations were completely sterilized by 5 per cent. solution of carbolic acid in twenty seconds, and if 30 per cent. alcohol were used as a solvent the same effect was produced by a 3 per cent. solution. Lysol in 2 per cent. solution sterilized sowings in ten seconds, but in its effects upon cultivations it came far behind carbolic acid. The three methyl-phenols, *o*-, *m*- and *p*-cresol, approximated closely to carbolic acid in their action, and resembled it in the concentration effective against sowings being near to that effective against cultivations. The cresolsulphonic acids proved to be much less effective than the phenols, and the same may be said of salicylic acid. Of the three dioxybenzols resorcin was least effective, a 10 per cent. solution not sterilizing a sowing in ten seconds; pyrocatechin came next and hydroquinone is thought worthy of further experiment. The trioxybenzol phloroglucin showed in 2 per cent. solution a slight action, but a saturated aqueous solution of tropæolin was without effect.

A large number of essential oils were also tested as to their action upon the diphtheritic bacillus, the plan adopted being to moisten with the oil to be tested the under surface of the wadding placed in the neck of the flask containing the inoculated serum mixture, and closing the whole with an indiarubber cap. The oils showed a remarkable difference in their behaviour, for whilst some hindered more or less the growth of the bacilli, others seemed actually to favour it. With the oils of sweet orange peel, lemon, eucalyptus, spike, thyme, mustard and garlic, as well as with allyl sulphide and anhydrocoriander, a substance prepared from coriander oil, no growth was perceptible in the flasks after two days. But upon removal of the indiarubber cap, development of the cultivation commenced in all the flasks, except that containing allyl sulphide, the growth taking place mostly at edges of the drops of condensed water. Since these results appeared to point to the activity being due to hydrocarbons the experiments were continued with a number of hydrocarbons of the aromatic series and their ethers. These were benzol, anisol, phenetol, toluol, *o*- *m*- and *p*-xylol, pseudocumene, cymene, cumene, thymol, creosol and oil of turpentine. All these bodies, except solid thymol, a piece of which was fastened under the indiarubber cap, and creosol, showed a remarkable inhibitory action, which with some was not limited to the surface, but penetrated deeper, as was shown by the non-development when the serum was inoculated by puncture. Anisol, phenetol, toluol and benzol proved especially active, since the surface of the serum in those flasks remained sterile after removal of the caps. It follows that the germs must have been killed by the vapour of these substances. When, however, one of these substances was poured upon a cultivation it did not by twenty seconds contact destroy its power of development and the action was not increased by an addition of alcohol. On the other hand, whilst thymol vapour was inactive a 1 in 500 solution of thymol in 20 per cent. alcohol destroyed sowings almost immediately, and aniline, which was also without effect in the vapour form, was very energetic when mixed with water. The vapour of metallic mercury also was fatal to sowings.

From the foregoing results, the author arrives at the conclusion that for prophylactic purposes, when there is danger of infection, the best of all treatment consists in using as a gargle for five to ten seconds every three or four hours a 1 in 10,000 to 1 in 15,000 solution of mercuric chloride, or, perhaps better, a 1 in 8000 to 1 in 10,000 solution of mercuric cyanide, because of its less disagreeable metallic taste. Other gargles that might be used with advantage are those of chloroform water, containing only a small quantity of chloroform, chlorine water containing 1 part of chlorine in 1100 of water, or a solution of 1 part of thymol in 500 parts of 20 per cent. alcohol. Of the substances active in the vapour form might be used the oils of sweet orange peel (oil of Portugal), lemon, eucalyptus and spike, as well as anisol, phenetol, benzol, and toluol.

In the treatment of actual cases of diphtheria Dr. Loeffler considers that, in addition to gargling every two hours with one of the above-named weaker solutions, a gargle of one of the stronger preparations, shown to be capable of sterilizing cultivations, might be used every three or four hours. Which of them is most suitable will have to be determined by actual experiments, but the author suggests a 1 in 1000 solution of mercuric chloride, a 3 per cent. solution of carbolic acid in 30 per cent. alcohol, or alcohol and oil of turpentine each with 2 per cent. of carbolic acid.

ALBUMINATE OF IRON AND ITS PREPARATIONS.*

BY DR. ADOLPH TSCHEPPE.

(*Concluded from page* 745.)

Before all it must be admitted that there is no peptonate of iron possible as a chemical compound. If the term, albuminate, implies the meaning that albumen acts as the acid radicle of the combination, then the same generic appellation applied to pepton should also imply the assumption of the same functions by the pepton. But the formation of a compound with iron, unexpected as it may be, does not take place with pepton. The want of forming a precipitable compound might be explained by its failure to give precipitates of its own on change of reaction, as is the case with all other albumen derivates. But if taken into consideration that we have the same indifference in glycerin also, it must be the want of chemical affinities rather than physical imperfection which causes this indifference of pepton towards iron.

In a mixture of pepton and ferric salt only hydrate of iron is precipitated on neutralization; no soluble compound is formed. In a mixture or pharmaceutical compound of pepton and oxychloride of iron, whatever there is of acid radicle is that supplied by the iron solution beforehand, and to name such a mixture "peptonate of iron" implies a misapplication of title. The two components in relation to each other are co-ordinate and the title should read "solution of iron and pepton." But if in preparations so named, it is found that they contain albumen and no pepton, the otherwise wrongful appellation takes the character of a misrepresentation.

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* Read at the recent meeting of the American Pharmaceutical Association, September, 1890.

As an amelioration of such accusation, it might yet have occurred that the sinners against the truth were working under a delusion in regard to what the term "pepton" really means. From numerous allusions in this direction, I have strong reason to believe that a large majority of otherwise well-versed pharmacists and others are still of the opinion that the mere solution of coagulated albumen also includes its transformation into pepton. The error of this conception has been detailed before. If the manufacturers of the condemned articles could be shown that they obtained their products by even a semblance of a digestive process the crime of deception would be pardonable, but the deception conveyed by the wrongful name would have to be rectified. But there are indications which point to the fact that this is not likely to be the case, and that the deception is knowingly perpetrated.

There is a formula by one of these manufacturers in which the digestion of albumen, used in the preparation, is not only aimed at but required to be completed, for safeguards are given which exclude the presence of precipitable albumen in the product of digestion. Yet the preparation turned out by the same man does not coincide with the formula given by himself. There are other indications yet which show that the same man was not unconscious of the misrepresentation charged. Side by side there is another formula for albuminate of iron, by the same author, yielding a true chemical compound, in which he orders three times the quantity of albumen for the same amount of iron as prescribed in the peptonate formula. Also the reaction of the solution is changed—for cause. It is to be surmised that this man, who is a skilful and shrewd experimenter, was aware of the fact of non-solubility of the pepton mixture in alkali, and that after precipitating it the pepton was wasted by passing into the washings. Why then this third of pepton, which is also wasted, is retained in the formula, and why recourse was taken to an entirely unnecessary chemical process, must be left unanswered with a big interrogation mark.

But the name of pepton is especially captivating and worth while to save it, in this age of advanced knowledge, especially with physicians who know enough of pepton to transmit its own supposed properties to that of peptonate of iron, which, thus endowed, could also be supposed to pass the trying ordeal of the complicated laboratory of digestion, pass the final membranes which separate the digested matter from the fæcal mass, to be absorbed, resorbed, and assimilated in its totality, hoof and all, untouched, undecomposed.

This would be a dream. For if the peptonate was possible in its present association, with basis in dialysed iron, it would not diffuse. Dialysed iron has the name of dialysed iron because it does not dialyse.

But this iron preparation as it is, diverted of its fanciful name, is good enough, and better than many others. Experts of pharmacology found it so; so finds it the public. And an enchanting title is of infinite magnitude, commercially. It helps to sell. It sells a book. The plot need not be true but plausible; and the success prompts a host of imitators to imitate.

As a proof of the assertion that these specialities are albuminates and not peptonates, the fact that they yield a precipitate on neutralization with alkali, and redissolve again in an excess, should suffice. The fact that the precipitate obtained now from the alkaline solution does not dissolve in dilute acids, strengthens the proof beyond doubt. Then the albumen may be transformed without lifting it out of the original preparation, by subjecting the diluted and alkalized solution to trypsic digestion, when through degradation of the albumen to the more indifferent pepton, the iron is gradually deposited as the albumen loses its grip on it. Parallel trials under additions of alkali in one, and pancreatine in another sample, did not decompose the compound. Pepsin in the original solution did not attack the albumen; the iron seems to prevent the digestion.

Also the public analyst, who gave his affidavit about another speciality of the same stamp, and which served as the prototype of the former, has been blind enough not to see that the very method he employed in his estimation of the pepton would necessarily exclude its presence. The method was otherwise faulty. In his testimony he came to the conclusion (not sustained by proofs) that he finds the preparation a "true peptonate," which all proves that such indorsements are too complimentary to be of much value, and if the expert ventures on a field where he is not expert —of no value at all.

Throwing the peptonate of iron out of further consideration, there are only albuminates left for further treatment. of which there is ońly the alternative of the alkaline normal albuminate prepared from normal chloride, and that of the alkaline basic albuminate prepared from ferric oxychloride. Acid solutions, as already mentioned, are mixtures only, and differ not at all from analogous mixtures of chloride or oxychloride of iron with sugar. These are not compounds, although they contain the necessary elements for the formation of the compound, but this has to be brought first into existence by addition of alkali. Alkali absorbs the acid from the iron salt, inducing thereby the copulation of the albumen to the iron, which once free from its former bonds, cannot resist the temptation of grasping the first opportunity offered, in our case albumen, of entering new hymeneal ties.

A mixture differs from a chemical compound in that the ingredients of a mixture may be separated by mechanical means. In mixtures of albumen with ferric chloride, if subjected to dialysis, the iron is soon found in the dialysate, and all of it passes out into the washings, except the small amounts retained by the alkalinity of the albumen, and possible contents of basic chloride in the solution of ferric chloride used. From mixtures of albumen and ferric oxychloride, both being colloids, no separation is possible by dialysis, but from mixtures of ferric oxychloride and pepton, it is this latter which passes into the dialysate, while the colloidal iron salt is retained within the separating membrane.

The alkaline solution of normal albuminate is represented by the "Liquor Ferri Albuminati," Drees, who also established the first formula for its preparation. It is a true chemical compound, the soluble alkali compound of the insoluble ferric albuminate.

This solution is prone to decompose through atmospheric influences, by attracting from it carbonic acid. It is not, however, as stated, the transformation of its alkali into alkali carbonate, which causes the downfall of the iron (and of the preparation too), for carbonates may be employed as well for preparing the solution; but it is the formation of bicarbonate which is devoid of the faculty to dissolve, or keep the iron in solution.

The preparation, again contrary to printed statements to this effect, spoils the quicker the better it is made pharmaceutically, that is, the less surplus of alkali had been used for its solution.

This is the reason why Drees' or all such preparations reach us since some time in a state of abject perdition; it is probably also the reason why manufacturers took recourse to the above-mentioned acid mixture, whose keeping qualities seem to be of infinite duration. For a time the disturbance of this alkaline solution of ferric albuminate may be rectified by a further addition of alkali, like the saccharate of German pharmacopœial fame, but later on either one is beyond hopes and doctoring.

Of the alkaline iron albuminate the dry preparation cannot be made by the usual evaporation on the water-bath, although it stands boiling without coagulation on evaporation; skin after skin is formed on the surface, like in milk, whose constitution as an alkali-proteid is not dissimilar. The final residue is insoluble. It may be expected that evaporation *in vacuo* may produce a similar soluble dry product to that obtained from milk.

Of the alkaline basic albuminate there is no representative amongst the preparations actually made. E. Dieterich gave a formula of which an important simplification may be found in the following lines:

To prepare a solution of normal ferric albuminate, a mixture of proper proportions of solutions of albumen and ferric chloride is neutralized by alkali. Ammonia or the hydrates of fixed alkalies answer as well, the carbonates of the latter being only impracticable for the large evolution of gas, which causes the albuminous solution to foam excessively. Litmus paper as a guide in the precipitation is excluded, as the precipitation is the most perfect when the liquid shows yet slightly acid reaction. But the formation of the precipitate is the best indicator itself to show its completion, for the precipitate being creamy at first, becomes flocculent, and on further addition of alkali aggregates in large flocks, which subside from the clear liquid, which, if the proportions were well chosen, contains neither iron nor albumen. At this stage the solution of alkali chlorides drain off rapidly on muslin, while an imperfectly precipitated solution shows the imperfection, may it consist in too little or too much addition of alkali, by refusing to drain off. After washing, the precipitate is dissolved by alkali. To insure solubility, it is better to add the precipitate to the alkali than to reverse the addition.

Solutions of the basic albuminate of iron may be more simply made. Considering that for each molecule of ferric chloride six molecules of alkali chloride are formed, the elimination of this large amount of salt is of paramount necessity in the preparation of ferric albuminate from the normal chloride. But with employment of oxychloride, which requires only one-twentieth part of alkali, or less than the normal chloride, for its neutralization, the washing of the precipitate may well be dispensed with, the more as a thorough washing diminishes the chances of its solubility. As the same contingency also rests with the precipitate obtained from normal ferric chloride, the probabilities are that, if the entire amount of these bye-products be left in the final solution of the basic albuminate, the contamination will be not more, but less, than in the former, where such ablution was imperfectly performed. If precipitation be deemed a superfluous proceeding, the preparation of this form of albuminate narrows down to the mixing of specific quantities of albumen and ferric oxychloride in admissibly diluted solutions, and to dissolve the resulting magma by alkali, as stated before.

To form pharmaceutically perfect preparations from these chemical solutions, they are mixed with ⅜ per cent. of alcohol and properly aromatized. The alcohol is necessary to preserve them.

The proportions in which the components combine may be calculated from data furnished above; practically they are elastic enough for a great divergence, as demonstrated by the various formulas given, provided there be a sufficiency of albumen. I do not intend to submit a specific formula, for it would have to be agreed upon first, and I am of the opinion that the accepted strength of the imported preparation is too low for American usage. Besides, this standard has to be fixed on the contents of iron, and not on that of the precipitable albuminate compound, which is too variable to admit of its use.

The concoctions or acid mixtures of albumen and iron are represented by preparation with both the chloride and oxychloride of iron.

Of the first order we have a domestic preparation. As stated before, this albuminate of iron is not soluble in conveniently diluted acid, and an acid solution of it would be impracticable from both the chemical and pharmaceutical standpoint.

However, prepared by a process or by no process, it would always represent the same—the original mixture, modified if a process was used.

As a process, dialysis of a mixture of ferric chloride and albumen was recommended, but the result is the entire or almost complete loss of iron, which passes through the membrane as dialysate while the albumen is retained, with such small amounts of iron as correspond to the natural alkalinity of albumen.

It had also been recommended—as the climax of all processes even—to obtain the compound by salting a mixture of albumen and chloride of iron. But the precipitate which is obtained is acid albumen, carrying down with it a portion of iron chloride as a mechanical impurity. The iron may be completely washed out by subsequent washings with an acidulated solution of sodium chloride, so that the albumen is left on the filter free or nearly so of iron.

In no case can a solution of stable proportions be obtained, or its content in iron be foretold, as no chemical compound is formed as long as the acid solution is maintained. In place of any troublesome process, it is as well to mix a meagre portion of tincture iron to a big portion of albumen, to add glycerin, alcohol, and what else, and to call it what you please—albuminate of iron or yellow throat mixture.

Of the mixture made with albumen and oxychloride of iron, there are as repesentatives the imported preparations known by the fanciful appellation of peptonates of iron. They contain respectively 0·42 and 0·46 per cent. of iron, or nearly 0·6 per cent. of hydrated oxide, and equal in strength 10 drops of tincture of iron U.S.P. in a teaspoonful. The precipitate obtained from the preparation by neutralization, best with carbonate of ammonium, consisting of ferric albuminate, weighs three times as much as the ferric hydrate, obtained by boiling a sample with strong potash lye, or four times as much as the ferric oxide obtained by calcination of the hydrate of iron previously obtained, or by incineration of either the precipitate of ferric albuminate or the dry residue of the original preparation.

They contain 5 and 8 per cent. of alcohol, said to be in the form of brandy, and one contains 2½ per cent. of sugar. The specific gravity is nearly that of water, and less in one of the specialities. Their acidity is very small; conforming the content of dialysed iron it corresponds to 2½ c.c. of $\frac{N}{K}$ for 100 c.c. On addition of minimal portions of alkali, they readily change their reactions, forming again perfect solutions. They stand boiling without change, as the albumen is in the state of acid albumen, and mix with alcohol for the same reason. Concentrated acids precipitate both the oxychloride of iron and albumen. Dialysis reveals nothing.

The almost imperceptible acidity and other agreeable features have helped to make these preparations favourites with the public, and the complexity of their deceptively delicate reactions has helped that the deception practised by them has not been discovered before.

These mixtures are most easily imitated by simply mixing solutions of albumen and dialysed iron; the only trick is that the albumen be first deprived of its alkalinity, else the *real* compound would be formed—which would be a failure.

The Pharmaceutical Journal,

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CORONERS' VIEWS ON THE SALE OF POISONS.

CONSIDERABLE attention has been directed to the case of the death of two farm labourers in Cheshire as a result of their application of nitrate of mercury to their bodies. Although at the inquests held to ascertain the cause of death the jury especially stated that no blame was to be attributed to any one but the unfortunate men themselves, the coroner's remarks appeared to indicate a tendency to censure the seller of the mercury and nitric acid on the ground that requisite precaution had not been exercised by him in supplying these articles. However, the facts of the case as reported appear to be inconsistent with such an assumption of negligence on the part of the chemist and druggist from whom the articles were purchased. In the first place it must be remembered that neither mercury nor nitric acid are, in the eye of the law, poisons or materials which require from that point of view to be dealt with by retailers according to the provisions established by the Pharmacy Act, 1868, as applicable in the sale of scheduled poisons. Therefore, the sale of the mercury and nitric acid in this case did not involve any possible breach of the law that is intended for the protection of the public. The sale was perfectly legitimate in any case, and the seller cannot therefore be held accountable for the fatal consequences of the misuse of the substances sold. The result of that misuse clearly illustrates the fact that outside the scope of the protective provisions of the Pharmacy Act there are possibilities of misadventure that may be very serious. This is an experience that is by no means new, and it must not be overlooked that the Council of the Pharmaceutical Society, as the body empowered by statute in regard to the safety of the public, to declare from time to time the substances that ought to be deemed poisons within the meaning of the Pharmacy Act, has on several occasions exercised that power, and has submitted for the approval of the Government authorities recommendations that certain additions should be made to the schedule of poisons. These recommendations have not been acted upon, as it has been held that their adoption would operate too disadvantageously in restriction of trade. It may here be mentioned that nitric acid is one of the articles that were recommended as proper to be placed in the poison schedule, and it may also be pointed out that even if such recommendation had been sanctioned by the Government, there would not have been any greater likelihood of the Cheshire disaster having been prevented. It would in that case have been rendered necessary that, in the sale of the article by retail, it should be labelled with its name, the word "Poison," and the name and address of the seller. Moreover a registered chemist and druggist would have been in that case the only lawful seller of the article. As a matter of fact all these precautionary conditions actually obtained in the case now being referred to. The chemist's assistant who supplied the nitric acid and mercury was himself a duly registered person; he carried out the precaution of attaching a poison label to a further extent than the Pharmacy Act requires, and thus gave practical effect to the recommendation of the Council of the Pharmaceutical Society. In addition, the report states that inquiry was made as to the purpose the articles were to be used for, and the purchaser was advised not to have them, but without effect.

Under the circumstances above stated it does seem to be a very grave injustice that the action of the seller in this case should have been commented upon by the coroner in the severe manner which the newspaper reports indicate by their being headed in large type "A Chemist Censured." In our opinion, formed from the published reports, there was not the least real foundation for censure of the chemist; he was in reality more entitled to sympathy as being unfortunately an unwilling and blameless participator in a sad misadventure. The only apparent excuse for the animadversions of the Coroner is that he seems to consider chemists and druggists as being capable of affording an absolute protection against the results of negligence or ignorance in the use of potent drugs and chemicals. Such exaggerated ideas of the efficacy of the Pharmacy Act, or the assumption of an arbitrary standard as to what it ought to be, is too frequently made the basis for unreasonable censure of chemists and druggists, as well as for complaints of the imperfections of the Pharmacy Act. Such critics appear to disregard the fact that the provisions of the Pharmacy Act in regard to poisons cannot at the best be more than a partial means of protection against poisoning by misadventure. However carefully those provisions are observed by chemists and druggists, the subsequent carelessness of persons in dealing with bottles that are labelled poison is almost entirely beyond their control. In cases where accident occurs, therefore, it should be only on the clearest evidence of some neglect of the prescribed precautions on the part of the seller that he should be blamed. If there be no such proof of neglect or breach of the law in cases of poisoning, the seller of the poison is entitled to more consideration than he often receives. It is remarkable how very defective a knowledge of the Pharmacy Act is often displayed by coroners and magistrates. Only this week a case has been reported in the *Western Morning News* where a coroner inveighed against the uselessness of the Act because a woman had poisoned herself with oxalic acid. He seems to have held the opinion that a medical certificate ought to be required to authorize the sale of this article, and that the absence of such a restriction on the sale of an article so extensively used for various technical purposes is an anomaly that should speedily be put an end to. Even medical journals fall into similar misconceptions. The *Medical Press and Circular*, for instance, adopts the recent dictum of the Sheffield coroner that "the Pharmacy Act is a farce," because a man was able to purchase enough laudanum to poison himself.

But if the provisions of the Pharmacy Act, even when strictly observed, are insufficient to secure perfect immunity from misadventure with scheduled poisons, and entirely to prevent their misuse, the danger that may arise from non-legal poisons is still more difficult to deal with. As we have repeatedly shown in this Journal, articles of this kind figure largely among the causes of death by poison recorded in the Registrar-General's reports. Notwithstanding their repulsive nature and immediate effects, carbolic acid and some of the strong mineral acids that are readily procurable at all kinds of shops are constantly being used for suicidal purposes, and they are also the cause of death in a large proportion of the cases of accidental poisoning. There does not appear to be any other possible means of attempting to reduce the fatalities caused by these articles either accidentally or with intent, than those of enforcing regulations as to labelling and prohibiting their indiscriminate sale by persons having no knowledge or regard for their poisonous properties. Such a restriction of their sale would be an unavoidable feature of any provision in the interests of public safety, for it would be a singular anomaly to insist merely upon the labelling of these articles with a poison label, and to allow their sale by persons ignorant of their properties and dangers. The view hitherto taken by the Government authorities in this matter is that, considering the general utility of the substances in question, the restriction of their sale to registered chemists and druggists would be attended with greater disadvantages and inconvenience than can be regarded as adequately made up for by the increased security from accident or misuse. So long as that view is maintained nothing further can be done than the Council of the Pharmaceutical Society has already done in submitting its recommendation to the Privy Council.

BORACIC ACID IN ARTICLES OF FOOD.

The *British Medical Journal* has lately called attention to the use of various preservative agents as adjuncts to articles of food, and suggested that this practice may be attended in some instances with injurious results. Last week the use of boracic acid in this way was specially dealt with, and surprise expressed that the local authorities, whose business it is to administer the Adulteration Act, appear to have considerable difficulty in arriving at definite conclusions on this subject. The view is put forward that food containing boracic acid is adulterated, and that the sale of such articles is an offence punishable under the Food and Drugs Act. As an example it is urged that milk or butter containing boracic acid cannot be correctly described as possessing their true nature and quality. The Kensington Vestry has recently applied to Sir Andrew Clark, Sir Henry Thompson and Dr. Lauder Brunton, for opinions on this subject. Sir Andrew Clark considers that though the chemical compounds employed for the preservation of food are innocuous in small occasional doses, they may become destructive to health when taken in small doses continued over long periods, and he believes that many obscure incurable disorders are caused in this way. In reply to the question whether boracic acid is injurious to health when persistently taken in the daily food, Sir Henry Thompson points out that in full doses boracic acid is acknowledged to be an irritant to the digestive organs; but that it is doubtful whether the small quantity necessary to prevent decomposition of milk would exercise an evil influence in the case of adults. As regards children, however, he thinks the case is different, and that with the small quantity above mentioned infants would be much more liable to injury. Dr. Lauder Brunton regards the question as difficult, though boracic acid is known to be a poison in large doses, and has been found injurious when added to articles of food. Sir Henry Thompson suggests that in cases where boracic acid is used, a declaration of the fact should be required in the form of a precise statement on the label, or of a notice where milk is sold on draught, and that when this is not done the sellers of articles found to contain boracic acid should be proceeded against for infringement of the Food and Drugs Act.

On Tuesday evening notice was given in the House of Commons by Sir Henry Roscoe of the introduction of the Pharmacy Acts Amendment Bill on Friday evening, the 20th inst.

* * *

A very successful musical and social meeting of the members of the Midland Counties Chemists' Association and their friends, was held on Wednesday evening at the Midland Hotel, Birmingham. Mr. T. W. Chapman officiated as Chairman, and at the close a proposition of a vote of thanks to him was carried unanimously.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Electromagnetic Repulsion.

On Friday evening, the 6th inst., a lecture was delivered at the Royal Institution by Professor J. A. Fleming on "Electromagnetic Repulsion." The lecturer showed, experimentally, the attraction and subsequent repulsion of pieces of soft iron and other metals by the pole of a large electro-magnet around which a continuous current passed, and contrasted this property with the strong continued repulsion experienced immediately that the continuous electric current is replaced by an alternating one, in which the direction of the current is reversed about two hundred times per second. Rings or discs of aluminium, copper and zinc will not remain at rest when placed above the pole of an electro-magnet through which such an alternating current is passed, but receive a powerful repulse, and, when lateral movement is prevented by means of a central cylinder, the rings or discs appear to float in the air several inches above the extremity of the magnet. Brass possesses this property to a less degree, and lead is scarcely affected, but thick plates of copper receive a thrust that may amount to several pounds. It is evident that the general explanation of magnetic attraction and repulsion will not apply to this phenomenon of repulsion in an alternating magnetic field, and Professor Fleming therefore proceeded to formulate an hypothesis by which the above observations can be adequately explained. If a diagram of the curves of the magnetic field and of the induced current be drawn so that the two curves follow each other at an interval of half a wave-length, a curve of force representing the force of attraction in its upward and of repulsion in its downward course, can be obtained by the multiplication of the co-ordinates of the two first curves. Assuming that the electromotive force in the ring above the pole of the alternating magnet varies in exact synchronism with the induced current in the ring, the force curve would show an equal amount of attraction and repulsion, or theoretically the ring should remain stationary. As this does not accord with experience, the assumption must be incorrect and the induced current in the ring cannot move in exact synchronism with the electromotive force. As a matter of fact, the inductance as well as the conductance of the metal ring has to be considered, and it is well known that the property of inductance is associated with sluggish movements and a tendency for the induced current to lag behind the electromotive force. The sluggishness is admirably illustrated by Faraday's classical experiments, described in his ninth series of researches on electricity, in which two incandescent lamps are illuminated respectively by a direct and an induced current. If the necessary correction for this lag be made in the diagram and the force curve be recalculated, it is found that the repulsive overpower the attractive impulses and the observed repulsion is in full accordance with theory. As the induced current is due to the conductance of the metallic ring and the lag of the induced current depends upon its inductance, the effect of repulsion in an alternating magnetic field must also be attributed to the inductance and consequently conductance of the metal. Rings made of metals of various conductivity are therefore repelled to different distances from the pole of an alternating electromagnet, so as to appear to float in the air at different heights like masses of various specific gravity in a solution of increasing density. A sensitive method of determining the conductivity of metallic plates, by "weighing" them in an alternating magnetic field, has been elaborated from these observations. But only perfect rings or plates, in which a complete circuit can be effected, are thus repulsed from the pole by an alternating magnetic current; the repulsive force is partially or completely paralysed by a slit in the ring or disc, although under more favourable conditions the "magnetic draught" is capable of raising a copper ring six or seven pounds in weight, which rests in the air, as Professor Fleming termed it, upon a hammock of forces. At the same time the temperature of the metal is raised considerably, owing to the resistance offered to the induced currents, which indeed suffices to cause the carbon film of an incandescent lamp to glow brightly, when floated in water within the alternating magnetic field. Besides the vertical repulsive force, a lateral repulsion is also exerted, and under suitable conditions a rotatory action may be set up. If two copper plates be held above the pole of an alternating magnet in such a way that the stationary plate overlaps one free to rotate, the shaded plate commences to revolve at high speed, and in this property the germs of a self-starting alternating current motor may be discerned. Professor Fleming explained that the first plate partially screens the second from induction, and that consequently eddy currents are formed, the effect of which is to bring about a rotatory movement in the mobile plate. The same result obtains with a metal ball half shaded by a metal plate, the essential feature consisting in the production, by means of screening, of two sets of eddy currents, in the screen and moveable plate respectively. The application of this principle to the production of an electro-magnetic gyroscope by Professor Thomson suggests that by employment of suitable drags to lessen the speed of rotation an alternating current meter can also be readily made. The lateral repulsion above referred to is doubtlessly due to the leakage that always obtains when an electro-magnetic force passes through a conduction circuit linked with an induction circuit in a semi-conducting medium, or when a magneto-magnetic force is passed through an induction circuit under analogous conditions.

SOCIETY OF CHEMICAL INDUSTRY.

London Section.

On Monday, March 16, Mr. Crowder read a paper consisting of the records of a series of observations on the working of vitriol chambers, which was of purely manufacturing interest.

Mr. A. H. Allen contributed an interesting communication on "The Chemistry of Whiskey and Allied Products," containing much valuable information. Whiskey is manufactured by two processes, either the "pot still" or the "patent still" being used. The distribution of the total output between these two is shown by the following table:—

Distilleries using		Engla. d.	Scotland.	Ireland.	Total
Pot stills only.	Number . .	none	113	22	135
	Produce . .	none	7,367,727	5,745,764	13,113,491
Both pot and patent stills.	Produce	1,482, 82	4,745,672	3,665,210	Pot 2,036,589 Patent 7 596,545
	Number	10	13	8	
Patent stills only.	Number				
	Produce	7,626,740	7,301,678	1,993,813	16,922,231

The author said pot still whiskey was made from malted grain or from a mixture of malted and unmalted. The malting was conducted over peat fires. The liquor after fermentation was run into stills provided with stirrers and the whole of its alcoholic contents distilled over the distillate being termed "low wines." The residual liquor in the still, almost free from alcohol, was called "pot ale," and had formerly been run to waste, but it appeared probable that a use would shortly be found for it. It had recently been examined by Mr. Cross, according to whom it contained about 3 per cent. of solid matter; this was made up of 1 per cent. of acid (mostly lactic acid), 0·7 per cent. of peptone, 0·6 per cent. of carbohydrates and 0·6 per cent. of ash. The "low wines" were redistilled in a still without a stirrer, as the liquor being clear agitation was no longer necessary, and the first fraction, termed "four shots," collected apart. The right time to change the receiver was indicated by the cessation of the production of a turbidity on adding an equal bulk of water to a test portion of the distillate. The fraction next collected was the whiskey proper, and was called "clean spirit;" the same test as to the presence of bodies precipitated by water was used to determine when to change the receiver again. The last fraction, or "faints," contained the whole of the rest of the alcohol, nothing being left but "spent lyes" in the still. The first and third fractions were worked up at the next distillation, so that the final products were only "clean spirit" and "spent lyes." No attempt was made to fractionate the whiskey further than this. The newly-made spirit had a nauseous flavour and required maturing; for this purpose it was best kept in old sherry casks. It was noteworthy that some of the most approved brands were most disagreeable when new. The main distinction between Scotch and Irish whiskey was that the former was made solely from malted barley. Illicit whiskey, or poteen, was made almost exclusively in Ireland, and various grains and saccharine matter, such as molasses, were used, as well as barley, and, in fact, it resembled rum rather than whiskey. The high duty on spirit made its manufacture profitable even when conducted on a small scale. In comparing the observations of English and continental chemists, mistakes frequently arose from the practise of translating "branntwein" as "brandy;" "branntwein" really covered all kinds of spirit, whereas "brandy" should be restricted to those produced by the fermentation of grape sugar. "Patent still" whiskey was made from all kinds of saccharine matter, instead of from malted barley, as "pot still" whiskey was. The still most in favour was that known as the "Coffy" still in which a certain amount of fractionation took place. The effect of this was that a certain proportion of the distilled liquid was simply rectified alcohol, and was termed "silent spirit," on account of it not betraying even to an expert the nature of the raw material used in its manufacture. The quantity of malt was cut down to the lowest limit, just enough to give diastase for saccharifying the starch of the other materials used. Patent still whiskey was milder in flavour than that from pot stills and did not alter much on keeping. It was largely sold as "malt whiskey" after having been blended with a small proportion of the genuine liquor. Such blending was carried out under the direct supervision of the excise, which thus countenanced a practice of very doubtful commercial morality. A certain amount of foreign "silent spirit" was imported, but less than had been supposed; it was largely used for methylating. Turning to the question of fusel oil in whiskey, Mr. Allen said that when he had endeavoured to find data on the subject already existing he had discovered that there were until quite recently only four published analyses of whiskey giving the percentage of fusel oil, three of them by Dr. Dupré and one (of poteen) by Sir Charles Cameron. It was somewhat surprising that the outcry that had been raised against fusel oil in whiskey could have rested so long on so slender a basis. Confusion had perhaps arisen from confounding the percentages of fusel oil commonly present in foreign potato spirit (using that term generically) with that found in real whiskey. The phrase "fusel oil" was itself a source of error. The distiller knew that an alcohol containing an appreciable amount of fusel oil became turbid on the addition of water, whence he argued that an alcohol which became turbid on the addition of water contained fusel oil, a converse proposition not necessarily true. "Four shots," as already mentioned, gave a milkiness with water, but it was more probably due to essential oil than higher alcohols. Free fatty acids had also been detected in "four shots," due probably to the practice of adding soap to the contents of the pot still; the soap would be decomposed by the slight acidity of the "low wines" and a portion of the fatty acid set free volatilized. How far the belief in the presence and evil effects of fusel oil would lead the credulous astray was shown by a case that had recently come under his notice. Whiskey was bought of a firm of Irish distillers, but payment refused on account of its alleged bad quality. The vendors brought a county court action and the defence set up was that the spirit contained 0·22 per cent. of fusel oil. The author was called in by the plaintiffs and found 0·07 per cent. In view of this discrepancy a joint analysis was carried out and the latter figure confirmed. Judgment for the plaintiffs naturally followed. With regard to the methods that had been proposed from time to time for estimating fusel oil and the results obtained by them, they were all open to doubt. Processes like the Rose-Herzfeld, which might work fairly on spirit containing a tangible amount of fusel oil, failed when whiskeys containing less than 0·1 per cent. were dealt with. Besides this they generally involved the use of large quantities of spirit, and samples of a litre or more were not always procurable. He preferred the process by which the higher alcohols were oxidized to their corresponding acids and the latter estimated. Carbon tetrachloride was preferable to chloroform for shaking out the former. He drew attention to a source of error that had been somewhat overlooked. The ethereal salts of fatty acids should be saponified before distillation of the higher alcohols, as otherwise they would be reckoned as fusel oil. The neglect of this precaution might lead to the condemnation of a whiskey rich in ethyl valerate, which was perhaps the most typical flavouring constituent of genuine whiskey. Furfurol and aldehyde were always present in pot still whiskey, and could be detected by the ordinary means. Quite apart from the question of the quantity of fusel oil in whiskey was that of its harmlessness or otherwise. Its toxicity had been largely over-rated. He had tried the effect upon himself of the habitual consumption of a whiskey to which 2 per cent. of amyl alcohol had been added, a quantity sufficient to give a copious turbidity on dilution with water, and found, except for its nauseous flavour, it was quite unobjectionable.

In the discussion which followed Mr. Tyrer said that the results just presented to the meeting certainly ran counter to many cherished ideas, and in the event of their being confirmed by subsequent observers they would revolutionize existing views on the subject.

Mr. Wanklyn stated that he had been accustomed to uphold that the injurious effect of whiskey was not due to fusel oil but essential oils.

Mr. Cross spoke of the utilization of pot ale adverted to in the beginning of the paper. It certainly was a pity to run a liquor containing 1 per cent. of lactic acid to waste. This was the more evident when it was considered that at a factory in America lactic acid was being made from glucose on a considerable scale. The price for 33 per cent. lactic acid of commercial quality was 4 cents per pound, and that of the same strength acid pure 5 cents. It was used in calico printing, and he thought that if it could be economically prepared from pot ale it would find a ready sale here.

Another member stated that pot ale was used as a manure with such good effect that it improved the output of the land to the extent of 10*s.* to 20*s.* per acre.

Dr. Squire spoke of the construction of patent stills, which he said effected but little rectification. The maturing of whiskey presented many interesting features and was little understood. It would take place in wood—preferably a sherry cask—but not in an impervious vessel, such as glass; he doubted whether it was a process of oxidation. The same cask could not be used with advantage twice running. A great difficulty in the way of obtaining further knowledge was the extreme conservatism of the distillers even in thoroughly unessential matters. In a Dublin distillery of which he knew a rope used in hauling up the grain broke and the bag killed a man. The coroner's jury recommended the substitution of some safer method of elevation, but the distiller declined to adopt it fearing some untoward effect on the flavour of his whiskey.

Mr. Allen in reply having dealt with some of the points raised, the meeting terminated at a late hour.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, March 12, Mr. W. F. J. Shepheard, Vice-President, in the chair.

Mr. T. M. Taylor read a paper on "Leeches," first describing and illustrating by slides and dissections the structure of these animals, then explaining their classification and describing the various kinds met with, their distinguishing characters, habits, and mode of life, more especially those used medicinally, and finally giving some hints on the best way of keeping leeches in a healthy and flourishing condition.

The paper was followed by a discussion in which the Chairman, Secretary, Messrs. Harrison, Roberts, Riches, and Gare took part.

In the absence of Mr. H. W. K. Pears, the Reporter on Materia Medica, his report was read by the Secretary. It included notices of the proposed use of methylal (on account of its easy and complete volatility) for extracting the odorous principles of flowers, the alkaloids of veratrum album, the distillation of otto of roses, a ferment in *Ficus Carica* similar to papain, the active principle of castor oil, the belladonna alkaloids, those of sabadilla, and the probable future supply of camphor from Florida. Mr. Pears also sent a sample of mistura olei ricini, made according to the official formula, with the precaution of first warming the mortar by allowing boiling water to stand in it a short time, and after drying and putting in the oils, adding all the liquor potassæ at once, then gradually incorporating the orange-flower water and syrup. The result was a very good emulsion.

The report gave rise to a discussion, in which the Chairman, Messrs. Roberts, Taylor, and Harrison took part.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The following paper was read at a meeting held on Thursday, January 29, Mr. A. Campbell Stark, President, in the chair:—

The Glucosides.

BY JOHN C. UMNEY,

Pharmaceutical Chemist.

The term "glucoside" in its limited sense is applied to a number of bodies, occurring principally in the vegetable kingdom, which are capable of hydrolysis under the action of ferments, dilute acids or alkalis, into a glucose and a second non-saccharine body. The interest of this subject both from a chemical and botanical standpoint is however greatly increased, bodies of perfectly analogous chemical constitution and physiological importance are also brought un consideration, although they may have no further cla to the generic appellation than that by their hydrolysis a near derivative of the carbohydrates, or su a saccharine compound of the aromatic series, obtai The name "glucoside" is indeed frequently applied this sense in chemical and botanical text-books, an far preferable to Laurent's "glucosamides." It is n however, without objections from the view of system chemical nomenclature, as the terminology sugg that these bodies are "esters" formed by the introd tion of acid radicles into the alcoholic groups of t sugars, as in Berthelot's synthetical "sacchari whereas the glucosides as a rule are not esters, b ethers of the glucoses, in that the alcoholic radi are combined with other radicals through an oxy atom, which as a rule does not belong to a carb group. Thus in nature we find glucoses combi with hydrocarbons, alcohols, aldehydes, etc., and c sequently exhibiting features of very diverse chem character. The classification still adopted as a b is that introduced by Hlasiwets in 1867, who dis guishes between the true glucosides, that yield hydrolysis one or two molecules of a glucose, phlo glucides yielding phloroglucinol, phloroglucosides w both glucose and phloroglucinol residues in th molecule, mannides or compounds with a mann derivative other than glucose, and lastly, the glucos containing nitrogen. Many tannins, phlobaph colouring matters of bark, etc., appear also nearly r lated to the glucosides. Their amorphous charact however, and the tardiness with which their hyd lysis is effected, suggest that they are derivatives o anhydrides of mannitol and the glucoses, of whi dextrine may be taken as the type.

In order to set out the subject more clearly, I hav subdivided this paper under the following heads:—

(1) Constitution.
(2) Methods of preparation.
(3) Decomposition.
(4) General characters and reactions.
(5) Occurrence in plants.
(6) Epitome of a few of the most interesting gluco sides pharmaceutically.

Constitution.—Glucosides may be viewed as com pound ethers containing the group $C_6H_{11}O_5$, which i turned out on hydrolysis, thus—R′ $C_6H_{11}O_5 + H_2O =$ R′ $H + C_6H_{12}O_6$. They are thus analogous to the ar ficial glucosides prepared by Berthelot and consider by him to be derivatives of glucosan $C_6H_{10}O_5$, becau by heating with alkalis they yield glucosan and sat glucose. The constitution of most glucosides is by n means simple, but amongst those most readily under stood, may be mentioned bornesit and dambonit, th natural methyl and dimethyl ethers of dambo a sugar probably identical with inosit. Attemp were made by Schützenberger to synthesize glucosi from the acetyl derivatives of sugars with only partia success, but it is the synthetical work of Michael especially, that has thrown most light on this import ant question. That chemist prepared phenol-glucoside by mixing alcoholic solutions of potassium phenate and aceto-chlorhydrose, obtaining it in long silky needles dextrogyrate in solution, and when boiled with dilu acids or alkalis, splitting up into glucose and phenol. Advancing a step further he was able to prepare ortho formyl-phenylglucoside or helicin, by the action of acetochlorhydrose on potassium salicylic aldehyde and finally from that body by the action of nascent hydrogen obtained salicin, thus performing the first synthesis of a natural glucoside. Michael also effected a synthesis of methyl-arbutin and prepared the gluco sides of guaiacol, eugenol, and similar bodies. Most of the natural glucosides are neutral bodies, combining notwithstanding, with certain metallic oxides, notably those of lead and silver. Some have a marked acidic character (myronic acid), whilst solanin is basic and may be considered almost alkaloidal in character. The sugar resulting from the splitting up of these bodies is in most cases ordinary dextro-glucose, but in some instances different glucoses, optically active and inactive, result, which will be briefly dealt with later when considering the respective glucosides which give rise to them. In some cases sugars that have been considered peculiar to certain of these bodies, have been shown on more recent examination to be ordinary dextro-glucose, as in the case of the so-called "phlorose" from phlorizin. In some cases, too, saccharine bodies result, closely related to the glucose group, but differing in some few points, as chinovit, which will be referred to later. The second body, resulting from the splitting up of glucosides, varies much in constitution, in some cases being a hydrocarbon (the terpene, $C_{10}H_{16}$, from picrocrocin), in others an alcohol (saligenol from salicin), in others an aldehyde (benzoic aldehyde from amygdalin), in others a phenol (hesperetin from hesperidin), or a diketone (alizarin from ruberythric acid), whilst in very many cases the chemical nature of the decomposition product has not been accurately determined.

Methods of Preparation.—Owing to the ill-defined nature of these substances, it is impossible to lay down any very definite lines for their extraction, the process differing in almost every case. The following five methods are those more usually adopted, and are included in a paper by M. Bocquillon-Limousin.[*]

(1) *Extraction by Alcohol.*—A method only applicable when the glucoside exists in a free state, little tannin being present.

(2) *Lime Method.*—That recommended by Tanret consists in leaving the plant in contact with milk of lime for twenty-four hours, transferring to a percolator and exhausting the mixture with some previously ascertained suitable solvent.

(3) *Litharge Method.*—The decoction of the plant is maintained at boiling point for some hours with litharge, filtered and then concentrated until it reaches a syrupy consistence and finally allowed to cool. This process is unsatisfactory, owing to the easy decomposition of the glucoside by continued heating.

(4) *Subacetate of Lead Method.*—The decoction is first clarified by neutral acetate of lead and filtered, and then the glucoside precipitated by the subacetate in the form of a lead compound. The lead is removed either by excess of sulphuretted hydrogen or dilute sulphuric acid, the former being obviously preferable.

(5) *Mixed Method.*—This process is generally adopted when the plant contains much tannin or the use of sulphuretted hydrogen is objectionable. The decoction is precipitated by subacetate of lead, the precipitate mixed with slaked lime and the mixture dried over a water-bath. The powder is then percolated with spirit, which on evaporation yields the glucoside.

Decomposition.—The characteristic splitting up of glucosides into sugars and non-saccharine bodies may be accomplished slowly in a few cases by heating with water alone at high temperatures, but readily occurs under the action of dilute acids, alkalis, suitable ferments and in some instances by electrolysis.

Decomposition at High Temperatures.—Experiments have been made by Schiff as to the action of prolonged exposure of these bodies to a high temperature. He states that æsculin, phlorizin and salicin are decomposed at temperatures ranging from 170° to 240° C., whilst others, arbutin, for example, are unaffected. Many glucosides, especially those of the saponin class, are decomposed by prolonged heating with water alone to high temperatures.

Decomposition by Dilute Acids.—The acids usually employed for this purpose are dilute hydrochloric or sulphuric acids, but they are not equally satisfactory in all cases. Thus, saponin may be readily split up by hydrochloric, but by no means so easily by sulphuric acid. In some cases decomposition may be effected by organic as well as the mineral acids.

Decomposition by Alkalis.—In the case of many glucosides, decomposition by alkalis, at any rate the caustic alkalis, is not of much value, as further change takes place, and the sugar at first formed is decomposed. When both resulting products are required, it is preferable therefore to employ baryta water.

Decomposition by Ferments.—By the action of specific ferments at ordinary or slightly elevated temperatures, the splitting up of many glucosides may be effected. "Emulsin," the ferment of the almond, is capable of decomposing not only amygdalin, with which it is associated in nature, but also salicin, æsculin and many other glucosides, the decomposition, however, being usually less complete than that effected by dilute acids. Other less generally active ferments are the saliva, myrosin, erythrozym (occurring in madder root), whilst in some cases the bacilli that give rise to alcoholic and lactic fermentation are sufficient to cause rapid decomposition. The action of these ferments cannot be in any way prejudged by analogy, for whilst salicin is easily decomposed by emulsin, populin (benzoyl-salicin) is quite uninfluenced, and yet can be readily split up by the lactic-fermentation bacillus.

The behaviour of some of the glucosides towards the physiological ferments, has been studied by Grisson, who states that amygdalen is not decomposed by any of the true digestive ferments, but that its decomposition in the body, and hence poisonous action, is probably due to the action of the putrescent ferment. Salicin, hesperidin and arbutin are not decomposed by saliva or pepsin, but are also probably attacked by the putrescent ferment.

Decomposition by Electrolysis.—Experiments in this direction have not apparently been very numerous. Salicin has been decomposed by means of 400 Bunsen's elements, and found to yield a glucose and saligenol, whilst amygdalin with 10 Bunsen's cells decomposes at first slowly, but afterwards rapidly, the products of the change being benzoic aldehyde, hydrocyanic acid and a small quantity of ammonia.

General Properties and Reactions.—The majority of the glucosides are composed of carbon, hydrogen and oxygen, some few contain nitrogen in addition (amygdalin, solanin), and sulphur (myronic acid). Many, owing to their proneness to decomposition, are somewhat difficult to isolate in a state of purity, but when thus obtained in almost every instance are crystalline. They are characterised as a class by a marked insolubility in ether, most, however, being readily soluble in water. Some are optically active, the majority being lævo-rotatory, but neither the direction nor the amount of the deviation caused by the sugar that results by decomposition of the glucoside, can be predicted from the behaviour of the parent substance. The absorption spectra have been studied only in a few cases, digitalin of commerce having been found to give rise to a black band at the beginning of the blue portion of the spectrum, on line F of Fraunhofer. Many of the glucosides, like the carbohydrates, by treatment with benzoic chloride give benzol compounds, which show considerable resistance to the action of reagents and even by boiling with alkalis are only decomposed with difficulty. Most, but not all, reduce alkaline copper solution on boiling. Some reduce ammoniacal silver solution. A few are precipitated by picric and tannic acids and alkaloidal reagents, others coagulate on heating. The aqueous solution of many of these bodies froths persistently. Only two reactions may be said to be characteristic of the whole class. (1) The splitting up by boiling with dilute mineral acids and reduction of alkaline copper solution after this decomposition. (2) Precipitation by a solution of molybdate of ammonium, slightly acidulated with hydrochloric acid.

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[*] *Répertoire de Pharmacie*, Nov. 10, 1890.

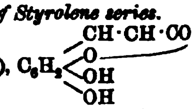
Occurrence in Plants.—The processes employed in the elaboration of glucosides in plants are so intimately associated with the manufacture of carbohydrates as carried out in the living chlorophyll grain, that in the consideration of the minor problem, the principal points of the larger question cannot well be excluded. Rochleder has maintained that the glucosides are the first assimilation products of the activity of the chlorophyll, and that from them by the action of ferments grape sugar is produced, subsequent change resulting in the formation of the other carbohydrates, starch, dextrin, etc. This theory, or, at any rate, the first part of it has recently received some support from the researches of Brunner and Chuard, who have shown that certain acids of a glucosidal nature, as gluco-succinic acid, do actually occur in considerable quantity in unripe fruits, but disappear on ripening, then appearing in the leaves. The fact, however, that gluco-succinic acid has been found to exist in some fungi, shows that it is not exclusively an assimilation product, but that it originates from change in the reserve material. The weight of evidence at the present time is in support of the view adopted by Sachs, in his 'Handbook of Experimental Physiology of Plants,' which is that starch itself and not the glucosides must be considered as the first assimilation product of plants; for if this were not so, one would expect to find the latter bodies in the assimilation organs containing chlorophyll, whilst they are in reality found most frequently in the reserve material of the plant. Whether glucose or its anhydride, starch, is the earlier product of assimilation, has not yet been determined; but, owing to the readiness with which starch and glucose are convertible the one into the other, this point is of comparatively little theoretical importance. Liebig promulgated the theory that the carbonic acid gas absorbed from the atmosphere by the plant, is converted into a carbohydrate by condensation of the molecule through the successive stages of oxalic, tartaric and citric acid, etc. These so-called intermediate bodies are, indeed, frequently found in the plant, but under circumstances in which they can evidently be of no further value in the economy of the plant, and therefore may be classed as degradation products. This consideration has led to the hypothesis of Baeyer being more universally adopted, in which the carbonic acid is considered to be first reduced to formic aldehyde (CH_2O) by the activity of the chlorophyll, six molecules of which condense to form sugars of the formula $C_6H_{12}O_6$ in the presence of some at present unknown reagent favouring polymerisation. This view is also strengthened by the identification of formic aldehyde, as one of the products of the distillation of green leaves with water, and also by the recent synthesis of fruit-sugar from formic aldehyde under the polymerising action of weak alkalis.

An interesting hypothesis has recently been put forward by Waage, as to the formation of phloroglucinol in plants, the body yielded by the decomposition of two of the classes of bodies in the classification of Hlasiwetz, viz., phloroglucides and phloroglucosides. He answers that under favourable conditions, a molecule of glucose may lose three molecules of water, forming a triketohexamethylene. Thus—

$CH_2OH\cdot CHOH\cdot CHOH\cdot CHOH\cdot CHOH\cdot CHO-3H_2O=$ $\underbrace{CH_2\cdot CO\cdot CH_2\cdot CO\cdot CH_2\cdot CO}$, the isomeric modification of phloroglucinol $C_6H_3(OH)_3$. The chief functions of tannins in plant life is, according to Möller, analogous to that of the glucosides, since both act as carriers of carbohydrates from one part of the plant to another, and in each case the *modus operandi* is probably identical, that is to say, the carbohydrates are set down at that part of the plant which needs them, while the tannic acid passes into the circulation.

Before epitomizing in alphabetical order a few of the more commonly occurring glucosides, I have drawn up a table showing the approximate constitution of those which have already been determined, as shown by the nature of their second decomposition product on hydrolysis.

The chemical constitution of the non-saccharine

Glucoside.	Sugar.	Second decomposition product (non-saccharine).
		Derivative of Ethylene series.
Myronic acid . .	Dextro-glucose.	Allyl-sulphocyanate, $C_3H_5\cdot NCS$.
		Derivatives of Benzene series.
Amygdalin . . .	Dextro-glucose.	Benzoic aldehyde, $C_6H_5\cdot CHO$.
Arbutin	Crystalline dextro-glucose.	Hydroquinone, $C_6H_4\cdot (OH)_2$.
Populin	Dextro-glucose.	Benzoic acid, $C_6H_5\cdot COOH$. Saligenol, $C_6H_4(OH)CH_2OH$.
Salicin	Dextro-glucose.	Saligenol, $C_6H_4(OH)CH_2OH$.
		Derivatives of Styrolene series.
Æsculin	A glucose.	Dioxycoumarin (æsculetin),  $C_6H_2\begin{cases}CH\cdot CH\cdot CO \\ O \\ OH \\ OH\end{cases}$
Daphnin. . . .	A glucose.	Dioxycoumarin (daphnetin) (isomeric with æsculetin).
Coniferin . . .	Dextro-glucose.	Coniferyl (hydroxy-methoxy-cinnamic) alcohol— $C_6H_3(OH)(OCH_3)CH\cdot CH\cdot CH_2OH$.
Hesperidin . . .	Dextro-glucose.	Hesperetin, the methoxy-hydroxy-cinnamic (hesperetic) ester of phloroglucin— $C_6H_3(OH)(OCH_3)CH\cdot CH\cdot CO_2\cdot C_6H_3(OH)_2$.
Phlorizin . . .	Dextro-glucose.	Phloretin, the paraoxyhydroatropic (phloretic) ester of phloroglucin, $C_6H_4(OH)C_2H_4\cdot CO_2\cdot C_6H_3(OH)_2$.
		Derivatives of Anthracene series.
Frangulin . . .	A glucose.	Frangulic acid, $C_{14}H_6(OH)_2O_2$ (isomeric with alizarin).
Ruberythric acid .	A glucose.	Alizarin, $C_{14}H_6(OH)_2O_2$.

decomposition product of the following, most of which are of medicinal importance, is as yet undetermined.

Glucoside.	Sugar.	Second decomposition product (non-saccharine).
Carminic acid	an inactive, non-crystalline sugar $C_6H_{10}O_5$	Carmine-red $C_{11}H_{12}O_7$
Chinovin . .	Chinovit ($C_6H_{12}O_4$)	Chinovic acid $C_{32}H_{48}O_6$
Convallarin .	a glucose	Convallamaretin $C_{20}H_{36}O_8$ (?)
Convallamarin	„ „	Convallaretin $C_{14}H_{26}O_3$
Crocin . . .	crocose	Crocetin $C_{34}H_{46}O_9$
Digitalin . .	a glucose	Digitaliresin } probably identical
Digitalein . .	„ „	„
Glycyrrhizin .	„ „	Glycyrretin $C_{18}H_{26}O_4$ (?)
Saponin. . .	„ „	Sapogenin $C_{14}H_{22}O_2$
Solanin . . .	„ „	Solanidin $C_{26}H_{41}NO_2$
Strophanthin .	„ „	Strophanthidin

Æsculin occurs in the bark of the horse-chesnut tree, *Æsculus hippocastanum*, and other species, *Pavia* and the root-bark of *Gelsemium sempervirens*. It crystallizes in colourless needles readily soluble in hot, but much less in cold water, the solution being highly fluorescent, especially in alkaline solution, a property, however, which is entirely destroyed by acids. It may be detected even in the minutest quantity by this characteristic and also by the formation of a blood-red colour when ammonia is added to a solution of it in nitric acid. It is decomposed by boiling with hydrochloric acid, by emulsin at 26° to 30° C., or by heat alone at 230° C. into glucose and æsculetin, a dioxycoumarin, as stated in the table above—

$$C_{15}H_{16}O_9 + H_2O = C_9H_6O_4 + C_6H_{12}O_6.$$

It forms substitution derivatives by replacement up to 5 atoms of its hydrogen by a halogen or acetic-anhydride.

Amygdalin occurs in varying quantities in the seeds of many Amygdaleæ and Pomeæ, ranging from nearly 4 per cent. in bitter almonds to about ½ per cent. in apple pips. It also occurs in mountain ash buds and the flowers and leaves of the bird cherry, whilst an amorphous amygdalin (laurocerasin) occurs in the leaves of the cherry laurel. Amygdalin was discovered by Robiquet and Boutron, who extracted it from pressed bitter almonds, and gave it the name by which it has since been known. It was, however, left for Wöhler and Liebig, who accurately determined its composition, to explain the formation of oil of bitter almonds from the glucoside. They showed that both bitter and sweet almonds contained a peculiar nitrogenous substance "emulsin," which in the presence of water splits up amygdalin into benzoic aldehyde, prussic acid and grape sugar,

$$C_{20}H_{27}NO_{11} + 2H_2O = C_6H_5{\cdot}CHO + HCN + 2C_6H_{12}O_6.$$

Similar change is effected by dilute hydrochloric, less readily by sulphuric acid and by pure water at 150° C. By boiling with alkalis amygdalin gives up its nitrogen as ammonia, forming amygdalic acid, a reaction which is utilized in the method proposed by Rieckher for its estimation. The amygdalin is decomposed by means of hydrate of barium, and either the amygdalate of barium may be estimated as sulphate (excess of barium having previously been removed by carbonic acid gas) or the amount of ammonia gas evolved may be determined, the one operation forming a very useful check for the other.

Amygdalin is lævo-rotatory and dissolves in concentrated sulphuric acid with a characteristic violet coloration.

Arbutin was first found by Kawalier in 1852 in bearberry leaves (*Arctostaphylos Uva-ursi*) and has been since shown to exist in *Pyrola umbellata*, *Gaultheria procumbens* and many plants of the Ericaceæ. It is, however, always contaminated to a certain extent with methyl-arbutin, from which it is exceedingly difficult to free it. It crystallizes in tufts of needles, easily soluble in alcohol. By the action of dilute acids, or less rapidly by emulsin, it is split up into hydroquinone and a glucose,

$$C_{12}H_{16}O_7 + H_2O = C_6H_{12}O_6 + C_6H_4(OH)_2.$$

Methyl-arbutin accompanies arbutin in bearberry leaves, as well as other plants containing that body, and splits up by boiling with dilute acids into methylhydroquinone and a glucose.

Reference has already been made to the synthesis of this glucoside from methyl-hydroquinone and acetochlorhydrose.

Carminic acid.—This substance, to which very varying formulæ have been assigned by different chemists, is the colouring principle of the *Coccus cacti*, and occurs also in *Monarda didyma*, and probably other plants. Liebermann has thrown doubt on its glucosidal character, and states that it yields no sugar on boiling with dilute acids, whilst it was described by Hlasiwetz as a glucoside having the formula $C_{17}H_{18}O_{10}$, which by boiling with dilute acids is split up into carmine red and a non-crystallizable inactive sugar, according to the equation—

$$C_{17}H_{18}O_{10} + 2H_2O = C_{11}H_{12}O_7 + C_6H_{10}O_5.$$

It is a weak dibasic acid, forming purplish-violet compounds with the alkalis and purple with the alkaline earths.

Chinovin.—According to Liebermann two apparently isomeric chinovins exist, which he designates as α- and β-chinovin.

α–Chinovin is that contained in cinchona barks.

β–Chinovin is that yielded by cuprea (*Remijia*) barks.

α-Chinovin is a light crystalline powder, having a very bitter taste, insoluble in water, but soluble in alkaline solutions. It deviates the ray of polarized light to the right, does not reduce Fehling's solution, and is not fermentable by yeast. It decomposes by boiling with dilute acids into chinovic acid and a peculiar sugar, to which the name "chinovit" has been given, thus—$C_{38}H_{62}O_{11} = C_{32}H_{48}O_6 + C_6H_{12}O_4$.

β–Chinovin has a characteristic behaviour towards absolute alcohol, in which it dissolves readily with evolution of heat. After some time, however, although evaporation be prevented, separation of a compound of β–chinovin with five molecules of alcohol takes place and the greater part of the β–chinovin comes out of solution. Its action towards polarized light is only half as much as the "α" variety, but it is split up in the same way by dilute acids into chinovit and chinovic acid.

Chinovit, or chinovin sugar, has, according to Liebermann, the formula $C_6H_{12}O_4$, is amorphous, can be distilled in small quantities undecomposed, is dextrorotatory, reduces Fehling's solution, and is not fermented by yeast. It yields oxalic acid by oxidation with nitric acid. Passmore, however, whose work on sugars with Emil Fischer has received such well deserved recognition in this country, states that he has obtained from β-chinovin a phenyl-hydrazine compound, melting at 205° C., which agrees with the osazone of dextroglucose. This fact tends to show that the so-called chinovit is either not a simple sugar, as has been supposed hitherto, but a mixture of dextro-glucose and another body, or more probably the substance has been partially altered in the process of isolation.

Coniferin occurs in many trees of the natural order Coniferæ, especially the genus *Abies*, *Pinus* and *Larix*, in which it is found in greatest quantity in spring in the cambium sap. Dilute acids resolve it into dextro-glucose and a resinous substance, but by the action of emulsin in presence of water, a crystalline decomposition product, coniferyl alcohol, is formed, which by exposure to the air acquires a vanilla-like odour. This change has been taken advantage of commercially for the preparation of vanillin, which can readily be obtained from it by oxidation with bichromate of potash and sulphuric acid.

Coniferin crystallizes in satiny, needle-shaped crystals, freely soluble in warm, but not in cold water. It forms a reddish-violet solution with concentrated sulphuric acid, and with hydrochloric acid and phenol a deep blue coloration, a reaction which may readily be made use of micro-chemically, in testing for the presence of this glucoside in cambium-sap. Coniferyl alcohol is a methoxy-hydroxy-cinnamic acid, having the formula $C_6H_3(OH)(OCH_3)CH{\cdot}CH{\cdot}CH_2OH$.

Convallamarin.—The principle to which the lily of the valley (*Convallaria majalis*) owes its poisonous action on the heart was discovered by Walz in 1858. It occurs to the extent of about 0·2 per cent. in the fresh plant, and is obtained as a pale, whitish-brown, amorphous substance, freely soluble in water and alcohol, but insoluble in ether. It is decomposed by boiling with dilute acids into a glucose and convallamaretin. It gives an intense violet colour when exposed to the air, in contact with sulphuric acid.

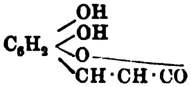
Convallarin, also discovered by Walz, possesses merely purgative properties. It is very slightly soluble in water, producing frothing, and is decomposed by boiling with dilute acids into a glucose and convallaretin.

Crocin.—The colouring principle of saffron was first prepared from that drug in 1851 by Quadrat, and later has been shown to exist in the fruits of *Gardenia grandiflora* and also *Fabiana indica.* The chief interest of this glucoside lies in the fact that by decomposition by dilute acids it yields in addition to crocetin a peculiar sugar, crocose. The same change is also effected almost instantaneously by alkalis. The statement of Weiss quoted in 'Pharmacographia,' p. 605, that polychroit, identical with the crocin of Rochleder, "yields an aromatic volatile oil," appears to be due to the presence in that body of the picrocrocin of Kayser, which yields on hydrolysis a terpene ($C_{10}H_{16}$), in addition to crocose.

Crocose, or saffron sugar ($C_6H_{12}O_6$), is strongly dextrorotatory, but differs from dextro-glucose in possessing only half its reducing power.

1 gram crocose = 0·877 grams Cu in form Cu_2O.
1 gram dextro-glucose = 1·8 – 1·95 „ „ „ „

Daphnin, occurring in the bark of *Daphne Mezereum* and other species, was first thought by its discoverer, Vauquelin, to be an alkaloid, but was subsequently shown by Zwenger to be glucosidal. It may be obtained in rectangular prisms, which are coloured yellow by alkalis, and is decomposed by ferments or boiling with dilute acids into a glucose and daphnetin. The latter body, as stated in the table above, is a dioxycoumarin, having the formula—



$$C_6H_2\begin{cases}OH\\OH\\O\text{———————}\\CH{\cdot}CH{\cdot}CO\end{cases}$$

and was shown by Rochleder to be isomeric with æsculetin.

The synthesis of daphnetin has been performed by Pechmann, who obtained it by the condensation of malic acid with pyrogallol in presence of sulphuric acid.

(*To be continued.*)

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the thirteenth session was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, March 11, at 9·15 p.m. Mr. Donald McEwan, President, in the chair.

The minutes of last meeting having been read and approved, the following papers were read:—

UNGUENTUM HYDRARGYRI NITRATIS.

BY JOHN LOTHIAN.

The ointment is a subject on which a vast amount of work has been done. From the very first it would seem to have given trouble to pharmacists, as even in the first volume of the *Pharmaceutical Journal* we have copious notes about it, and suggestions as to different fats, proportions of acid, temperature, manner of stirring, and so forth. Considering these facts I was rather surprised to read in a paper about ointments in the Journal a short time ago, that the present official formula gave an ointment absolutely perfect. I scarcely think this is a common experience, and I do not think any formula containing lard will give an absolutely perfect unguent. hydrarg. nitratis. It would be wearisome to recapitulate the different fats and mixtures of fats that have been experimented with by various observers. I prepared a number of these ointments, but as most of them were unsatisfactory I have not deemed it necessary to enter into detail as to their appearance and keeping properties.

It is necessary to have olein as a constituent of the ointment, and good olive oil gives most satisfactory results. Some samples of olive oil which I examined appeared to contain seed oils, as they gave, on applying the elaidin test with nitric acid, masses of a reddish colour which did not set hard like pure olive oil. I need scarcely say they did not make nice ointments, as it is well known that these seed oils have a powerful reducing effect on salts of mercury.

It has been recommended to make citrine ointment with white vaseline instead of lard and olive oil. This gives an ointment which preserves its appearance pretty well and does not readily become reduced, but nitric acid having no action on a paraffin, it is obvious that vaseline is not a suitable fat for this ointment. It is sure to contain free acid, has a rank acid odour and is very apt to irritate the patient when applied.

Substituting white vaseline for the lard alone makes a much better preparation. The combination which I recommend is equal parts of white vaseline and lanoline in place of the lard. This makes an ointment of nice citron appearance and good consistence, and it keeps very well. A larger proportion of lanoline makes it too sticky. You will see that my main contention is that the lard is the disturbing factor in the official ointment.

There is, however, a great deal in the *modus operandi*. It is an advantage, as recommended in the U.S. Pharmacopœia, to use one half of the nitric acid to oxidize the fats before adding the mercury dissolved in the other half. One requires to be careful, too, of the temperature. This has been said by some to be the main factor in determining the colour of the ointment. I think that 212° F., as recommended in the B.P., is the best, and the ointment should be vigorously stirred until quite cold.

The next paper read was entitled "Two Days with the Leaders of Chemical Science," by Peter MacEwan, F.C.S., London, in which the author gave an extremely interesting description of the proceedings in connection with the recent jubilee of the Chemical Society. The paper contained some excellent word sketches of the appearance and manner and speeches of the leaders of science, both British and foreign, who took part in the proceedings on that memorable occasion.

The discussion which followed was taken part in by Messrs. Cowie, Duncan, Hill, Lothian, McEwan, and Parker. On the motion of the Chairman cordial votes of thanks were awarded to the authors, and especially to Mr. MacEwan for his continued interest in the Association.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

The annual meeting was held on Wednesday, 11th inst. There was a large attendance, and the following were elected office-bearers for 1891-2: President, Mr. Johnston; Vice-President, Mr. Mortimer; Secretary, Mr. Strachan; Treasurer, Mr. J. Paterson; Curator, Mr. Ritchie; Librarian, Mr. J. Cruickshank; Auditor, Mr. Reid. The other business was formal.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The usual monthly meeting of this Society was held on Wednesday, March 11, the President, Mr. J. H. Bradwall, occupied the chair. The minutes of the last meeting having been read and confirmed, the Chairman called upon Mr. G. A. Grierson, F.L.S. (in the absence of Mr. Houfton, who was unable to give his paper), to give a lecture on "Plant Histology."

The lecture, which was illustrated by lantern slides, lent by Mr. Newsholme, who worked the lantern, proved to be one of great interest. A hearty vote of thanks was recorded to Mr. Grierson and Mr. Newsholme for their kindness in giving so interesting a lecture at about four hours' notice. At the next meeting of the Society, Professor Arnold will give a lecture on the "Micro-Spectroscopic Recognition of Blood-Stains," illustrated by lantern slides, etc.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

A meeting of the Liverpool Pharmaceutical Students' Society was held on Thursday, the 12th inst., when a paper on "The Periodic Law" was read by Mr. J. T. Conroy, B.Sc.

The author commenced by referring to Prout's hypothesis published in 1815 that the atomic weights of all the elements are multiples of that of hydrogen, and that hydrogen is the primary substance from which all other bodies have been derived. This proved to be in conflict with the subsequent more accurate determinations of atomic weights by Berzelius, and although Dumas afterwards suggested that the atomic weights might be multiples of one-half, or even one quarter that of hydrogen, the lower of these units is not in accord with the present accepted atomic weights. Dumas and others pointed out some remarkable relations existing between the atomic weights of similar elements and the probability that these relationships are governed by some simple law. But it was not until the difference between atomic weight and equivalent was clearly understood that any connection between the atomic weights of dissimilar elements was discovered. Such a connection was first pointed out in 1865, when Newlands enunciated his "law of octaves." The periodicity of chemical properties was rediscovered independently in 1869 by Mendeléef and Lothar Meyer, to whom the greater part of the present knowledge of the subject is due. The periodic law, as laid down by the former, may be briefly expressed in the words, "The properties of the elements and the properties and constitution of their compounds are periodic functions of the atomic weights." Mr. Conroy illustrated this law by tracing in considerable detail the chemical and physical properties of the elements and their compounds represented in a table in which groups of similar elements were arranged in vertical columns. Reference was then made to the fact that with the aid of this law Mendeléeff was enabled to affirm the existence of several new elements, and to predict certain of their properties, also to question the accuracy of several of the received atomic weights. These conclusions were stated to have since been proved to be correct in almost every particular. In 1871 Mendeléef described three as yet undiscovered elements under the names "ekaaluminium," "ekaboron" and "ekasilicon," and Mr. Conroy showed how in respect to atomic weights and chemical and physical properties his predictions were fulfilled in the subsequently discovered elements, gallium, scandium and germanium. As to the cause of the periodicity, Mr. Conroy said no complete explanation has yet been given, though many attempts have been made. In 1886 Carnelly published a paper in which, among other things, he showed that with three absolute elements of atomic weights, 1, 12 and −2, approximation could be made to the atomic weight, of all known chemical elements. Two of these elements he thought might be hydrogen and carbon; the third, possessing negative atomic weight, might perhaps be the ether. Many chemists have also attempted to express the atomic weights by algebraic formulae. A curve planned by Emerson Reynolds for representing the periodic law seemed to have been suggestive to other workers, having led to the "cubical curve" of Haughton, and another modification was put forward by Crookes in his address on the genesis of the elements. Crookes had applied the principle of evolution to the chemical elements, and proposed a hypothesis to explain how all the known elements may have been produced from one primary substance, which he named "protyle." According to this the conversion of protyle into the elements has been brought about by the action of two forces, one a gradual cooling acting in the direction indicated in a diagram in which groups of similar elements are arranged in vertical lines in order of increasing atomic weight, and the other a force intimately connected with electricity, which was represented on the diagram as passing backwards and forwards through the vertical lines like the swing of a pendulum. The paper concluded with a reference to the Crooke's theory of the existence of "meta elements."

Obituary.

CARL JOHANN MAXIMOWICZ.

By the death of Maximowicz, Russia has lost her greatest botanist of the present generation. He died on February 4, after a few days' illness, of lung disease following on influenza, at the age of 64. He was born at Tula in 1827, and was educated partly at a German Lutheran College in St. Petersburg and partly at the University of Dorpat. He commenced his botanical career as assistant to the Director of the Botanical Gardens at Dorpat, where he remained until 1852, when he was appointed Curator of the Imperial Botanic Gardens at St. Petersburg. The next year he went on a voyage round the world in the frigate Diana in order to obtain living plants for the Gardens, and visited Rio Janeiro, Valparaiso, and Honolulu, but was left on the coast of Manchuria, owing to the breaking out of war between Russia and Great Britain. From thence he made his way up the River Amur, exploring its banks and the surrounding country as far south as Victoria Bay, and returning to St. Petersburg by way of Siberia. The results of this exploration was published, after two years' labour, under the name of

Primitiæ Floræ Amurensis,' and the excellence of this work led to his being awarded the Demidoff Prize and to his being again sent to the East. In 1859 and 1860 he again travelled in Manchuria; in 1861 to 1863 he investigated, with the help of a native Japanese, Tschonoski by name, the flora of the Japanese islands, Yesso, Nippon, and Kiu-siu, and returned to Europe in 1864 by the sea-route, visiting England on the way for the first time. In the same year he was elected a member of the Imperial Academy of Sciences, and the direction of the Herbarium of the Academy was given over to him. In 1869 he was appointed as the head botanist (Botanicus Primarius) at the Imperial Botanic Garden of St. Petersburg. Under the name of 'Diagnoses breves Plantarum novarum Japoniæ et Mandshuriæ' he published at intervals twenty papers, giving descriptions of the new species found by him in those countries. In the 'Diagnoses Plantarum novarum Asiaticarum,' of which seven parts were issued, he described the new plants collected by Prejevalsky, Potanin and others in Central Asia. Subsequently, in 1889, he published fuller details of these collections in the 'Flora Tangutica' and the 'Enumeratio Plantarum, hucusque in Mongolia, etc., lectarum,' but at the time of his death these had only reached the *Thalamifloræ* and *Disciforæ*, although much more had been got ready for the press.

By botanists who had the privilege of knowing him personally, he is described as being affable and courteous, a gentleman in the truest sense of the word, extremely accurate and painstaking in his work, in this respect resembling our own celebrated botanist Robert Brown, and the equally well-known pharmacognosist and botanist, Daniel Hanbury. As a correspondent he was most generous, both in giving specimens and supplying information, often, evidently, at the cost of much time and trouble to himself. Indeed, the Herbarium of the Pharmaceutical Society is indebted to him for a series of dried specimens of all the species of the genus *Aconitum* cultivated in the Imperial Botanic Garden at St. Petersburg, as well as for a specimen of *Scopola japonica*, which was the only duplicate he possessed with the rhizome attached. The value of his work was recognized in 1880 by the Linnean Society of London, which elected him a foreign member. The accuracy of his work is so great and the botany of the countries he visited is known to so few, that his place will not be easily filled, and the non-completion of his floras of Tangut and Mongolia will be not merely a national, but a European loss, for they are indispensable to all botanists who may in future still further investigate these little known regions.

Notice has also been received of the death of the following:—

On the 3rd of March, Mr. Ralph Dearlove Walker, Chemist and Druggist, Vicar Street, Kidderminster. Aged 50 years.

On the 14th of March, after a few hours' illness, Mr. John Allden, Chemist and Druggist, Cromwell Road, South Kensington. Aged 47 years. Mr. Allden was an Associate in Business of the Pharmaceutical Society.

On the 17th of March, Mr. William Crow, Chemist and Druggist, High Street, Berwick-on-Tweed. Aged 33 years.

Review.

COMMERCIAL BOTANY OF THE NINETEENTH CENTURY.[*] By J. R. JACKSON, A.L.S.

This is a small octavo volume of 168 pages, and is published as a "Record of Progress in the Utilization of Vegetable Products in the United Kingdom and the Introduction of Economic Plants into the British Colonies during the Present Century." The author is the Curator of the Economic Museums at Kew, and as such undoubtedly possesses special advantages for compiling a work of this kind, inasmuch as Kew is the centre for the introduction and distribution of economic plants throughout Great Britain and her Colonies. It is only natural therefore to find that throughout the volume the introduction of new products and plants is regarded rather from the date at which they were first noticed at Kew, than from their first appearance in commerce. In this way a little injustice has perhaps, in some cases, been unintentionally committed in not giving credit to those whose business energy and foresight led to the real introduction of plants and their products. A more careful search in the pages of other journals would have obviated this fault. From the point of view of an outsider the book has, nevertheless, some very good traits. It is written in a very readable style, and may be regarded as a useful epitome of the Kew Reports and Bulletins, the scattered information derived from which has been condensed and presented in a form suitable for the general reader. Having the advantage of a good index the book will form an excellent guide for the visitor to the Economic Museums at Kew, whilst the frequent references to the 'Kew Report' occurring in the text are useful as indicating where more detailed information may be obtained. In the commencement of the work a chronological table of the dates of introduction of the various plants and plant products is given. Here it should be noted that the date of introduction of medicinal products appears to refer to their adoption in the London or British Pharmacopœias. Thus belladonna leaves are stated to have been introduced into use in medicine in 1809 and cajuput oil about the year 1813. This table does not seem to have received the same care as the subsequent chapters; thus we find the entry "1849. Child's night-lights introduced." "1868. Botanical source of Zanzibar anime determined." And in many other cases the scientific name of the plant yielding the product is omitted. But a reference to the index shows at once that the details are fully given elsewhere.

The book is divided into fourteen chapters. Indiarubber and gutta percha have each a chapter to themselves. The article on indiarubber gives probably the best botanical information that can be obtained anywhere concerning these plants, but under gutta percha reference has evidently not been made to Dr. Burck's valuable monograph (1885). The chapter on drugs gives a very good summary of cinchona and ipecacuanha cultivation, but an oversight is noticeable under China cuprea, where on p. 70 it is stated that this bark attracted attention in consequence of the "high yield of quinine," whereas on the opposite page it is stated that the better sorts of cuprea bark contained on an average 1·8 to 1·9 of sulphate of quinine, rarely reaching 2 per cent. As a matter of fact attention was directed to the bark as a cheap source of quinine. The rhubarb plant figured on p. 75 is evidently neither the *R. officinale* nor the *R. palmatum* mentioned in the text. Under new drugs, on p. 93 mention is made of drumine, as "an alkaloid contained in *Euphorbia Drummondii*," but which has been shown to be non-existent (*Pharm. Journ.*, [3], xvii., p. 1047).

On p. 99 an omission of the word thymol renders the following sentence (which occurs under menthol) somewhat obscure. "A similar crystalline principle is obtained in India from the oil expressed (*sic*) from the seeds of *Carum copticum*." In the chapters on gums, resins and varnishes, fibres, paper materials, timber and fodders, the author is evidently more at home than in those on drugs and new drugs, and the information contained in these chapters cannot fail to be interesting to those who visit the rich and well-ordered Museums at Kew. In glancing through the volume, one is surprised to notice in how many of the colonies useful plants have been introduced, and how readily commercial or economic products in case of need could be obtained from our Colonies, as will doubtless happen during the next century with gutta-percha and indiarubber. The errors are so few in this little volume, and its general usefulness is so apparent, that we can but express the hope that it may meet with sufficient success to induce the author to publish a more detailed work on economic botany, since a standard work on this subject is still a desideratum in this country.

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[*] Cassell and Co. London: 1890.

BOOKS RECEIVED.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX. 1891. Bristol: Wright and Co. From the Publishers.

INTENSITY COILS. How Made and how Used. By "Dyer." Sixteenth edition. London: Perken, Son and Rayment. From the Publishers.

THE POCKET PHARMACOPŒIA. By C. E. ARMAND SEMPLE, B.A., M.B., etc. London: Baillière, Tindall and Cox. From the Publishers.

AIDS TO MATERIA MEDICA AND THERAPEUTICS. Part IV. By C. E. ARMAND SEMPLE, B.A., M.B., etc. London: Baillière, Tindall and Cox. From the Publishers.

Correspondence.

THE POSITION OF ASSOCIATES.

Sir,—Will you permit me to rectify a statement which appeared in the report of the discussion on Mr. Marshall Leigh's paper that I did not like the idea of associates enjoying the full privileges of membership of the Society. I expressed the opinion that Minor men ought to have the same privileges as Major men can claim, because they have the same interests at stake as those who pass the higher examination, but that by permitting them to take the title of Member of the Pharmaceutical Society, a great deal of the commercial value of the Major qualification would be done away with.

To educate the public to distinguish between a pharmaceutical chemist and the Minor man, who will be able to designate himself "member of the Pharmaceutical Society," would be perfectly hopeless, seeing that a large portion of the public are only just beginning to recognize the difference between a pharmaceutical chemist and a chemist by examination, dispensing chemist, etc.

A new title for major men, other than Pharmaceutical Chemist, would alone obviate this difficulty.

The thorough approval of the Bill, which the meeting gave, is a good sign of the popularity of our President's policy amongst the younger members of the trade. They would not support it did they not think that any required extra expenditure of time, money, and labour would be rewarded by the brighter prospects which in return it will provide for them. H. W. K. PEARS.

THE ANNUAL DINNER.

Sir,—Now that the Annual Dinner is once more about to be arranged I should like to make a few suggestions through the medium of your paper.

First, as regards the price of the tickets. I think, and many others think, that a guinea is a very exorbitant price to pay for a single dinner.

We chemists are not a set of rich men who can afford to throw money about us, and naturally it is only the aristocracy of our profession who can treat themselves to the luxury of the dinner; the poorer members, who form the great majority, perforce must stay at home because the prohibitive price very broadly intimates that they will not be welcomed by the select few, who possess the spare guinea necessary to gain a seat at the dinner.

And even for those who can afford it, it is a wicked waste to spend on a single meal a sum of money which would keep a poor starving family in comfort for a week.

My third reason against the price lies in the words "including wine."

I am happy to know that our fraternity, like all others, contains a goodly number of teetotalers, and it is not fair to charge them for wine they are not drinking, thereby compelling them to help to pay for the wine that others are consuming. Of course it is the wine which is the expense at these dinners; it would take a big glutton to eat a guinea's worth, but anybody could soon polish off that amount in champagne.

On these arguments I suggest then: charge 7*s*. 6*d*. or 10*s*. for the dinner and let wine be extra. That would be fair for everybody, but at present it is very unfair on the abstainer.

Another point I want to urge is that on this occasion of our jubilee we ought to invite a cabinet minister as a guest. Hitherto we have been satisfied with the presidents of a few learned societies, very good men, but still not sufficiently well known.

At the cutlers' feast at Sheffield they always have a lot of the nobility; at the Chemical Society's dinner they got the Marquis of Salisbury. We ought to get an earl at the very least in May.

In conclusion I say let us advertise our Society more than we do; let us invite the press to come and report to the world what we are doing.

Modesty is a virtue but it may be carried too far.

Our doings, such as the opening of the school in October, the Conversazione and Dinner in May, the Evening Meetings every month are never recorded in the daily papers as they ought to be.

The B.P.C. last year got half a dozen lines, but that only on the first day, and look at the columns that appeared every day about the Transactions of the British Association.

It is not sufficient that our Scientific Journals should report.

The general public may well look down upon us as nothing but tradesmen when they know so little about our Society and its doings.

The very few people who know of our existence believe our Society is merely a sort of Trades-protection Association and Benevolent Fund.

When our new laboratory was opened, on which so much money was spent, we ought to have had a Prince of the Blood Royal to perform the ceremony.

Our Society should be "The *Royal* Pharmaceutical Society of Great Britain," with Her Majesty as Patron. The hospitals and medical schools can secure the Royal Family and why not we?

Let us advertise our Society more, and let the public see that we are working for their good, that we are more than mere shopkeepers and deserve more recognition than we get.

Sunninghill. T. ERNEST TAYLOR.

DEFECTIVE LIME WATER.' A WORD OF WARNING.

Sir,—Notwithstanding the strict commandments given in the 'Chemists' Bible' (the Pharmacopœia), it is a practice by no means uncommon amongst those who should be guided by the precepts contained in that volume, to manufacture their lime-water by a process which finds no countenance there. It may be called "the continuous process," or, with even greater appropriateness, "the treacherous process;" and, as most readers know, it consists in the use of the same lime over and over again for a dozen times or more. At first sight it seems a very feasible method, and one can scarcely wonder that some chemists are led astray by it. What could be simpler or more natural (apparently) than to shake up a few ounces of washed calcis hydras with a gallon of water, to syphon or filter off the clear lime-water, to pour on a fresh lot of water, and, after a due amount of shaking or stirring, to secure a second gallon of solution, and as many more subsequent gallons besides as would drown the operator? "For, is it not a fact," he argues, "that water will only take up a certain small proportion of lime, leaving the remainder unchanged and therefore available for future use almost as long as I like?" Now, that is all very well in theory, and would also be all right in practice if suitable precautions were taken and really pure distilled water used. But that is exactly where the difficulty arises and where theory and practice are found to be at variance. The disturbing element is carbonic acid, of which water contains a considerable proportion. It enters most readily into combination with wet calcium hydrate, speedily converting it into insoluble calcium carbonate; so that, after repeated treatment with such carbonated water, the hydrate soon becomes almost entirely converted and quite useless. This is especially so with natural water, but it is also the case with much, if not most, of the distilled water supplied to chemists. I do not think I should be far wrong in saying that by far the larger proportion of the distilled water sent out by the wholesale houses is prepared by the continuous distillation method, and so contains a fair share of the carbonic acid present in the original water. If strictly pharmacopœial distilled-water were used, the quantity of carbonic acid present would be comparatively small, and would therefore not involve much loss of hydrate, so those who use that kind need not feel "hereby warned and exhorted." Freshly collected rain water, too, would be all right. I tested some of that recently, and found it so free from carbonic acid that it could be mixed with solution of subacetate of lead without causing even the slightest opalescence.

I am inclined to think that the lime used in the making of liquor calcis by the continuous process, becomes insoluble long before it has all been changed to carbonate. Indeed, Maben states (*Pharm. Journ.*, December 29, 1883) that he has examined samples of badly carbonated calcis hydras, but still containing as much as 15 per cent. of real hydrate, which yielded nothing, or practically nothing, to water. I have heard it said that that is owing to the particles of hydrate having become encased in a coating of carbonate—after the manner of some of the "high-class" pearl-coated pills of the present day!

In proof of some of the statements made in this paper, I recently mixed an ounce of real calcium hydrate with a gallon of tap-water in a well-corked bottle, shook them up occasionally for a day or two, and then filtered, obtaining a gallon of full strength lime water. The same portion of lime was treated in the same way with a second gallon of water, and then with a few more—I think about five or six in all. The last gallon of "lime-water" obtained was found on analysis to contain only 2 grains per pint, instead of the 10 grains required by the Pharmacopœia? How pretty that would have looked in a newspaper account of a prosecution! and how likely to promote one's reputation as a vendor of good drugs!! Another interesting fact observed was this. On pouring hydrochloric acid on to the contents of the filter paper, after the liquid had drained away from it, quite a brisk effervescence ensued, whereas the original hydrate did not effervesce at all with an acid. The carbonic acid gas evolved could only have had one main source, viz., the water, as the lime was not exposed to atmospheric influences for more than a few minutes.

By the way, I suppose that is a part of the principle on which "anti-calcaire" works. I analysed some of that a few years ago and, if I remember rightly, it was found to consist mainly of calcium hydrate and dried sodium carbonate. Assuming that to be correct, the former would rob the water of the carbonic acid, which retains in solution the "temporary hardness," and down would go a precipitate of chalk, whilst the soda salt would complete the softening process as regards the "permanent hardness."

Before concluding I should like to describe another method of preparing lime water, which has suggested itself to me as likely to prove reliable. It is an adaptation of the plan figured on Tidman's Sea Salt labels. I would propose to rub the lime with a little water in a mortar and then transfer the "milk of lime" to a piece of clean calico held in position over a wide-mouthed jar to which a bung could be fitted (an empty 7 lb. carbonate of ammonia jar would do very well for small quantities); to wash the lime free from chlorides, caustic soda, etc., with a pint or more of distilled water slowly allowed to percolate through; to reject the washings, and fill up the jar with distilled water (that made by continuous distillation would be quite good enough), and to tie the washed lime into the calico, letting it dip just underneath the surface of the water and retaining it in position by means of a string held up by the bung. The solution of calcium hydrate, being the heavier, would fall to the bottom, leaving the remainder of the water to be gradually and automatically saturated. No shaking or stirring would be needed, and that is where I think an advantage would be gained. I dare say insufficient agitation is the cause of a good deal of the attenuated lime water we hear of from time to time. If it were thought desirable to exclude carbonic acid gas, a piece of oiled silk or gutta-percha tissue might be tied tightly over the bung and jar neck. [The stock bottle of slaked lime should always be kept tied over in the same way.] I have not yet put the process to the test, but if when it has been tried, it should turn out to be a success, the result will be communicated by and by.

Those who wish to study other aspects of the subject will find several interesting papers in back numbers of the Journal, by Abraham, November 5, 1882; by Maben, September 1 and December 29, 1883; and by Fraser, March 26, 1887.

The essence of the present letter is this: Never make lime water from spent lime unless you are certain the water employed before was free from carbonic acid.

Brixton, S.W. WILLIAM JOHNSTON.

AN INCOMPATIBLE PRESCRIPTION.

Sir,—I had the following to prepare:—

℞ Tinct. jaborandi . . . . ℥iv.
Lanolin. . . . . ℥iij.
Glycerin. . . . . ℥ij.

Mix together with the aid of a little soft soap.

Using 1 drachm of soft soap B.P., mixing the tincture, glycerine and soap together, and adding the mixture gradually to the lanoline, the result was a mass of curdy appearance surrounded by fluid. Trying again with 2 drachms of soft soap the result was practically the same. I explained that it was quite incompatible, and my client accepted the product in a wide-mouthed phial. It is for the hair, recommended (I believe) in the *Lancet*. A month later this client returned, and in a laughing manner asked for another supply; but, said he, "substitute vaseline for glycerine; the writer of the prescription says the chemist ought to have known that vaseline was intended; then it will mix well."

Prepared by rubbing the tincture and soap (2 drachms), pouring this into a measure, mixing the vaseline and lanoline and gradually adding the tincture and soap solution, the result was again disappointing. Will any correspondent suggest a method of making a homogeneous preparation and say what the appearance should be.

Of course, "a little soft soap" is very ambiguous. I have not tried a larger proportion of soap, thinking the prescriber would not intend the product to be chiefly soap. I may say that my soap is unusually moist.

Northampton. J. CLOWES.

Crimson Marking Ink.—H. W. Harris asks for a recipe for a permanent crimson marking ink. He has tried one containing carmine of nitrate of silver, but finds the product soon turns black.

Inquirer.—The phosphorescence results from the roasting of the sulphides in the presence of certain other substances. See a note on the subject in the "Month" in the *Pharmaceutical Journal* for April 2, 1887, p. 806.

T. Rose.—Elixir Aurantii, U.S.P.—Oil of orange, 1 part; cotton, 2 parts; sugar, in coarse powder, 100 parts; alcohol and water, of each q. s. for 300 parts. Distribute the oil of orange through the cotton, pack the cotton in a conical percolator and gradually pour on a mixture of alcohol (sp. gr. 0·820), in the proportion of 1 to 3, until 200 parts of filtered liquor are obtained. In this liquid dissolve the sugar by agitation, without heat and strain.

R. Bennett.—The introduction of the pulvis sodæ tartaratæ effervescens into the B.P. may be regarded as establishing a standard for seidlitz powders. In case of any deviations from that standard the fact should be distinctly stated upon the label. As far as such a practice became universal it would tend to the attainment of the object referred to in your letter.

Errata.—On p. 351, col. i., in the formula *for* a preserving liquid, *for* "Boric acid, 6 parts" *read* "Boric acid, 1 part;" in col. ii., line 23 from top *read* "with from ·1 to ·25 or ·3 grams," etc.

NOTICE OF MEETINGS.

Photographic Society, March 24, "Hand Cameras."
Chemical Society, March 25, Anniversary Meeting.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Moore, Atkins, Blunt, Kubler, Mander, Evans, Martinson.

"THE MONTH."

Japanese Cantharides.

At the last meeting of the Berlin Pharmaceutical Society Dr. Bosetti read a note upon a new kind of cantharides received from Japan (*Pharm. Zeit.*, March 11, p. 163). The beetles are described as being smaller than the official kind and having a weaker odour. The wing-cases are black, with delicate brown longitudinal stripings, and the head is reddish and relatively large. They have been referred by Dr. Meyer, of Dresden, to the species *Epicanta Gorrhami.* Nothing is said as to the amount of cantharidin they contain.

Iron Quinine Chloride.

Attention is called by Dr. J. Kersch to "iron quinine chloride" as a preparation deserving of more attention than it has hitherto received (*Pharm. Post*, March 1, p. 172). The preparation is described as being made by adding an equivalent weight of pure quinine to a solution containing an equivalent weight of ferric chloride, in which it should dissolve perfectly without any reduction taking place, forming a dark red solution. This thickens upon standing for a time in a warm place to a paste, which when dried at a moderate temperature, sheltered from light, forms a hard dark brown mass, presenting a resinous fracture. This iron quinine chloride is amorphous and can be easily powdered, but as it readily absorbs moisture it should be kept in well closed vessels. It dissolves freely in water and alcohol, somewhat less freely in ether, and has a bitter astringent taste. Dr. Kersch states that, applied externally, the compound has hæmostatic properties similar to ferric chloride, but that, even in concentrated solution and applied to fresh wounds, it is without causticity and perfectly painless in its action. Administered internally, Dr. Kersch says he has found a 10 per cent. solution very useful in cases of profuse hæmorrhage *post abortum*, in doses of ten drops, every one or two hours, given in water or on sugar enclosed in a wafer; also in profuse menstruation, in ten drop doses five or six times a day, and in pulmonary hæmorrhage.

Iodpyrin or Iod-antipyrin.

The therapeutic action of an iodine derivative of antipyrin has been reported upon by Dr. E. Münzer, under the name "iodpyrin" or "iodantipyrin" (*Pharm. Centralh.*, Feb. 26, p. 123). A compound of iodine and antipyrin was prepared in 1885 by Dittmar, by the action of iodine chloride upon antipyrin, but the compound used in these experiments is stated to have been prepared by Herr Ostermeyer in a different way. The product is said to be a compound in which one atom of the hydrogen in antipyrin is replaced by iodine, and according to the formula given it is assumed that the substitution takes place in the phenyl group. The compound is described as crystallizing in colourless, shining, prismatic needles, melting at 160° C., perfectly tasteless and without special odour. It is difficultly soluble in cold water and alcohol, but freely soluble in both liquids when hot. According to Dr. Münzer iodpyrin in doses of 0·5 gram to 1·5 gram causes a fall of temperature, accompanied by sweating; in these doses it produces no collapse, and the return rise of temperature is unaccompanied by shivering. In its antipyretic property iodpyrin would therefore appear to correspond to pure antipyrin. After the administration of iodpyrin the urine gives with nitric acid and chloroform a strong iodine reaction, and with nitrous acid a faint antipyrin reaction. In an aqueous solution of iodpyrin these reactions are not perceptible at first, but they occur if the mixture is heated or allowed to stand; the same decomposition is caused also by hydrochloric acid. Further experiments are required to determine whether the administration of this compound presents any advantages over that of antipyrin and an alkaline iodide given separately.

Iodantifebrin.

Dr. Münzer has also experimented with an iodine derivative of antifebrin or acetanilide, a compound first obtained, according to Beilstein, by Michael and Norton, in treating an acetic acid solution of acetanilide with iodine chloride, and called "acet-*p*-iodanilide." The preparation used was, however, so it is stated, prepared by Herr Ostermeyer from para-iodaniline, and is described as crystallizing from water in colourless and tasteless rhombic tables, melting at 181·5, slightly soluble in cold water, alcohol and ether, more freely soluble in hot alcohol and glacial acetic acid. The antipyretic action of iodantifebrin proved to be absolutely nil; the compound does not appear to be absorbed, but is eliminated for the most part through the intestines unaltered.

Catharidinate of Potash.

In view of the conflicting statements that have been made as to the preparation and dose of the liquid used by Dr. Liebreich in the treatment of tuberculosis under the name "cantharidinate of potash," it may be convenient to put on record what is understood to be the exact formula, which has been kindly communicated by Dr. C. Schacht, of Berlin. In preparing the liquid 0·2 gram of cantharidin and 0·4 gram of potassium hydrate (or 0·3 gram of sodium hydrate) are weighed with great exactness, and heated in a flask of one litre capacity on a water-bath with about 20 c.c. of water, until a clear solution results. Water is then added quite gradually, while the heat is continued, until the mark is nearly reached, and then after cooling the whole is made up exactly to one litre with water. A litre of the liquid therefore contains 2 decigrams of cantharidin, and each cubic centimetre contains one tenth of a milligram. In reply to a question put to Dr. Liebreich at the last meeting of the Berlin Pharmaceutical Society he is reported to have said that he has confirmed the observation that the sodium compound with cantharidin is milder in its action than the potassium compound.

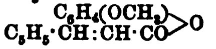
Gold and Manganese in Tuberculosis.

At the February meeting of the New York Academy of Medicine a paper was read by Dr. John Blake White on the value of a preparation of the subcutaneous administration of gold and manganese in the treatment of tuberculosis (*Bost. Med. Surg. Journ.*, March 12, p. 266). Dr. White stated that the remedy had yielded good results in the treatment of phthisis, glandular enlargements and sinuous abscesses due to scrofula, chronic skin affections, persistent anæmia, chronic Bright's disease, and the cachexias due to syphilis and scrofula. The liquid used for injection is described as being prepared by boiling five or ten minims of a 1 per cent. solution of carbolic acid, and adding, after it has thoroughly cooled, one or two drops of a solution of gold and manganese. Unfortunately, Dr.

White gives no clue in the paper to the preparation of this solution, beyond saying that "in combining the chloride of gold with the iodide of manganese, unless some special skill is exercised, a precipitate results, which is liable to make the liquid useless;" and that "when correctly compounded it should have no precipitate and present a rich garnet colour." As to the proportions, there is no indication beyond a casual reference by one of the speakers in the discussion to an injection of one drop of a 2 per cent. solution of chloride of gold and iodide of manganese.

Styracol.

"Styracol" is the name of still another competitor with "tuberculin" in the treatment of tuberculosis (*Pharm. Centralh.*, March 19, p. 170). It is described as the cinnamic acid ester of guaiacol, or cinnamyl-guaiacol, and represented by the formula



$$\left.\begin{array}{r}C_6H_4(OCH_3)\\ C_5H_5\cdot CH:CH\cdot CO\end{array}\right>O$$

Its preparation is the subject of a German patent, but is said to consist in bringing together equal molecules of guaiacol and cinnamyl chloride, and at the end of two hours heating the mixture for a short time on a water-bath. The mass is then treated with boiling alcohol, which is filtered and deposits on cooling the styracol in long crystalline needles. These after purification by recrystallization from alcohol melt at 130° C. Styracol is claimed to act as a strong antiseptic, controlling fermentation and putrescence, promoting the healing of wounds and ulcers, and to be useful when administered internally in cases of chronic catarrh of the bladder, gonorrhœa, and catarrhal affections of the stomach and intestines.

Hypnal.

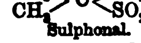
Attention is called by M. Demande to the ease with which pharmacists can prepare their own supplies of monochloralantipyrin, or "hypnal," (*Répertoire*, March 10, p. 107). If a solution of 47 grams of chloral hydrate in 50 c.c. of distilled water be mixed with a solution of 53 grams of antipyrin in 50 c.c. of water, and poured into a separating funnel, an oily looking liquid is formed in the lower part, which, after standing an hour, is drawn off from the aqueous supernatant liquid. At the end of twenty-four hours the oily liquid will be converted almost entirely into a mass of transparent rhombic crystals, and some small crystals will have formed in the aqueous liquid. These should be drained and dried between folds of filter paper or under a glass with sulphuric acid.

Impure Phenacetin.

The occurrence in phenacetin of unconverted *p*-phenetidin and its detection form the subject of a paper by Herr Reuter (*Pharm. Zeit.*, March 21, p. 185). He states that if 2·5 gram of chloral hydrate be melted in a small test tube at a water-bath temperature and 0·5 gram of phenacetin be added, solution takes place upon shaking, and if the phenacetin be absolutely pure the solution remains for a time colourless. If, however, it should contain traces of *p*-phenetidin, and it be exposed to the temperature of a water-bath for not more than two or three minutes, it becomes coloured, according to the quantity of the contamination present, more or less intensely violet, from a red violet to a blue violet. Pure phenacetin will remain at this temperature colourless for five minutes, but after that time will assume a rose colour, which Herr Reuter looks upon as a characteristic reaction for the identification of phenacetin. Herr Reuter adds that some preliminary experiments on animals have shown *p*-phenetidin to be poisonous in very small doses if continued over a long time, causing nephritis with albuminuria.

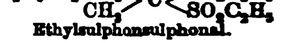
Substituted Sulphonals.

In a paper upon substituted sulphonals, communicated to the German Chemical Society (*Berichte*, xxiv., 166), Herr Authenrieth refers to the ethylsulphonsulphonal, phenylsulphonsulphonal and chlorsulphonal, as having been tested physiologically on animals and found to be inert, apparently not producing the slightest hypnotic effect. The first of these compounds is a sulphonal in which an atom of hydrogen in one of the methyl groups is replaced by the ethylsulphone group, $C_2H_5SO_2$. This substitution is represented in the formulæ:—



$$\left.\begin{array}{r}CH_3\\ CH_3\end{array}\right>C<\left\{\begin{array}{l}SO_2C_2H_5\\ SO_2C_2H_5\end{array}\right.$$

Sulphonal.



$$\left.\begin{array}{r}C_2H_5SO_2\cdot CH_2\\ CH_3\end{array}\right>C<\left\{\begin{array}{l}SO_2C_2H_5\\ SO_2C_2H_5\end{array}\right.$$

Ethylsulphonsulphonal.

Similarly in phenylsulphonsulphonal the hydrogen is replaced by the group $C_6H_5SO_2$, while the chlorsulphonal the author represents by the formula $CH_2Cl\cdot C(SO_2C_2H_5)_2\cdot CH_3$. Sulphonal itself is very stable towards reagents, but these substituted compounds were found to be readily and completely saponified by potash solution.

Apomorphine and Apocodeine as Expectorants.

It is generally understood that apomorphine in small doses administered by the mouth does not produce emesis. But according to a paper on the treatment of chronic bronchitis communicated by Dr. Murrell to the *British Medical Journal* (Feb. 28, p. 452) the quantity tolerated by the stomach is much larger than has hitherto been supposed, for he therein states that he has now under treatment several patients who take 1½ or 2 grams of apomorphine hydrochloride three times a day. Although, however, these large doses, when given by the mouth, fail to produce nausea or emesis, Dr. Murrell states that they exert a powerful expectorant action in cases of chronic bronchitis. As a proof that the preparation used was an active one, it is mentioned that a patient who was made violently sick by one-sixth of a grain given hypodermically, could take by mouth four-fifths of a grain three times a day without the slightest inconvenience. In fact, Dr. Murrell is of opinion that the compound is not one that deteriorates by keeping, since on one occasion he administered a hypodermic injection of 4½ minims of a 1 in 50 solution of the hydrochloride that had been exposed to light for three months and become dark green in colour, which in less than two minutes acted upon the patient powerfully and completely evacuated the stomach. Six months later a dose of the same solution acted equally promptly upon another patient. In the majority of cases, in the treatment of chronic bronchitis and winter cough, the apomorphine has been ordered in the form of a solution, but in one or two cases it has been ordered in pills. Dr. Murrell has also found apocodeine hydrochloride to act as a powerful expectorant when given in the form of a pill, and states that 3 to 4 grains may be administered daily with perfect safety.

The isolation from valerian of two principles presenting alkaloidal reactions and forming crystalline salts is recorded by M. Waliszewski (*L'Un. Pharm.*, March, p. 109). They are stated to be

Alkaloids from Valerian Root.

btained by boiling the roots in distilled water, fter they have been submitted to a distillatory operation to remove valerianic acid and other odorous volatile principles, decolorizing the decoction with lead acetate, removing the lead and vaporating the liquid to the consistence of a oft extract. This is treated with 90° alcohol, he tincture filtered and the alcohol distilled off, he residue taken up with distilled water, and his liquid filtered and evaporated. The new extract is treated with an alkali and ether, and the ether, after being washed with water and evaporated, leaves as a residue the most abundant of the two alkaloids, which it is proposed to call "chatinine," after the late director of the Paris École de Pharmacie. It is said to be readily convertible into the crystalline hydrochloride, in which combination, taking advantage of its solubility in strong alcohol, it can be freed from a contamination of ammonia that persistently accompanies it. The second alkaloid, which has been named "valerine," is insoluble in ether and remains in the mother liquor.

Timbo.

Under the name "timbo" several plants are used in Brazil by the natives for stupefying fish. One of these has been submitted to chemical examination by Herr Pfaff, but unfortunately its botanical origin is not precisely known (*Archiv*, Jan. 26, p. 31). Among the plants reported to be so employed are *Serjania cuspidata*, *S. lethalis* and *Paullinia pinnata*, belonging to the Sapindaceæ, *Tephrosia toxicaria* belonging to the Leguminosæ, and the Solanaceous *Physalis heterophylla*. The plant used by the author is described as a liane growing on marshy grounds, and was gathered by himself at Moura, a small settlement on the bank of the Rio Negro, not far from the mouth of the Rio Branco, where it is used exclusively as a fish poison; it occurs also on the Amazon and the Solimöes, where it is employed in addition as a medicine. Only the root, stem and leaves were obtained, but these have been identified as coming from a leguminous plant. The root system is strongly developed, and the secondary roots, not thicker than a finger, are described as permeating an area five feet wide or more, at a depth of eight to twelve inches. The plant usually branches close above the ground and the long twining branches, as well as the roots, the bark of which is grey-brown and very thin, are very juicy in the fresh condition. When dried the roots and branches are extremely light, porous, and show distinctly the broad medullary rays. Herr Pfaff found that the toxicity of this variety of "timbo" is due principally to the action of a chemically indifferent non-nitrogenous body, allied to the toxines, which he has named "timboin," and represents by the formula $C_{27}H_{26}O_8$. Another toxic body present is an oil of camphor-like composition that he has named "timbol."

Test for Mace.

Herr Hefelmann calls attention to the frequent occurrence in the German market in recent years of powdered mace containing, besides leguminous flour, turmeric and "Bengal mace," which, according to Tschirch ('Year-Book,' 1882, p. 205) is derived from another species of *Myristica* (*Pharm. Zeit.*, Feb. 21, p. 122). He states that the adulteration may be detected by treating an alcoholic extract of the powder with lead acetate, which gives with genuine mace a milky white turbidity, but with "Bombay mace" a beautiful red flocculent precipitate, perceptible in suspension even when the proportion of the sophistication is relatively small. Turmeric also gives with lead acetate a similar red colour, but the two may be distinguished by saturating a strip of filter-paper with the alcoholic solution, gently drying, and then placing it in a cold aqueous solution of boric acid. The false mace will leave it colourless, but in the presence of turmeric it will become orange-coloured to red brown. Or if a drop of potash solution be placed on it a blue ring will be formed in contact with turmeric and a red one with "Bombay mace."

Cadaverine.

Cadaverine ($C_5H_{14}N_2$), the base first isolated from human corpses by Brieger, is an isomer of saprine and neuridine, and has been shown by Ladenburg to be identical with pentamethylenediamine $NH_2(CH_2)_5NH_2$. It is a syrupy strongly alkaline liquid, smelling something like coniine or spermine, and its compound with hydrochloric acid splits up upon distillation into piperidine and ammonia. It has been detected in the urine of patients suffering from cystinuria and occurs among the products of cultivations of the cholera bacillus. As the result of a recent study of cadaverine Professor Kobert (*Pharm. Centralh.*, March 19, p. 162), has come to the conclusion that the danger of this compound to human patients may be considerably lessened by its conversion into a neutral salt. He therefore favours the treatment of cholera by the administration of acid drinks and washing of the intestines with acid liquids, especially as it has been shown that the cholera bacillus itself is affected by traces of acid.

Constitution of Cymene.

The establishment of the correct constitutional formula for the aromatic hydrocarbon cymene has been long recognized among chemists as an important task, owing to the frequency of its occurrence in essential oils and more especially with regard to its intimate relation to the camphors, terpenes, carvol, carvacrol, thymol, and other bodies of allied constitution, of which it may be said to form the molecular nucleus. Cymene was first prepared from camphor in 1839, by Dumas and Peligot, by distillation with phosphoric anhydride, and was discovered two year later by Gerhardt and Cavour in the essential oil of *Cuminum Cyminum*. Subsequently, hydrocarbons of the same percentage composition and similar in properties were obtained from various natural sources and by several synthetical methods. It was thought that these might be differently constituted, but the investigations of Beilstein, Fittig, Paterno, Pisati, Wright and others led to the conclusion that all the cymenes of various origin were identical with the *p*-methylpropyl benzene or *p*-propyltoluene, synthesized by Fittig from *p*-bromtoluene and normal propyl-bromide. The confirmatory work of O. Jacobsen, who again identified the propyltoluene obtained by Fittig's method with the natural product, was regarded almost as a superfluous proof of the existence of a normal propyl group, $CH_3{\cdot}CH_2{\cdot}CH_2$, in cymene, and the absence of an isopropyl group, $\begin{matrix}CH_3\\CH_3\end{matrix}\!>\!CH$, whilst his further statement, that the synthetical isopropyltoluene and its derivatives are quite distinct in character from cymene and its derivatives was subsequently endorsed by R. Meyer and others. But the difficulty presented itself that while the synthesis of cymene from cumic alcohol and the conversion of cymene into cumic acid in the animal organism showed the existence of a genetic connection between the cymene and cumene series, nevertheless the evidence of an isopropyl group in the latter bodies was incontestable, since cumic acid yields isopropylbenzene by distillation with lime, and an oxyisopropylbenzoic acid by oxidation with alkaline permanganate. These conflicting statements could only be met by assuming that the propyl and isopropyl groups are spontaneously transmutable, and for some years an hypothesis has been accepted that the normal grouping is the more stable when a methyl group occupies the para position, but that an isopropyl derivative obtains when a carboxyl group is in the para position. Herr O. Widman, however, discovered a flaw in this last refuge, which he himself had helped to establish, and consequently felt impelled once more to compare the natural cymene with synthetical p-methylpropylbenzene, and to his surprise found that the sulphonic acid upon the identity of which so much stress has been laid by previous investigators was not a simple body, but a mixture of two isomerides. In fact, he further conclusively proves (*Berichte*, xxiv., 439) that cymene is not identical with *p*-methylpropylbenzene, but with *p*-methylisopropylbenzene, notwithstanding Jacobsen's and Meyer's statements to the contrary. The mystery that has hitherto enveloped the cymene series is thus removed and the question of changes within the propyl group is definitively negatived. In future, also, thymol and carvacrol, as well as the natural terpenes and camphors, must be regarded as isopropyl derivatives.

Gulose and Xylose.

The presence of "camphoglycuronic acid" in the urine of dogs fed with camphor was pointed out some years ago by Schmiedeberg and Meyer, and later glycuronic acid was also recognized as a decomposition product of urochloralic acid, formed from chloral in the animal organism, and of the excrementitious euxanthinic acid. Schmiedeberg and Meyer assumed that glycuronic acid must be an oxidation product of glucose which, owing to its ability to form compounds with camphor and other bodies, is removed from the animal organism without undergoing further oxidation. This view was substantiated by subsequent observation that glycuronic acid is readily oxidizable to saccharic acid, and it would therefore appear that its molecule may be represented by the formula of glucose, in which the aldehyde group has been oxidized to a carboxyl group, and the terminal alcoholic group to an aldehyde group. Thierfelder (*Zeitsch. f. phys. Chem.*, xv., 71) recently obtained, by the reduction of glycuronic acid, a new monobasic acid that is not identical with either the gluconic or mannonic acids, as might have been expected, and to this he gave the name of gulonic acid. The scarcity of material prevented, however, further investigation, but E. Fischer and O. Piloty have now synthesized d-glycuronic acid from d-saccharic acid by simple reduction of the lactone of the latter acid with sodium amalgam (*Ber.* xxiv., 521). The synthetic acid proves to be identical with the natural glycuronic acid, and like it reduces Fehling's solution; by its further reduction the non-reducing d-gulonic acid of Thierfelder is obtained. The reduction of the new monobasic acid yields a new sugar, d-gulose, which possesses the same constitutional formula as glucose, but in which the aldehyde group is supposed to be at the opposite end of the carbon chain. The relations between the old and new compounds may be easily understood from the following formulæ :—

Glucose	$CH_2OH{\cdot}(CHOH)_4{\cdot}CHO.$
Gluconic acid . .	$CH_2OH{\cdot}(CHOH)_4{\cdot}COOH.$
Saccharic acid . .	$COOH{\cdot}(CHOH)_4{\cdot}COOH.$
Glycuronic acid .	$COOH{\cdot}(CHOH)_4{\cdot}CHO.$
Gulonic acid . .	$COOH{\cdot}(CHOH)_4{\cdot}CH_2OH.$
Gulose	$CHO{\cdot}(CHOH)_4{\cdot}CH_2OH.$

The corresponding l-gulonic acid and l-gulose might no doubt be obtained in an analogous manner from l-saccharic acid, but E. Fischer and R. Stahel have found the l-gulonic acid already to hand in the xylose-carboxylic acid, the acid resulting from the addition of prussic acid to xylose and saponification of the resulting cyanhydrine. Xylose, obtained by Tollens as a product of hydrolyais of a carbohydrate existing in beech-wood, is a sugar of the formula $CHO{\cdot}(CHOH)_3{\cdot}CH_2OH$ and was thought to be the optical isomeride of arabinose from cherry-gum. The above results show however that it stands in the same relation to arabinose as gulose to glucose or mannose, since arabinose-carboxylic acid has already been shown to be identical with l-mannonic acid. This is borne out by the fact that by the reduction of xylose, a pentahydric alcohol, xylitol, is formed, which is not identical with arabitol. Gulose yields by reduction a hexa hydric alcohol closely resembling sorbitol (sorbite), which is supposed to be the corresponding alcohol to glucose.

Mercuric Chloride.

Attention is called by Herr Bornträger to an interesting property of mercuric chloride of apparently retarding chemical action in some cases (*Apot.-Zeit.*, March 11, p. 145). He states that iron filings to which a trace of mercuric chloride has been added dissolve in strong hydrochloric acid to form a colourless solution under a very slow evolution of hydrogen. A similar behaviour is observed when nitric acid is used, a colourless solution resulting with the evolution of scarcely any nitrous or hyponitrous fumes. Whilst the solutions free from mercuric chloride give with potassium ferro- or ferricyanide a blue precipitate, when it is present they give with ferric salts a dark green precipitate like that given by mercuric chloride. Ammonia throws down from the former a red brown and from the latter a black brown precipitate. Herr Bornträger remarks that it would almost appear that mercuric chloride "acts also as an antiseptic towards chemicals," but to this the editor of the *Apotheker Zeitung*, taking the remark probably more seriously than it is meant, objects and sees more possibility in it being the result of electrical action. He suggests that the solution of iron containing mercuric chloride in nitric acid without evolution of gas might be explicable upon the assumption that there is a continuous reduction and regeneration of the mercuric chloride with the formation of ammonia salts. The editor of the *Pharmaceutische Centralhalle* thinks that in both cases reduction may take place, resulting in the deposit upon the surface of the iron of a film of quicksilver that protects it from the action of the acid.

In the same communication Herr Bornträger discusses the best methods of detecting traces of

Test for Mercuric Chloride.

mercuric chloride. He points out that any aqueous, oily, or soapy liquid containing mercuric chloride gives immediately, with zinc chloride and hyrochloric acid, a black gray colour, while with sulhuretted hydrogen or ammonium sulphide it immediately becomes blackened. When shaken with a mixture of potassium iodide, acetic acid, and ether, nd allowed to stand, three layers are formed, the middle one constituting a green zone of the merurous salt. The separation is said to be so sharp hat when carried out in a narrow test-tube it gives pproximately quantitative results.

Allotropic Forms of Silver.

Three allotropic forms of silver, which had been btained by the reduction of silver salts with various substances, were described by Mr. Carey Lea in 1889 (*Amer. Journ. of Science*, [3], xxxvii., 476 and xxxviii., 47). All three modifications possessed he property of forming perfect metallic films upon glass or paper, when smeared over in a moist condiion and allowed to dry, and these films assumed brilliant colours with different reagents. In a furher publication (*Phil. Mag.*, March, p. 231), Mr. Lea tates that allotropic silver presents itself in an almost endless variety of forms and colours—gold coloured, copper coloured, blue, bluish green, red and purple—and that most of these varieties seem to be capable of existing in two conditions, of which one s more active than the other. The metal precipitated from a solution of silver nitrate and Rochelle salt by the addition of ferrous sulphate assumes, when dried, either a bright yellow colour, a reddish colour or a deep rich copper shade, according to the amount of washing which the freshly prepared material has received. The most characteristic reactions of allotropic silver, which differentiate ts various forms from ordinary silver, are those with the strong acids. By the action of hydrochloric acid chloride is always formed, though only n small quantity by the concentrated acid, since t converts allotropic into ordinary silver almost nstantly, but if the acid be largely diluted the conversion is retarded and the proportion of chloride greatly increased. Thus, for example, when allotropic silver is treated with ordinary solution of hydrochloric acid, diluted with fifty times its volume of water, about one-third of it is converted nto chloride, and probably the whole would be but for the conversion to normal silver. Neutral chlorides also act strongly upon allotropic silver, even when much diluted, and sulphuric acid possesses he same property. Ammonia seems to be without converting action, but dissolves a trace, and indeed one form of allotropic silver is abundantly soluble n ammonia. In those reactions in which allotropic silver acts the part of a reducing agent, as with potassium ferricyanide and permanganate and with ferric chloride, its behaviour differs from ordinary white silver chiefly in showing greater activity, and these reagents give a series of most brilliantly-coloured films, especially potassium ferricyanide with light gold-coloured silver. As to the substance constituting the film which is formed, it is difficult o say whether it is silver suboxide or ferrocyanide, but moist allotropic silver suspended in a ferrocyanide solution is entirely converted into a yellowish-white powder, consisting almost wholly of silver ferrocyanide mixed with a little silver erricyanide. Allotropic silver is readily converted into normal silver by different forms of energy. High tension electricity, heat and acids convert it into dull grey silver, on which potassium ferricyanide has no action whatever; whilst light and pressure each convert allotropic to bright white silver, on which form the above reagent acts slightly. An intermediate form of bright yellow colour, which does not readily whiten and can be easily burnished, is also obtained by the action of heat upon dry gold-coloured allotropic silver. These seem to be not merely new facts, but to belong to a new class of facts. No instance has been hitherto known of an element existing in so great a variety of forms, and passing so readily under the influence of any form of energy from one to another of them. It is evident that a connection must almost certainly exist between these varied transformations and the changes which many silver salts undergo through the action of light and other forces, and this connection will form the subject of a further communication.

Randia Dumetorum.

Sir James Sawyer has been experimenting with a tincture of the fruit of *Randia Dumetorum* (*Lancet*, March 21, p. 656). Some years ago Dr. W. C. Ondaatje suggested in this Journal that it should be tried as a substitute for ipecacuanha (*Pharm. Journ.*, vol. xiii, p. 818), stating that the powdered seeds acted as an emetic in doses of 5 to 10 grains. According to 'Pharmacographia Indica' (p. 206) its properties are due to saponin, of which each fruit contains 4 grains, and to valeric acid. It is to these principles that Sir James Sawyer attributes its physiological action as a nervine calmative and antispasmodic. The tincture he uses is, however, made with sp. ætheris, B.P., so that this action may be partly due to the vehicle as well as to the valeric acid. He has experimented also with tinctures made with proof spirit, rectified spirit, and aromatic spirit of ammonia, but prefers the ethereal tincture, because when diluted with water and acidulated with acetic acid, the odour of valerian is more apparent than in the other tinctures. The tincture is described as having a characteristic strong odour and taste and being of a bright maize colour; the dose is from 15 to 60 minims diluted with water, but the strength is not stated.

Rhamnus Californica.

In an article by Katherine Brandyle (*Pharm. Record*, Feb. 19, p. 71), the authoress contends that *R. Californica* and *R. Purshiana* are only forms of one species, and adduces the plant known as *R. tomentella* as an argument in favour of the contention. This plant is said to run in the northern part of Lake and Colusa counties into broad-leaved forms which apparently bear the same relation to *R. Purshiana* that the southern *R. tomentella* does to *R. Californica*, and it is remarked that it can hardly be supposed that if the species are distinct each can have a variety *tomentella*, varying in the same manner as the species. So far as can be gathered from the statements made, it appears that the fruit varies in the number of lobes, just as *R. Frangula* and *R. catharticus* do in this country, but it seems that the shape and character of the endocarp have not received the attention they deserve, and an examination of them might throw some light upon the question at issue. Professor Rusby relies upon the channelled character of the midrib, but this the authoress says is variable.

To those who have not had the privilege of seeing a series of forms of these plants, the somewhat coriaceous hairless evergreen leaves, with lateral veins patent near the midrib, and the channelled character of the latter seem to distinguish the plant readily from *R. Purshiana*, with its deciduous, hairy, softer leaves and straight not curved lateral veins. But very small botanical differences often accompany considerable chemical variation in plant products and the question of the difference in therapeutic value of the bark of the two plants is certainly worthy of investigation.

Lesquereux on Mosses.

In the *Popular Science News* (p. 38) an introduction to the Study of Mosses, by Professor Leo Lesquereux, the well-known American bryologist, is published now for the first time. It is stated that this had been omitted from his famous Manual of the Mosses of North America on the score of expense, and after his death was found by his son, who permitted its publication. In four columns it gives as simple, concise and clear an explanation of the general structure and organs of mosses as could be found in any work on the subject.

New Granada Plants.

The Herbarium of the late well known botanist, M. Triana, has been acquired by the British Museum. It includes more than eight thousand plants, and should prove invaluable for reference concerning the medicinal and economic plants of that country. It will be remembered that M. Triana described in this Journal the plants yielding cuprea bark (*Pharm. Journ.*, [3], xii., p. 861) and also condurango (*Pharm. Journ.*, [3], ii., p. 861).

THE DETERMINATION OF CAFFEINE.

BY DR. B. H. PAUL.

Judging from the relative solubility of caffeine in various menstrua, it would appear probable that chloroform would be a more effective solvent than alcohol for extracting caffeine from tea in the manner recommended by myself and Cownley,* and in order to test its applicability for the purpose I suggested to Mr. E. S. Smith, a pupil in my laboratory, that he should make some experimental trials to ascertain whether this modification of the process would give better results or admit of the analytical operations being carried out more quickly.

The tea operated upon was a sample of Java tea which had been found by previous examination to contain 3·78 per cent. of caffeine. Five grams of this tea was mixed in a finely powdered state with 2 grams of caustic lime, the mixture wetted and dried in a water bath and then transferred to a small continuous percolator. Treatment with boiling chloroform† was continued for five hours, and on distilling off the chloroform a residue of caffeine was obtained, weighing 0·065 gram, equal to 1·3 per cent., or little more than one-third of the amount of caffeine actually present in the tea. This deficiency in the quantity of caffeine obtained was not due to any decomposition of the caffeine by the action of lime, for on further treatment of the mixture of tea and lime with boiling alcohol the remainder of the caffeine was then extracted.

Experiments were then made with magnesia in the place of lime. Operating upon the same tea the quantity of caffeine obtained from 5 grams of the tea was 0·103 gram, equal to 2·06 per cent., or little more than one-half the amount present in the tea. In this case also the remainder of the caffeine was readily extracted by treating the residual mass with boiling alcohol.

Another sample of tea that contained 2·78 per cent. of caffeine gave similar results, and the following table gives the results of comparative experiments with lime and magnesia and extracting with alcohol, conducted with the two different samples of tea being operated upon:—

	Caffeine. Gram.	P c.
No. 1.		
5 grams tea with 2 grams lime gave . .	0·189 =	3·78
5 grams tea with 2 grams magnesia gave	0·188 =	3·76
No. 2.		
5 grams tea with 2 grams lime gave . .	0·137 =	2·74
5 grams tea with 2 grams magnesia gave	0·139 =	2·78

It appears therefore that notwithstanding the greater solubility of caffeine in chloroform it is not possible to substitute this solvent for alcohol in determining the amount of caffeine in tea. Moreover the results above stated will in some degree account for the small amounts of caffeine reported by some analysts to have been found in tea when chloroform has been used for its extraction.*

It has been stated† that caffeine is decomposed by lime, and although in the foregoing experiments it was ascertained that the deficiency observed was not due to this cause a direct experiment was made with pure caffeine mixed with lime wetted and dried in a water bath. The mixture was then dissolved in hydrochloric acid and the caffeine extracted by shaking the solution with chloroform.

A quantity of caffeine equivalent to 0·192 gram of dry substance treated in this manner gave, on evaporating the chloroform solution, 0·189 gram of caffeine, clearly showing that there had not been any sensible decomposition of the caffeine.

It is evident from the results of the experiments above described that chloroform cannot be used for extracting tea in the determination of caffeine, but it is by no means clear why it fails to dissolve out the whole of the caffeine from mixtures of tea with lime or magnesia. It may, however, be mentioned that similar results were obtained when operating upon mixtures of pure caffeine with lime or magnesia. In one experiment a mixture of 0·25 gram of dry caffeine with 1 gram lime, wetted and then dried, was subjected to the action of boiling chloroform in a percolator. The chloroform solution gave on evaporation 0·182, showing a deficiency of 27·2 per cent. of the quantity taken, and that was afterwards extracted by treatment with boiling alcohol. In another experiment with 0·258 gram dry caffeine and 1 gram magnesia the caffeine obtained was 0·256 gram, or only 0·8 per cent. short of the amount taken. It appears therefore that lime has a peculiar capability of retaining some of the caffeine, when chloroform is used as the extracting menstruum, and the results obtained in these experiments also serve to account for the fact that in extracting with chloroform, more caffeine is obtained from a mixture of tea with magnesia than from a mixture of tea with lime.

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* *Pharmaceutical Journal*, 3rd series, vol. xviii., p. 417.

† In all instances the chloroform used was perfectly dried by contact with calcium chloride and then distilled.

* Allen, 'Commercial Organic Analysis,' vol. ii., p. 504.

† Normandy, 'Commercial Handbook of Chemical Analysis,' p. 376.

The Pharmaceutical Journal,

SATURDAY, MARCH 28, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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CHEMICAL CHANGES PRODUCED BY THE GROWTH OF BACILLI.

ONE of the most interesting and important subjects of investigation at the present time is that relating to the change which organic substances undergo while supplying the means of growth to bacterial organisms. This subject has already been studied by chemists and by bacteriologists, but seldom by investigators alike conversant with the higher branches of chemistry and with the niceties and significances of bacteriology. Some years ago Dr. BURDON-SANDERSON, in reporting upon the chemical agents capable of destroying the material of infection, drew attention to the remarkable circumstance that many of the chemical products of bacterial life are endowed in a very marked degree with the power of putting an end to the life of bacteria themselves. At a subsequent period Dr. WOOLDRIDGE, in carrying out experiments with a septicæmic bacillus upon solutions of vegetable albumen, obtained a toxic substance which he regarded as being of a proteid character. The same observer also, by growing anthrax bacilli upon certain prepared animal fluids, obtained a product which when injected into the circulation of animals susceptible to anthrax appeared to confer upon those animals immunity against the effect of anthrax simultaneously injected into them. The death of Dr. WOOLDRIDGE in 1889 put an end to this investigation for a time, but it has now been resumed by Dr. SYDNEY MARTIN for the Medical Department of the Local Government Board, and the recently issued Report of Dr. GEORGE BUCHANAN, the medical officer of that department, contains a preliminary account of the results he has obtained. His experiments consisted in growing anthrax bacilli under known conditions in a medium prepared from the simplest unorganized material he could devise in imitation of blood serum, its proteid and salts, and in observing the chemical changes of this medium that were produced by the bacilli at one or other stage of their growth. The plan adopted was to separate such products as presented themselves, and to investigate their chemical nature, while at the same time using them, after due separation of the bacilli themselves, for the inoculation of mice so as to ascertain their physiological action. Operating in this manner Dr. MARTIN has succeeded in tracing successive stages of the conversion of the proteid experimented with into other more or less chemically definable proteid substances; his observations thus far yielding results similar to those obtained by Dr. WOOLDRIDGE. He has also, by a more continued growth of anthrax bacilli upon the same medium, obtained as a product of its alteration an alkaloid which is described as being of definite chemical character and forming readily crystallizable salts with acids. The more precise chemical investigation of this alkaloid has yet to be carried out.

The other products of the alteration produced by anthrax bacilli are of the nature of new proteids, which are termed "anthrax albumoses," and the physiological action of these, as well as that of the alkaloid, has been tested on mice, with the result in all instances of producing disease in them. The effects of these products appeared to be identical with those resulting from the inoculation of the animals with anthrax bacilli, although on the examination of the animals after death no anthrax bacilli were to be found in their organs. For the production of these disease phenomena the anthrax albumoses had to be used in some considerable quantity. This was also requisite, though in a less degree, with the anthrax alkaloid. It was not sufficient, as in the case of inoculation with bacilli, that a quite inappreciable quantity of the toxic substance should be injected into the body. The toxic alkaloid when it operated harmfully upon the animals experimented with, did so with great rapidity. The anthrax albumoses operated with less rapidity, but without showing any such lapse of time as occurs between the inoculation of living anthrax bacilli and the appearance of the characteristic symptoms of anthrax disease. In Dr. MARTIN's experiments gelatin was discarded as unsuitable for the preparation of a culture fluid, and with the object of having a pure proteid which could be sterilized in solution and then mixed with the requisite mineral salts, alkali-albumin was selected for the purpose. This was prepared from the proteids of serum by precipitation with an acid, washing and then redissolving in water with a small quantity of alkali with the aid of heat. The proper salts were then added so as to produce a liquid corresponding to blood serum. In such a culture fluid the *Bacillus anthracis* grows well, even when it is slightly alkaline. The strength of this solution was regulated so that from 200 c.c. of original blood serum one litre of solution was prepared. A strength of more than 1·64 per cent. of proteid ought not to be exceeded, as the solution then becomes too turbid on sterilizing. Such a liquid is slightly alkaline to test paper. Nitric acid gives a dense precipitate that is coagulated by heating. A trace of copper sulphate and excess of potash give the violet colour which is the ordinary proteid reaction.

After the cultivation of bacilli in this liquid for various periods it was filtered so as to separate the organisms completely, and then examined chemically. As an illustration of the effect produced, a tube tested after seven days gave with copper sulphate and potash a pink colour or well marked biuret reaction, and with nitric acid a dense precipitate, mostly soluble on heating but reappearing upon cooling, thus showing that the alkali-albumin had undergone change into albumose. After longer periods of cultivation the biuret reaction was more marked, but the liquid was still distinctly alkaline. The separation of the new proteids from the non-proteid products was effected by alcohol, which precipitated the former and dissolved the latter. The albumoses obtained differed from those produced in peptic digestion chiefly in their marked alkalinity, and it is stated that this character was not due to their having been formed from alkali-albumin, since albumoses have no such power of holding acids or alkalies as globulin and albumin have. This alkalinity is not removed by absolute alcohol, benzene, chloroform or ether, but appears to be a character peculiar to the albumose. The alcoholic extract separated from the precipitated albumose and mineral salts yielded on evaporation a yellow amorphous substance which, after purification from traces of leucin and tyrosin, was strongly alkaline, readily soluble in water, alcohol and amyl alcohol, insoluble in ether, chloroform and benzene. It readily forms crystallizable salts with acids, the sulphate and oxalate being insoluble in absolute alcohol. The base is hygroscopic and when exposed tends to become liquid. In the dry state it undergoes decomposition when kept for two or three weeks, gradually losing its alkalinity. With the ordinary alkaloid reagents it gives in aqueous solution copious precipitates. The lethal dose of the albumose products amounts to from 12·7 to 13·6 grams per kilo weight of the animal; but they act slowly. The alkaloid acted more rapidly when injected in smaller doses, always causing enlargement and congestion of the spleen, and all the indications of typical anthrax, the only difference being that no bacilli were found in the spleen. It is more poisonous than the albumose products, and a small dose causes death more rapidly. Dr. Martin suggests that the above-mentioned alkalinity of the albumose products may be due to the formation from them of the alkaloid, which may be one of the final stages of the "digestion" of the alkali-albumin by the anthrax bacillus. If that be the case the alkalinity of the albumose product may be due not to the mere presence of the alkaloid, side by side with the proteid, but to its presence in a more or less firm chemical combination with the proteid molecule. The toxicity of the albumose products when brought into contact with living tissues may also be due to this condition and to the alkaloid becoming developed out of the albumose by the agency of the tissues themselves, just the same as in the experimental culture medium it is produced from the albumose by the agency of the bacillus. This view is favoured by the circumstance of the slow development of the toxicity of the proteid products.

We are informed that the Committee entrusted with the carrying out of the arrangements for the official celebration of the Jubilee of the Pharmaceutical Society has decided that a meeting shall be held at eight o'clock on the evening of Tuesday, the 26th of May, in the Lecture Theatre, 17, Bloomsbury Square. The proceedings at this meeting, at which ladies are to be invited to be present, are to include the delivery of an Address by the President, the reception of addresses from British and Foreign Chemical, Pharmaceutical and other Scientific Societies, and the presentation of the Hanbury Gold Medal. At the conclusion of the formal proceedings an adjournment will be made to the Examination Hall, where the Band of the Grenadier Guards will be in attendance.

* * *

The Pharmacy Acts Amendment Bill was introduced into the House of Commons on Friday, the 20th inst., by Sir Henry Roscoe, and read a first time. The Bill is set down for second reading on April 15.

* * *

In the House of Commons on Monday, the 23rd inst., a question was put to the Secretary of State for the Home Department by Mr. Samuel Smith, in reference to the large consumption of chlorodyne, especially among women, and to the grave evils which result from this practice. Mr. Smith asked whether the fact of chlorodyne being a patent medicine and protected by a stamp exempts it from the operation of the Sale of Poisons Act, and whether the Government will take into consideration the expediency of classing chlorodyne with other narcotics and only allow it to be sold under the same restrictions. The reply of the Home Secretary was that he had forwarded to the Privy Council Office a representation that has been made to him by a coroner's jury on this subject, that being the department concerned with it. As to the second part of the question Mr. Matthews said that the answer to it depends upon the proper construction of sections 16 and 17 of the Pharmacy Act, and that in regard to the addition of any article to the poison schedule, section 2 of the Act prescribes the mode in which that is to be done, through the action of the Council of the Pharmaceutical Society, to whom it was stated that any representation should be addressed in the first instance. It may be added that the provisions of the Act are such as to enable the police or any individual to institute a prosecution in cases where scheduled poisons are sold in contravention of the prescribed regulations, or under such conditions as not to come within the exemptions stated in section 16. The questions of fact, both actual and legal, must, however, be first established.

Transactions of the Pharmaceutical Society.

SCHOOL OF PHARMACY EXAMINATION QUESTIONS.

PRIZE EXAMINATION.

CLASS OF PRACTICAL CHEMISTRY.

PROFESSOR ATTFIELD.

Forty-Ninth Session.—Winter Course.
March 20. *Hours*—10.30 *to* 1 *and* 2 *to* 4.30.

The following are the questions that were set for this examination:—

Books and Memoranda permitted. Standard number of Marks, **100.**

1. What substances are present in the accompanying "Lotion?"
2. What were the chief mineral ingredients of "The Pills" supplied to you?
3. Report on the quality of the "Powdered Nitre."
4. Report on the purity of the "Glycerine."
5. Name the "Organic Acid."

NOTE.—*Manipulation as well as results will be scrutinized.*

BOTANY.

PROFESSOR GREEN.

BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR

Session, 1890–91.—*Winter Course.—Monday,*
March 23, 1891.—*Time allowed*—2 *p.m. to* 5 *p.m.*

The following are the questions that were set for this examination:—

1. Give an account of the structure of the leaf of a dicotyledonous plant. What are the functions of leaves?
2. Describe the inflorescence of a gymnospermous plant such as Pinus. How does the yew tree (Taxus) differ from Pinus in this respect?
3. Give some account of the so-called *sleep movements* shown by certain plants. What is the purpose of the movement and how is it brought about?
4. Describe the reproductive processes of a moss?
5. Classify the more commonly occurring forms of fruit and give illustrations of the kinds you describe.

PRACTICAL BOTANY.

PROFESSOR GREEN.

BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

Session, 1890-91.—*Winter Course. Monday,*
March 23, 1891.—*Time allowed*—11 *a.m. to* 1 *p.m.*

The following are the questions that were set for this examination:—

1. Make what microscopic preparations you think necessary to show the structure of A.
2. Sketch your preparations and indicate on the sketches any points you consider important.
3. Identify the microscopic specimens B, C, D.
4. Dissect the flower provided. Pin out the several parts separately and indicate by a sketch their relations to each other.

Refer the flower to its sub class.

MATERIA MEDICA.

MR. H. G. GREENISH.

BRONZE MEDAL.

Session, 1890–91.—*Winter Course. Tuesday,*
March 24.—*Time allowed*—2 *p.m. to* 5 *p.m.*

The following are the questions that were set for this examination:—

1. What is Lupulin and how is it obtained? Name the plant yielding it, its natural order and habitat. Describe its macroscopic and microscopic characters and the means you would take to ascertain its quality, giving the reason for each test you would apply.
2. Give the botanical names, natural order and habitat of the commercial varieties of buchu. Name the active principles and state in what part of the drug they reside.
3. By what characters may belladonna root be distinguished? Name any roots resembling it you may be acquainted with, and give in a few words their distinguishing characteristics.
4. How is balsam of copaiba formed and obtained? Give the name, natural order and habitat of the plant yielding it. Is it a balsam, and why? What adulterations would you look for and how would you ascertain the purity of a suspected sample?
5. What drugs are obtained from plants belonging to the natural order Euphorbiaceæ? Name the plants yielding them and their habitats and state of what part of the plant the drug consists.
6. What characters should the official strophanthus seed possess?

CHEMISTRY.

PROFESSOR DUNSTAN.

EXAMINATION FOR A BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

Part I.—Physics.

Session, 1890–91.—*Winter Course. Wednesday.*
March 25. *Time allowed*—10.30 *a.m. to* 1.30 *p.m.*

1. Describe the construction of the mercurial barometer. What are the circumstances which have to be taken into account in order that accurate readings of the instrument may be obtained?
2. Mercury at a temperature of - 40° C. is gradually heated until a temperature of 360° C. is attained. Describe the physical changes which occur during the course of the experiment.
3. A litre of gas at 25° C. exerts a pressure of 710 mm. What pressure will it exert when the temperature is raised to 50° C., the volume remaining the same?
4. Describe one method of determining the specific heat capacity of a substance. Calculate the specific heat capacity of iron from the following experimental data. Weight of iron 10 grams, temperature 100°; weight of water 18 grams, temperature 15°; temperature of the mixture 20°.

CHEMISTRY.

PROFESSOR DUNSTAN.

EXAMINATION FOR A BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

Part II.—Chemistry.

Session, 1890-91.—*Winter Course.—Wednesday,*
March 25, 1891.—*Time allowed*—2.30 *p.m. to* 5.30 *p.m.*

1. Silver is dissolved in nitric acid, the liquid evaporated to dryness, and the resulting salt strongly heated in a glass tube. Write a full account of the chemical changes which have occurred and of the properties of the bodies formed.
2. How are the principal oxides of phosphorus obtained? Assign reasons for writing the formula of phosphorous oxide P_4O_6.
3. Name the chief ores of zinc and cadmium. Describe the metallurgy of these elements.
4. Discuss the action of sulphuric acid on alcohol and give an account of the various products which may be obtained under different conditions. Show how "acetic ether" (ethyl acetate) and indirectly, marsh gas may be produced from alcohol.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

THE GLUCOSIDES.

BY JOHN C. UMNEY,

Pharmaceutical Chemist.

(*Concluded from page* 872.)

Digitalin.—The active constituents of *Digitalis purpurea* are partially, at any rate, glucosidal, but it is doubtful whether the several bodies stated to be contained therein have been obtained in a perfectly pure condition. This glucoside is stated by Schmiedeberg, who has made the most recent complete investigation of this subject, to be the chief constituent of Homolle's digitalin (digitaline amorph., Codex), and occurs also, but with a large quantity of digitoxin, in the digitaline cristallisé of Nativelle. The insolubility of the digitalin of Schmiedeberg in chloroform tends to show that it is not present in great quantity in either "digitaline" of the Codex, both of which are required to be entirely soluble in chloroform. By boiling with dilute hydrochloric acid in alcoholic solution, it is split up into so-called digitaliresin and a glucose.

The *Digitalin of the B.P.* 1867 was of a glucosidal nature, but was indefinite in composition, and was consequently omitted in the 1885 edition.

Digitalein, stated by Schmiedeberg to be one of the constituents of commercial digitalin, is an amorphous yellowish substance, soluble in water and differing in this respect from the "pure digitalin" and digitoxin of the same chemist. By boiling with dilute acids it is decomposed into a glucose and a product probably identical with digitaliresin. Its aqueous solution froths considerably in the same manner as digitonin (for which see under "saponin").

Frangulin was first obtained by Binswanger, in 1849, from the stem-bark of *Rhamnus Frangula*, and has since been shown to exist in the root-bark and twigs of the same tree and in the berries of *Rhamnus catharticus*. It occurs in lemon-yellow, micro-crystalline masses, insoluble in water, and only slightly soluble in cold alcohol. By heating with dilute mineral acids it is split up into glucose and frangulic acid. The latter body was stated by Faust to be a dihydroxyl-anthraquinone, and isomeric with alizarin, but Liebermann maintains that it is identical with emodin, and therefore trioxymethyl-anthraquinone, whilst later still Kreussler has pronounced it to be trioxyethylanthraquinone.

Glycyrrhizin, occurring in the roots of *Glycyrrhiza glabra*, *G. echinata* and *Abrus precatorius*, was originally stated by Gorup to correspond with the formula $C_{24}H_{36}O_9$, but has been said subsequently by Habermann to be a tribasic acid containing nitrogen and having the formula $C_{44}H_{63}NO_{18}$. The identity, however, of these two bodies must be considered somewhat doubtful. It exists in the root, according to Sestini, in combination with bases, chiefly lime. The glycyrrhizic acid of Habermann, deposited from glacial acetic acid, was in masses of prismatic needles. It is decomposed by boiling with dilute acids, but not by emulsion, into glycyrretin and a fermentable glucose.

Hesperidin is widely distributed in the fruits and leaves of the Aurantiaceæ, and may be best obtained from the dried unripe fruits of *Citrus aurantium* by extraction with alcohol made alkaline with caustic soda. It exists in minute crystals, which are very sparingly soluble in cold water, although hygroscopic, but is very easily dissolved by dilute potash solutions, giving on evaporation to dryness a red colour, passing to violet when warmed with sulphuric acid. It decomposes under the action of dilute acids, without taking up water, into dextro-glucose and hesperetin; thus, $C_{22}H_{26}O_{12} = C_{16}H_{14}O_6 + C_2H_{12}O_6$.

The latter body may be considered as the hesperetic ester of phloroglucin. Hesperetic acid, being a methoxy-hydroxycinnamic acid,

$$C_6H_3(OH)(OCH_3)CH{\cdot}CH{\cdot}COOH.$$

Hesperidin is very nearly allied to naringin, a glucoside obtained by De Vrij from the flowers and leaves of *Citrus decumana*, and is possibly synonymous with diosmin obtained from buchu leaves.

Myronic Acid.—The potassium salt of this acid occurs to the extent of ·5 to ·6 per cent. in black mustard seeds (*Brassica nigra*), and also in *Brassica Napus* and *Brassica rapa*. The acid may be obtained from the crystalline barium salt by decomposing it with dilute sulphuric acid. By the action of "myrosin," an albumenoid substance occurring in the white mustard, but not by emulsin or yeast, the salt is split up into sulphocyanate of allyl, acid sulphate of potassium, and dextro-glucose—

$$C_{10}H_{18}KNS_2O_{10} = C_3H_5{\cdot}NCS + KHSO_4 + C_6H_{12}O_6.$$

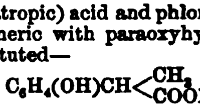
Caustic alkali acts very energetically on dry myronate of potassium, heat being evolved, with formation at first of mustard oil, and afterwards of allyl cyanid, ammonia, and dextro-glucose.

White mustard contains no myronic acid, but in its stead another glucoside, to which the name "sinalbin" has been given.

Phlorizin was discovered by Koningk, in 1835, in the root bark of the apple and cherry tree, from which it may be obtained by extraction with warm dilute alcohol. It crystallizes readily in colourless, silky needles, freely soluble in boiling, but not readily in cold water. It decomposes by boiling with dilute hydrochloric, sulphuric, phosphoric, or oxalic acids, as also by heating for twenty-four hours with water alone at 110° C. into phloretin and a glucose, which has been shown by Rennie by the melting-point of its phenylhydrazine derivative and other properties to be dextro-glucose, and not a different sugar "phlorose," as was long supposed. This statement has also been confirmed more recently by Fischer. The decomposition is represented by the equation—

$$C_{21}H_{24}O_{10} + H_2O = C_{15}H_{14}O_5 + C_6H_{12}O_6.$$

Phloretin may be viewed as the ester of phloretic (paraoxyhydroatropic) acid and phloroglucin, phloretic acid being isomeric with paraoxyhydrocinnamic acid and thus constituted—



$$C_6H_4(OH)CH\!<\!\begin{smallmatrix}CH_3\\COOH\end{smallmatrix}$$

Ruberythric Acid was first isolated in a pure state by Rochleder in 1851 from madder root (*Rubia tinctoria*) who demonstrated its glucosidal character and assigned to it the formula $C_{36}H_{40}O_{20}$, which he subsequently altered to $C_{20}H_{22}O_{11}$. The now generally accepted formula is that of Graebe and Liebermann, viz., $C_{26}H_{28}O_{14}$. Its chief interest centres in the fact that it was the original source of alizarin, which it yields together with a glucose, by the action of ferments or dilute acids. Thus—

$$C_{26}H_{28}O_{14} + 2H_2O = C_{14}H_8O_4 + 2C_6H_{12}O_6.$$

This reaction, however, is no longer of any industrial importance, as the alizarin now used in dyeing is obtained by artificial processes from anthracene, the one most largely used being that of Perkin, which consists in its preparation from anthraquinonemonosulphonic acid.

Salicin was discovered by Leroux (1830) in the bark of *Salix Helix*, and was classified as a glucoside by Piria, who studied its properties some years later. It does not exist in all the trees of the genus *Salix*, *S. argentea*, *S. babylonica* and *S. bicolor* having been proved to be free from it. It occurs also in many trees of the genus *Populus*, in the flower buds of *Spiræa Ulmaria* and in castoreum, from all of which it can be readily extracted. As has been stated previously (see constitution), it has been prepared synthetically by the action of nascent hydrogen on helicin, and may so be obtained by the action of lime on populin, which resolved into benzoic acid and salicin. By the action emulsin or synaptase, salicin is split up into dextrolucose and saligenin (salicylic alcohol)—

$$C_{13}H_{18}O_7 + H_2O + C_6H_{12}O_6 + C_7H_8O_2,$$

ut by heating strongly with dilute acids the action roceeds somewhat further, saliretin and water being rmed. The former reaction, however, takes place if e solution is only gently warmed. At a temperature 150° to 170° C. water alone splits up salicin, but it unacted upon by alkalis at any temperature. haracteristic tests for this glucoside are the red oloration with sulphuric acid, and the odour of eadow-sweet, produced by its oxidation with chromic cid, due to the formation of salicylic aldehyde. It rms chlorine, bromine, and acetyl substitution erivatives and reacts with sodium ethylate in alcoolic solution, forming sodium-salicin ($C_{13}H_{17}NaO_7$), Perkin).

Benzoyl-salicin, or *Populin*, occurs in the leaves of he aspen (*Populus tremula*) and other species, and ields by decomposition with mineral acids, dextrolucose, benzoic acid and saligenin, but is not acted pon by emulsin under any conditions.

$$C_{20}H_{22}O_8 + 2H_2O = C_6H_{12}O_6 + C_7H_6O_2 + C_7H_8O_2.$$

Saponin.—The suggestion made by Flückiger that ssibly a homologous series of "saponins" exists, as not up to the present been confirmed, although it eems a possible explanation of the many nearly llied frothing principles occurring in certain plants. mong the more important are the following:—

Name.	Source.	Sugar.	2nd decomposition product (non-saccharine).
Saponin.	*Saponaria officinalis*	a glucose (dextro-rotatory)	Sapogenin
Struthiin	*Gypsophila species*	"	"
Quillain.	*Quillaia Saponaria*	"	"
Senegin.	*Polygala senega*	"	"
Cyclamin	*Cyclamen europæum* *Primula officinalis*	a glucose (dextro-rotatory)	cyclamiretin
Parillin.	*Smilax* species	a crystalline glucose	parigenin
Digitonin	*Digitalis purpurea*	a glucose	digitoresin digitonein

Struthiin, quillain, and senegin are undoubtedly synonymous with saponin. Cyclamin, parillin, and digitonin are very closely allied to it, if not absolutely identical.

These bodies may be extracted from the various plants that contain them by hot 83 per cent. spirit, from which they are deposited on cooling. Baryta water precipitates them from aqueous solution, as also does basic acetate of lead. They are all decomposed by boiling with dilute acids, or by emulsin, and some of them (saponin, cyclamin, digitonin) by continued heating with water alone. Two methods of estimating saponins, dependent on the formation of a compound with baryta, have been described by Christophsohn and Otten.

Solanin, which from its basic character has been termed an alkaloid-glucoside, was discovered by Desfosses in the fruits of *Solanum nigrum*, and has been since found in many fruits of that genus, *S. Dulcamara*, *S. tuberosum*, *S. Lycopersicum*, and somewhat doubtfully in *Scopola Japonica*. The question as to whether so active a poison as solanin exists in potato tubers, has been decided by Otto and other workers, who assert that the glucoside exists only in the shoots themselves, or the peel immediately surrounding them, of those tubers that have been allowed to sprout during storage, parts always removed before eating. It occurs in colourless, slender silky needles, very insoluble in water and ether, slightly soluble in cold, but very soluble in hot alcohol. Its chemical constitution remains somewhat uncertain, many formulæ having been assigned to it, the latest being that of Hilger, $C_{42}H_{87}NO_{15}$. It is decomposed by boiling with dilute acids, yielding a glucose and solanidin, also a strongly basic body, having the composition according to Hilger, $C_{26}H_{41}NO_2$.

Strophanthin, stated by Fraser to be the active principle of strophanthus seed (*S. hispidus*, var. *Kombé*), was obtained by him to the extent of about 65 per cent. from the extract. In appearance it is colourless, opaque, and only exhibits crystalline form under the microscope. It is exceedingly soluble in water and alcohol, but precipitated from either solution by addition of ether. The aqueous solution froths persistently when shaken. It is decomposed by boiling with dilute acids into glucose and strophanthidin, the latter body crystallizing readily in slender colourless crystals. Saliva appeared to exert but slight decomposing power, a small quantity of glucose being formed, but no trace of strophanthidin could be detected in the liquid. The glucoside is coloured dark green by sulphuric acid and bright blue by the addition of phosphomolybdic acid with an alkali.

Tannins.—As first stated by Hlasiwetz, many of the tannic acids are glucosidal, but the difficulties that arise in their investigation have up to the present time prevented any very confident result being attained as regards the composition of the majority of them. The readiness with which they begin to decompose, their uncrystallizability, the close resemblance in many cases of the resulting products to the mother substances and the incompleteness often of the decomposition, are undoubtedly the cause of the varying statements met with regarding these bodies. The decomposition products which some glucosidal tannic acids yield by heating with dilute acids or alkalis, as well as the oxidation products by fusing with caustic potash, have been classified by Hlasiwetz thus:—

Acid.	Decomposition products.	Oxidation products by fusion with caustic potash.
Gallo-tan. acid	a glucose and gallic acid	pyrogallol and carbonic acid
Granato- "	a glucose and ellagic acid	gallic acid
Caffea- "	a glucose and caffeic acid	protocatechuic and acetic acids
China- "	a glucose and china-red	
Chinova- "	a glucose and chinova-red	
Filix- "	a glucose and filix-red	
Rhatania- "	a glucose and rhatany-red	protocatechuic acid and phloro-glucinol

In conclusion I must express my thanks to my friend, Dr. F. W. Passmore, for valuable suggestions with regard to this paper, and also to Mr. Holmes for his kindness in allowing me the use of specimens from the Museum of the Pharmaceutical Society.

Mr. Stark, in thanking Mr. Umney for his paper, said it would be invaluable as a reference. He was not prepared to criticize, yet one or two things had suggested themselves to him. He would have liked to have seen all the glucosides used in medicine grouped together in a pharmaceutical table, and their physical and chemical properties described. Chinovit was remarkable as a substance which, though containing oxygen could be distilled without decomposition. He would like to know what pure digitalin really was. The supposed identity of frangulin and emodin was interesting as affording an explanation of the properties of cascara.

Dr. Passmore said that when Mr. Umney allowed him to read through his paper, his attention was called to the fact that existing knowledge of the glucosides was mainly confined to those of the vegetable kingdom. Was this because so few occurred in the animal kingdom or on account of the difficulties in isolating them? Among the animal glucosides might be instanced the cerebrin of brain tissue, which Liebreich had identified as a glucoside, and the sugar from which had recently been shown to be isomeric with galactose. The proteid-like bodies, mucin and condylin, occurring in mucus and in cartilage respectively, also yield a glucose by hydrolysis. The indican isolated from the urine of herbivorous animals was at first considered to be identical with the vegetable glucoside of that name, but further investigation showed that although it yielded indigo, no glucose resulted by hydrolysis, and that probably it is a salt of indoxylsulphonic acid. Another body obtained from excrementitious matter, purrée or Indian yellow, was also of a glucosidal nature. It was the magnesium salt of euxanthinic acid, and the latter split up upon boiling with dilute acid into euxanthon and glycuronic acid, which might be regarded as a glucose in which one of the alcohol groups has been oxidized to a carboxyl group. With reference to the President's remarks on chinovit, Dr. Passmore said that the volatility of oxygenated carbon compounds appeared to depend upon the position of the oxygen atom in the molecule, since all the higher atomic alcohols, like mannitol, heptitol and octitol, volatilize more or less readily at high temperatures without decomposition. He questioned whether chinovit is actually the sugar of chinovin, since in view of Fischer's recent synthesis from d-glucose of a sugar isomeric with maltose by treatment with hydrochloric acid, Liebermann's method of effecting hydrolysis by dissolving chinovin in absolute alcohol, saturating the solution with dry hydrochloric acid gas and extracting the saccharine body from the filtered solution after standing twenty-four hours, appeared open to serious objections.

Mr. W. Lloyd Williams had listened with much pleasure and profit to Mr. Umney's valuable paper, and could not help remarking the fulness with which the subject had been treated. He thought it could not be too strongly insisted upon, that the fact of a body yielding a copper reducing principle when boiled with acids was not a sufficient indication of a glucoside, since many other bodies yielded a reducing compound under similar conditions. He would ask if Mr. Umney could give any information as to what extent fluorescence was a characteristic of the glucosides, and if there was any probability that the fluorescence of other natural bodies, like quinine, might be attributed to impurities. Professor Thorpe had recently made some detailed experiments on frangulin. In the Pharmacopœia process for ext. glycyrrhizæ liq., the rectified spirit threw down apparently simply degraded matter and albumenoids, but from large quantities of fluid there was also deposited a substance (probably glycyrrhizin) which would in his opinion repay investigation. Myrosin decomposed without hydrolysis in the ordinary sense of the term. The reaction always occurred in the dry state, and quite recently some light had been thrown upon this subject, which suggested the advisability of reconstructing the present formula. It was curious to note that two glucosides, indican and ruberythric acid, yielded dyes of immense importance, and that both these dyes had been synthesized from coal-tar products. Professor Fraser was reported to have found as much as 65 per cent. of strophanthin in the extract of strophanthus. Would not this be a misprint?

Mr. Millard said that the accepted definitions of a glucoside as given in the text books were deficient in some instances and too comprehensive in others. In the present paper glucoside had been defined as a body that was hydrolized by dilute acids, and the term had been made to include any substance that was decomposed by simple means. He objected to Mr. Umney's definition, because the term glucoside was generally held to include a number of bodies which might be tabulated under a different definition and in a better fashion. Picrotoxin had not been mentioned, although it yielded a glucose; the B.P. 'Additions,' by the way, did not venture the statement that it was a glucoside. He would like to know the names of those glucosides which were precipitated by the acid solution of molybdate of ammonium.

Mr. Dymond thought the most interesting part of the paper was that which dealt with the formation of glucosides in the plant and the functions they filled in the vegetable economy. There were two theories as to their formation—(1) that they were formed intermediately between the absorption of carbon and the formation of starch; (2) that they were formed from the starch. There were several reasons for supposing the latter hypothesis incorrect; these glucosides were not found in the reserve substance of the plant (there was no solanin in the tubers of the potato), and, further, they would have to suppose the existence of a waste product in plant physiology, which was not borne out by investigation. It did not seem likely that these bodies were formed from starch, since starch was required for conversion into cellulose as the plant grew. What was the explanation of the difference in the actions of hydrochloric acid and sulphuric acid on saponin? Was the reducing action of glucoside on Fehling's solution always due to the previous formation of sugar by hydrolysis? Mr. Umney's paper was exceedingly interesting and the subject had been treated fully and satisfactorily.

Mr. Ellwood agreed that the usual definitions of a glucoside were a little vague, but when they had to embrace such a number of complicated substances an exact definition was difficult to subscribe. A simpler way would be to find special terms for those bodies differently acted upon by different reagents. He had been much interested in the different kinds of digitalin and had obtained more than a dozen commercial samples, all differing in appearance and reactions; the physiological actions differed in three or four instances. Were these facts due to impurities or to the presence of different homologues of digitalin? He would like to have seen a list of the tests applicable to the glucosides used more or less frequently in pharmacy, drawn up in a table. Were the carminic acids of plants similar in chemical characters and action to that obtained from cochineal?

Dr. Passmore remarked with reference to the vagueness of the definition, Mr. Millard had overlooked the fact that that adopted by Mr. Umney included only those substances which, when split up yielded one or two molecules of glucose, and a second non-saccharine body, a definition which excluded starches and other anhydrides of sugars. As to the theories for the formation of glucosides, since these were compounds of glucose it would only be natural to suppose the latter to be the first body formed by the plant. Solanin, the instance cited as a glucoside not occurring among the reserve products of the plant, was found in the growing shoots of the potato, and therefore was presumably formed from the starch stored up in the tuber.

Mr. Dymond remarked that glucose was far more easily obtained from the glucoside than the glucoside from glucose.

Dr. Passmore said that the latter point could scarcely be considered to have been determined under the conditions existing in the plant, nor was the existence of a waste product a necessary supposition. The matter was one of considerable discussion, but he believed that the majority of eminent authorities agreed in considering that glucose was first formed, and that by the formation of soluble glucosides from the latter, the transference of nutriment was facilitated from one part of a plant to another.

Mr. Umney, in reply to Mr. Stark, said that he had included tables of the more important glucosides, showing the composition of those at present determined. In mentioning "pure digitalin" he meant that of Schmiedeberg, isolated from the commercial digitalin. He had not dealt with the animal glucosides, a subject mentioned by Dr. Passmore, except in the case of carminic acid, which occurs in the vegetable and animal kingdom. In reply to Mr. Lloyd-Williams' query with regard to fluorescence of certain tinctures, as far as he was aware, æsculin had only been proved to exist in *Gelsemium sempervirens*, in addition to the species of *Æsculus* and *Pavia* mentioned in the paper. In reply to Mr. Millard's question as to which glucosides were precipitated by molybdate solution, he had stated in his paper that that was a general reaction of this class of bodies. Several speakers had objected to the definition of the term "glucoside" as somewhat vague; but it was only put forward after much consideration, and was based on that of Jacobsen, the greatest authority, probably, on this subject. He had not included tables of the colour reactions of the various glucosides, as they were included in most text books; and moreover, such reactions could not be absolutely relied upon. The percentage of strophanthin from the extract was correctly stated, viz., 65 per cent., and corresponded to about 6 per cent. actual yield of the glucoside from the seeds.

At a meeting of this Association held on Thursday, Feb. 12, at 103, Great Russell Street, Mr. A. Campbell Stark, President, in the chair, a paper was read on—

BACTERIA AND THEIR RELATION TO LIFE.

BY H. W. K. PEARS.

Pharmaceutical Chemist.

After some introductory remarks the author referred to an "old theory revived by Liebig," that putrefaction is due to ferments, which Liebig described as nitrogenous substances, such as fibrin, casein and albumen, altered by air. According to this view the oxygen of the air is the first cause of the breaking up of the nitrogenous substances, the disturbance being transmitted from molecule to molecule. Berzelius considered ferments to be albumenoid bodies endowed with catalytic force, neither losing nor gaining strength themselves, but acting merely by contact. The observation made simultaneously by Latour in France and Swann in Germany that yeast consists of cells that multiply by budding raised the question whether the fermentation of sugar, resulting in the formation of alcohol and evolution of carbonic acid, might not be connected with the act of cellular vegetation. The opposition of Liebig and others to this theory led to its temporary abandonment, until Pasteur, while studying the lactic fermentation, observed in the fermenting liquid minute rods that reproduced themselves by constriction and separation at the middle, and by ingenious experiments demonstrated their causal connection with the phenomenon of fermentation. The next discovery was the ferment of butyric acid, which proved to be a bacillus, occurring in cylindrical rods, isolated or in chains of two or three and capable of living and multiplying without access to free oxygen (anaerobic). This butyric ferment was described as playing an important part in the processes of the human economy and in the decomposition of decaying vegetable tissue. The process of putrefaction was then spoken of as a fermentation induced by anaerobic bacteria, occurring in the interior of the putrefying substance, and aerobic organisms, which transferred oxygen from the air to the organic compounds, causing their slow combustion and conversion into soluble compounds again available for use by the vegetable kingdom. In this process of putrescent decomposition basic compounds are formed, having the constitution of diamines and many of them toxic, which are called collectively "ptomaines." The controversy as to the spontaneous generation or the germ origin of these organisms was then referred to, and some of the experiments of Pouchet, Pasteur, Tyndall and others described, the outcome of which was said to be that the theory of spontaneous generation received its death blow. One result of this work was the revival of the ancient theory of parasites and living contagia, and Pasteur predicted that the etiology of contagious diseases was on the eve of having new and unexpected light shed upon it. Among the first discoveries was the observation that the ammoniacal fermentation is due to a bacterium that in its life processes converts urea into ammonium carbonate, which suggested the successful application of boracic acid to counteract the development of the organism in diseases of the bladder. In 1865 Dr. Lister commenced his series of successes in the application of antiseptic surgery. The author then devoted some time to the morphology and physiology of bacteria, and illustrated how the observed effects of extreme heat or cold upon their development had received useful application in the preservation of food substances. He also discussed the action of various compounds upon bacteria, defining antiseptics as substances of which salicylic acid is an example, which prevented their development, and germicides, like mercuric chloride, as destructive of their life. Reference was then made to Cohn's classification of micro-organisms into Micrococci, Microbacteria, Bacilli, Spirilla and Spirochaetæ, and some of the accepted methods for their cultivation were described. Each of these classes was then discussed under the headings Septic, Zymogenic, Chromogenic and Pathogenic. Of the Pathogenic Micrococci mention was made of those occurring in the lymph of vaccinia and variola and those of diphtheria and pneumonia. The Pathogenic Bacteria referred to were those of fowl cholera, and incidentally it was shown how Pasteur's observation upon this bacterium and the bacillus of anthrax had led to the discovery that by successive cultivations of pathogenic micro-organisms under certain conditions it is possible to "attenuate" their virulence, whilst leaving them capable, when injected into the organism, of exercising a protective influence against more virulent growths of their own species. The Pathogenic Bacilli mentioned were those of diarrhœa, leprosy, anthrax, tuberculosis and cholera. The only other microbe referred to as of medical importance was the spirillum of relapsing fever. The author concluded a lengthy paper by a short summary of the theories that have been put forward to explain the protective effect of inoculations.

The President, after remarking on the exhaustive nature of Mr. Pears' paper and the ground he had covered, observed that the author had omitted to lay stress upon the fact that ptomaines were produced not only after death but during life. Creatinine was now classed as a ptomaine. That the idea of spontaneous generation was not altogether abandoned was evidenced by the article which appears in Quain's 'Dictionary of Medicine.' He would have liked to have heard more of the action of antiseptics as a subject of special interest to pharmacists. He was glad Mr. Pears had drawn so clear a distinction between germicides and antiseptics, for the true meanings of these terms were frequently confounded. He was inclined to think that the germicidal action of mercuric chloride was due to a kind of poisoning similar to that produced in the human subject, a view borne out by the fact that nearly all the poisonous alkaloids were powerful antiseptics. At the same time he would remind them that many eminent surgeons entirely repudiated the use of antiseptics, and one medical man had been known to say that if he could obtain sufficient bacteria he would make a poultice of them. He thought Mr. Pears was in error when he said the heat of boiling water was sufficient to destroy bacteria, experiment showed that they were able to resist a dry heat of considerable intensity. In fact Dallinger had said that they could be acclimatized to an almost incredible extent. The study of bacteria was attended with much difficulty since they could not be readily distinguished even under a $\frac{1}{4}$ or $\frac{1}{16}$ in. objective. He did not think they were directly the cause of disease, but that the part they played was purely a secondary one, and it must be remembered that they were never inactive. He thought that human beings were able after a time to form a "bacterium habit" and so secure immunity from disease.

Mr. W. Lloyd Williams thought that Mr. Pears's paper afforded food rather for digestion than criticism. He would like to know if the author could give him any information as the action of diastase, whether it could act for an indefinite period, or if after a time it became exhausted. He referred to the bacillus which gave rise to the nitrification in soils, and in reference to antiseptics observed that thymol was useful as a preservative in volumetric solutions. He would like to have had information as to the bacillus of typhus, and drew attention to the fact that a new edition of Crookshank's 'Manual of Bacteriology' had been recently published.

Mr. Ellwood observed that Mr. Pears's paper was a useful epitome of the work that had already been done in the study of bacteriology, a study which had revolutionized medicine and medical practice. Was physic to be done away with altogether? and how far should bacteriology be studied by the pharmacist? were important questions. It had been prophesied that within the next fifty years the sale of medicines would be reduced 50 per cent., and that in one hundred years it would be *nil*. He thought it was time to consider how far the pharmacist should vie with the biologist in the cultivation of bacteria. Mr. Ellwood made some amusing references to the blue and yellow colours of London milk, which he said were certainly not due to the bacterium xanthinum nor any other bacterium. The subject of antiseptics was a favourite one with Mr. Stark and mercuric chloride alone afforded ample subject for discussion. The theory of spontaneous generation had been completely overthrown by the investigations of Dallinger and Pasteur. A subject for further investigation was the disease known as "pink eye" in horses, which was doubtless the work of a microbe.

Mr. Pears in reply said that when he spoke of the temperature of water he intended to imply steam at that temperature. He had not come across any definite statement as to the action of diastase. He did not think pharmacists would ever be able to undertake bacteriological work. In reference to the bacillus of anthrax, Pasteur found that earth worms coming up through the soil where animals that had died of anthrax had been buried, brought up the bacteria in the little cylinders of earth they ejected, a statement which was denied by Koch. After some remarks on cremation Mr. Pears said that, on the whole, the opinion seemed to be that the earth was a good a filter that there was little harm in burying bodies in soils near towns, even in the neighbourhood of the water supply.

Provincial Transactions.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eleventh meeting of the second session of this Association was held in Lockhart's Café, St. Nicholas Square, on Wednesday evening, March 18, at a quarter past eight o'clock. There was a fair attendance, and Mr. F. Park, President, occupied the chair.

The minutes of the previous meeting having been read and adopted, Messrs. G. Cormack and Hedley Pattinson were appointed to audit the Treasurer's accounts, and Mr. G. F. Merson gave notice of a motion to alter certain clauses in the constitution, at the annual meeting to be held on April 1.

Mr. George Weddell then introduced a paper entitled—

SOME DANGERS OF PHARMACY, IN STORING, HANDLING, MANUFACTURING, DISPENSING, AND SELLING DANGEROUS DRUGS AND CHEMICALS.

Mr. Weddell, who said he did nothing more than open up a rather extensive question, acknowledged contributions on the subject from:—Mr. Atkins of Salisbury; Dr. W. Inglis Clark and Dr. Dott (Duncan, Flockhart and Co.), Messrs. Smiles and D. Mackenzie (T. and H. Smith and Co.), and Mr. Peter Boa, of Edinburgh; Mr. Lane (Woolley, Sons and Co.), Manchester; Mr. Martindale, Mr. C. Umney and the editor of the *Chemist and Druggist*; also from his local confrères, Messrs. Bambridge, Clague, Park, B. S. Proctor, and from Mr. Linford (Lofthouse and Saltmer), Hull.

Mr. Weddell said it was impossible in a single evening to go thoroughly into all the dangers of pharmacy, but promised that if members of the calling would assist him by sending him their experiences of danger, whether physical, chemical, physiological (poisons) or legal he would, when leisure permitted, bring the matter in a more or less compact form before the general body of chemists and druggists. He also asked them to consider nothing too commonplace, or, on the other hand, too uncommon to be communicated, and promised due acknowledgment to contributors. The points on which he invites information are dangers incurred in storing, handling, manufacturing, dispensing and retailing inflammables (also notes on spontaneous combustion), explosives, corrosives, and poisons, vapours, liquids and solids.

A great deal of nonsense, the author said, was talked on the question as to whether the calling is a trade or a profession, or midway between the two. That is a matter of supreme indifference, the real test of honour being whether the work, whatever it be, is well done, conscientiously done, and skilfully done. But whereas the work done in many other callings affects only the pocket or the temporary pleasure of men and women, that of the chemist affects their life and health, at a period, too, when these are in a critical condition. The doctor prescribes the remedies which he believes will act in a certain manner on a certain organ of the body or on the general system. It remains with the chemist to see that these remedies are forthcoming, that they

pure, potent, well prepared, and in the required
e, with directions for their safe and proper use.
w before this can be assured the chemist must
uire a complete knowledge of the hundreds or
usands of articles which he dispenses. That is a
tter of a few years' study and a good memory. But
does not so soon nor so easily acquire that constant
lertness of mind" which enables him to judge
ether all the conditions have been fulfilled in a
tle of medicine. The habit and the faculty are
ned only by long anxious years of constant watch-
ness; and when the public buys the bottle of medi-
e it buys not the drugs merely, but the "alertness
mind" which surrounds and interpenetrates it, and
hout which the simplest drugs are emissaries of
ger.

Iow, continued the author, on you assistants and
rentices who look forward to a career, is laid the
essity of acquiring not only knowledge of chemistry
l materia medica but that habit of carefulness
ich will eventually become almost a sixth sense.

'he following are amongst dangerous substances
l compounds mentioned by Mr. Weddell:—

'nflammables.—Mixtures of H and O, cotton wool
ar gas), sugars (in syrup making), spirits. (in heat-
or measuring near light), ethers, ac. carbolic. (in
iefying), fats and oils, carbons (?), hydrocarbons.

Zxplosives.—Syphons of aerated waters. Potass.
or. (powdered in iron mortar or tramped under
t on floor), mercuric oxalate (in powdering), argen-
oxalate (in powdering), fulminates of silver and
rcury, argentic oxide, phosphorus picric acid and
rates, nitroglycerine, sulphur hypochlorite (in tap-
g stopper), hypophosphites (in powdering).

Mixtures.—Pot. chlor. c. antim. nig., pot. chlor. c.
ophosphit., pot. chlor. glycerin., pot. chlor., ammon.
phuret., pot. chlor. c. morph. mur., pot. chlor. c.
phur, pot. chlor. c. tannin. Pot. permang. c. glycerin.,
. permang. c. alcohol, pot. permang. c. fer. redact,
. bichrom. c. alcohol, pil. phosphori., sp. terebinth.
I_2SO_4, iodine and iron, iodine and liq. ammon. fort.,
:ate of lead and charcoal, ac. chromic. and gly-
ine, strong acids and glycerine, tr. nucis. vom. c.
l. nitro. mur. dil. (burst).

'orrosives.—Sulphuric acid (spirits of water added
t instead of it to water), nitric acid fumes, hydro-
oric acid, chromic acid, chlorine, bromine, hydro-
ric acid, sodium, phosphorus, caustic soda.

'oisons of various kinds were mentioned by the
hor, with precautions to be observed, and also a
nber of dangers of various kinds to be guarded
inst at the retail and dispensing counters, such as
nsposition of labels on liniment and mixture bottles.
elling strong drugs "poison" or "with caution"
n when for internal use. In giving customers what
y ask for, *protest* or *caution* if necessary. Badly
d bottles for kali. When temperature rises, see to
pered bottles in case they burst. Volatile liquids
to be kept on a high shelf; carbon bisulphide,
Powdering chrysarobin, corrosive sub., plumbi
., potass. cyanide, etc.

mixture of calomel and gum forms a cement. In
danger of not having active ingredients (strych-
, ext. physostigmatis, etc.), thoroughly mixed;
ing nitric or other strong acid in dirty bottle (tur-
ine, etc.); using distinctive bottles for external
ication.

closing, Mr. Weddell briefly touched on the
l dangers which beset the unwary pharmacist,
as, drugs not up to requirements (Food and
gs Act), drugs under *common* names (citrate of
nesia, milk of sulphur and sweet spirit of nitre,
, sale of s. v. m. on Sunday, sale of same for
king without licence, use of same in preparations
ble of being used externally, use in patent
icines (although unknown to seller), use of still without licence, or for methylated spirit preparations, sale of medicated wines without licence (if capable of being used as a beverage), acting as an apothecary (do not take pay), ship medicine chests (not to requirements), stamp duty, *poisons* not labelled or insufficiently so, sale of medicines capable of being used for improper purposes, buying goods dishonestly acquired.

Considerable discussion followed, and with a hearty vote of thanks to Mr. Weddell, the meeting closed at 10 p.m.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

At a meeting of the Midland Counties Chemists' Association, held at the Mason College, Birmingham, on the 17th ult., the following paper was read:—

The Respiration of Plants.

BY JOHN BARCLAY, B.SC. LOND.

Until the end of the last century the existence of a respiratory process in plants was denied by some and doubted by many, amongst the latter being the great Liebig. Such a conclusion depended no doubt to a great extent on, first, the difficulty of proving the simultaneous absorption and evolution of oxygen, and second, on the incongruity of such a state of things if proved. That true respiration does, however, take place has now for a long time been known, and the importance of the process to the plant is fully recognized. The kinetic energy of the plant obtained from without is derived from the light and heat of the sun, and in addition to this there is a continual evolution of kinetic energy going on in the plant, due to the destructive metabolism which the oxidation known as respiration causes. It is clear that respiration or destructive metabolism gives rise to heat, for, as is well known, wherever a complex substance breaks up into a number of simpler or more stable compounds there is an evolution of energy; in other words, we have an exothermic reaction, on the principle of the "greatest development of heat." It must be remembered, too, that the simpler or more stable the products of decomposition are, the greater is the amount of energy evolved. Thus if, through the decomposition of the protoplasmic molecule by the inspired oxygen, we obtained CO_2, water and nitrogen, the amount of energy evolved would be much greater than if, as is really the case, a number of more complex compounds were formed at the same time.

Having given then a certain amount of energy due to respiration, it is to be inquired, what becomes of that energy? The answer is, that it develops mechanical forces by means of which the ultimate particles of the plant substance are set into those movements, upon which growth and the other functions of the plant depend. Part of the energy may, in fact, appear in the form of movement, part in the form of heat, or of light, or even of electricity.

It being evident then that respiration is necessary for the plant, we should expect that if this function were stopped, those processes which depend on it would also be arrested, and such is indeed found to be the case; *e.g.*, *Mimosa* (the sensitive plant), when placed under the receiver of an air pump—the air being exhausted—assumes a rigid position. The same effect is observed when the plant is placed in an atmosphere of nitrogen. In both cases, however, a return to the normal atmosphere causes a return of the irritability. To show that access of oxygen was necessary to growth, Malpighi placed seeds in water covered by a layer of oil, and found that they would not germinate. Similarly it has been shown that respiration is necessary to the evolution of heat by the plant. Hubert covered the spadix of *Colocasia odora* with oil and found that the temperature of the organ was diminished, and other investigators have shown that various parts of plants, when placed in an atmosphere of hydrogen or nitrogen, were of about the same temperature as surrounding objects, but that in air they showed a decided rise in temperature.

It may be interesting to take in review some of the researches upon which our present knowledge depends. De Saussure was perhaps the first investigator who contributed any valuable work to the solution of the question of respiration in plants, and after him came Garreau, who not only showed where his predecessors had erred, but also conducted a number of very important experiments and established the fact of respiration once for all.

His first experiment was for the purpose of showing that plants inspired oxygen during the day, in the shade and in dark weather. This he did by means of a piece of apparatus consisting of an elongated flask produced at one end into a tube, the free end of which was graduated and dipped under water into a trough. The upper end of the flask was closed with a perforated cork, into the perforation of which was introduced the stem of a green foliage shoot, placed in an inverted position so that the leaves and small branches occupied the greater part of the flask. At a constriction of the tube was placed a small cup containing a strong solution of caustic potash. The method of working was as follows:—As the plant absorbed the oxygen contained in the closed flask and gave out an approximately equal volume of CO_2, the latter was absorbed by the caustic potash solution and the water rose in the graduated tube to take its place. By means of the graduations a rough estimate of the volume of the oxygen was obtained, while by decomposing the potassium carbonate formed during the experiment, he obtained the amount of the CO_2, which had been evolved. On comparing the results of his experiments he found that the volume of oxygen absorbed was greater than that of the CO_2 evolved, and this he attributed, partly to the fact that caustic potash did not, in all probability, absorb all the gas; it is quite possible, however, that the temperature at which he worked had some effect on the proportion of the gases.

Garreau next experimented to show that there was a well marked relationship between the volume of CO_2 evolved, and the intensity of light during the process. In order to show this, he used the same foliage shoot under three different conditions, viz., (1) ordinary daylight, (2) diffused daylight, (3) total darkness; and he found that the amount of CO_2 evolved, increased in the above named order. This is readily understood, for during the day, when the processes of respiration and assimilation are going on simultaneously, the CO_2 evolved in the former process would be partly re-taken up at the assimilating surfaces, and the more intense the light the more marked would this be. Here, then, we have the source of the old idea, that CO_2 was absorbed during the day and thrown off during the night. Garreau afterwards proved conclusively that CO_2 was evolved in the very broadest sunlight.

Since plants are under the influence of their environment as regards temperature, we should expect that a fall of temperature of any serious kind would, by to a certain extent paralysing the plant, diminish or arrest the respiratory process. De Saussure, many years before Garreau, had stated that the volume of oxygen absorbed by green leaves depended upon their environment; thus if they inhabited low, marshy places, or lived in a rarified atmosphere or under a cold sun, they absorbed relatively less oxygen than those enjoying an optimum temperature and environment. Garreau, in investigating the relationship of respiration to temperature found that the evolution of CO_2 was considerably diminished and in some cases arrested by placing plants in an atmosphere having a temperature of 5° C. to 8° C.

Unfortunately, he did not estimate the amount of oxygen absorbed under these circumstances, or he would probably have found that when the evolution of CO_2 was reduced to a minimum, absorption of oxygen was still taking place to an appreciable extent, for it has been shown that at low temperatures the absorption of oxygen is relatively greater than the evolution of CO_2, and conversely that at high temperatures the evolution of CO_2 is relatively greater than the absorption of oxygen.

Garreau's next experiment was to prove that respiration resulted in a rise of temperature. We have, of course, a well known instance of this in the malting of barley, and it may easily be demonstrated by introducing a thermometer into the midst of a handful of moistened peas, placed in a vessel covered by a bell jar (to prevent loss of heat by convection):—a notable difference between the temperature of the germinating seeds and that of the surrounding atmosphere will at once be observed. Leaf buds, seedlings, bulbs, etc., are well adapted for studying the respiratory process, as Garreau found, inasmuch as in them the assimilative process (involving the absorption of CO_2) is relatively small, while on account of the energetic use of reserve food material, the respiratory process is relatively great. With regard to absolute magnitude of respiration it was found that twelve buds of *Syringa vulgaris* (dry weight at 110°, 2 grams) exhaled 70 c.c. of CO_2 in twenty-four hours. It was shown by Garreau, de Saussure and others that respiration in point of magnitude depended upon the function of the organ concerned, and one curious result obtained was that the andrœcium of flowers respired more energetically than the gynecium, and that in the case of diœcious plants the same rule applied to the whole flower. There seems to be no attempt to explain either this individual instance or the general relationship of function to respiration, but if one may hazard a conjecture, it would appear as if the well known superior activity of the male element over the passivity of the female, required a greater evolution of kinetic energy, and hence the respiration of the andrœcium is relatively greater.

As is well known some plants can exist without oxygen; such seem to be confined to the fungi. For this to take place there must be an energetic destructive metabolism going on, such as there is in the case of ferment-fungi. Thus yeast cells may live without oxygen provided they have plenty of sugar and the alcohol is not allowed to accumulate. Then there is the case of the Schizomycetes (*Bacteria*, etc.), which not only grow and multiply in the absence of oxygen, but in many cases die from the effect of its presence in the free state. Many of the higher fungi, such as *Mucor mucedo*, *Penicillium*, etc., can live without oxygen, but cannot grow without it, while others, such as *Mucor racemosus*, which are capable of exciting active fermentation, can live and grow in the absence of oxygen.

Since, as stated above, the growth of a plant is directly dependent upon destructive metabolism for the mechanical forces which determine it, we should expect a rise or fall of temperature to have the same effect on growth as on respiration, or in other words that the curves of growth and respiration would be identical. Such, however, is not the case, for it is found that the maximum temperature for growth is lower than that for respiration, and conversely that the minimum temperature for respiration is lower than that for growth. This apparent contradiction may be explained as follows. Growth can only take place when the evolution of energy is considerable, and while at a low temperature a certain amount of destructive metabolism may go on, nevertheless the energy so supplied is not sufficient to admit of growth. The converse case is not so easily explained; it may be that higher temperatures are prejudicial to growth in a manner ot understood while they do not interfere with repiration, or that the evolution of CO_2 which goes on at igh temperatures is not a normal process of a healthy lant.

It has been shown that the relationship of the volume f oxygen absorbed to CO_2 evolved is not affected y variations in the composition of the atmosphere, at it is a curious fact that destructive metabolism materially affected by the nature of the inorganic od supplied to the plant. Thus, germinating seeds pplied with a solution of nitre absorb the salt, and ie amount of CO_2 liberated is by this means much creased. This may be explained in one of two ways; ther a large amount of oxygen is set free by reducon of the nitrate, resulting in a more energetic oxidaon, or the absorption of the salt may be useful merely r constructive metabolism, resulting of course in a ore energetic life for the plant. The question at ice suggests itself, whether the whole of the oxygen ocessary for destructive metabolism might not be pplied from inorganic salts rich in oxygen; there pears to be no record of any experiments with this view.

Turning to inquire into the real meaning of e respiratory process we find our first knowledge this point to have come from Garreau. He und that two shoots of approximately equal size d weight, the one being bruised and the other sh, evolved different volumes of CO_2 in a ven time, the fresh shoot being much more enertic in respiration than the bruised one. He therere came to the conclusion that the process of respition was not purely chemical but rather vito-chemil, and that it was the property not of dead or dorant protoplasm, but of the active living substance. uriously enough, however, we find that in a germinng seed there is no loss of proteid substance, howr energetic the destructive metabolism may be, owing that if the protoplasm is destroyed it is immetely built up again. Now we know that sufficiently g deprivation of oxygen results in the death of the nt, which means that not only are the functions of wth, irritability, motility, etc., stopped, but also t the metabolic processes are arrested, and since most important of the metabolic processes is the f-decomposition of the protoplasm we may safely ume that respiration (that is oxidation) is essential the self-decomposition of the protoplasmic molee. Although it is quite impossible to know the ct action of the inspired oxygen in this relation, it alts, according to Pfeffer, in the formation of an unole compound made up of the protoplasmic molee united with the oxygen obtained from without. s unstable compound, similar, let us say, in proties to nitroglycerine, readily explodes (or unders decomposition) into a number of compounds of ch water and CO_2 are eliminated, heat being at the e time evolved, since the reaction is exother-. Bearing in mind that the amount of CO_2 lved and oxygen absorbed are not in a constant o, it cannot be assumed that the absorbed oxygen nmediately yielded up united with carbon to form . It is possible that the nitroglycerine-like mole- of oxidized protoplasm is, as indeed we should ect it would be, more stable at low temperatures, as previously stated the absorption of oxygen at temperatures is relatively greater than the evoluof CO_2. It has been found that when carbohye is the plastic material to be utilized in the nstruction of the protoplasm, the volume of oxygen rbed is practically equal to the volume of CO_2 ved, and it has been thought that this was due to complete oxidation of the carbohydrate into CO_2 water, according to the equation

$$C_6H_{12}O_6 + 6O_2 = 6CO_2 + 6H_2O.$$

is view has, moreover, secured some confirmation from the fact that the loss of weight in a starchy seed may be exactly accounted for by the loss of starch; but it seems rather unlikely, for it is hard to believe that the respiratory process, which like all other vital processes (and it has been shown to be vital) resides in the protoplasm, could be carried on by the latter and at the same time have no effect upon it. We are indebted to Vines for the following more reasonable explanation. He says: "Assuming that the evolution of CO_2 is attributable to the oxidation and subsequent decomposition of the protoplasmic molecule, which breaks up into a number of nitrogenous and non-nitrogenous compounds of a simple nature, and that under ordinary circumstances, given a sufficient length of time, the amounts of CO_2 evolved and oxygen absorbed are approximately equal, then if no restitution were to take place simultaneously, the whole of the protoplasm would shortly be destroyed. But it has been shown that the amount of proteid matter in a germinating seed is the same as before germination; hence there must be some restitution, and this restitution must be obtained from the decomposed starch;" or, to put it shortly there is a continual breaking down of the protoplasmic molecule with a simultaneous reconstruction at the expense of the plastic carbohydrate. This theory, if adopted, enables us to account for certain facts hitherto unexplained. As is well known, the germination of a fatty seed begins with the conversion of fat into starch, and it is also well known that during the germination of such seeds the absorption of oxygen is much greater than the corresponding evolution of CO_2; that is, at first, for when the whole of the fat has been used up the two processes are about equal. Now fat which we may regard for the sake of argument as olein ($C_3H_5(O{\cdot}C_{18}H_{33}O)_3$) is poor in oxygen, containing only about 10 per cent., while starch ($C_6H_{12}O_6$) is comparatively rich in oxygen, containing about 53 per cent., and this being the case, for the transformation of fat into starch a fixation of oxygen must take place. The process of germination of an oily seed may then be described as follows:—We know that protoplasm forms starch, therefore, when in order that this may take place the protoplasm undergoes decomposition into simpler nitrogenous and non-nitrogenous substances it must, for the formation of starch to continue, be reconstructed, and this is brought about as follows:—The nitrogenous products of a previous decomposition of protoplasm unite with the plastic carbohydrate to form more protoplasm, and since the carbohydrate (in this case fat) contains less oxygen than starch, oxygen is fixed from without, and hence the excess of oxygen absorption over CO_2 evolution. The above is of course only a possible theory. The whole subject requires, as Sachs tells us, much more patient and laborious research.

It appears from some researches of De Saussure that CO_2 and water are not always the resultant products of the decomposition of the protoplasm. In many cases there are, no doubt, substances formed which have a much more complex structure, and which may be classed under excretory products, though they may be useful to the plant in some unrecognized way. In the majority of such cases, however, the customary evolution of CO_2 and water has taken place. De Saussure found, however, that after allowing a piece of a stem of *Opuntia* to absorb 80 c.c. oxygen, he could, by means of the air-pump, obtain neither CO_2 nor oxygen from the organ. This pointed to the fact of the oxygen being fixed, and showed that the oxidized protoplasm had not, as is usual, undergone decomposition to form CO_2, for even if the CO_2 were held in loose combination it would by means of the pumping, have been set free. A theory to account for this has been suggested by the marked increase of organic acid which was observed in the organ during the experiment, an acid which was said to be oxalic. Under similar circumstances malic acid is said to have been detected. Such acids may be regarded as purely excretory products, analogous to resins, ethereal oils, etc., or according to Hugo de Vries they are useful in causing turgescence, and consequently of value in growth. If we accept this latter theory, then it is possible that such instances of formation of organic acid are by no means rare, but that generally, and particularly in the case of germinating seeds and shooting buds, oxyacids, useful chiefly in osmotic relations, may be formed as products of the decomposition of the protoplasmic molecule. This might occur either, as in opuntia, instead of formation of CO_2, or simultaneously with it.

In contradistinction to the above class of phenomena we have the case of the evolution of CO_2 not preceded by the absorption of oxygen. This phenomenon, known as "intra-molecular respiration," is not confined to the vegetable kingdom, for Pflüger found in 1875 that frogs not only continued to live in an atmosphere devoid of oxygen, but that they also went on evolving CO_2. He therefore concluded that both carbon and oxygen were obtained at the expense of the tissues of the animal itself. The same was noticed with fungi by Grischow in 1819, but the general eccentricity of the fungi, and the great difference of their vital processes from those of chlorophyll-containing plants, render the phenomenon in their case less significant. Dr. Wortmann has, however, shown that this so-called intramolecular respiration takes place amongst chlorophyll containing plants. He found in the cases of seedlings, flowers, and growing stems placed in an atmosphere devoid of oxygen that they evolved in the first few hours as much CO_2 as would be due to normal respiration in the atmosphere, but that subsequently the process sank considerably, and that during the experiment a small amount of alcohol was formed and given off. Whatever this intra-molecular respiration is, it is important to nôtice that it cannot produce the forces necessary for growth and irritability, and it is probable that it merely represents the decomposition of a quantity of oxidized protoplasm, formed before the plant was deprived of oxygen, in which case, of course, intra-molecular respiration could only last so long as there was a supply of intra-molecular oxygen.

As previously stated, a certain amount of the energy of destructive metabolism is lost to the plant, disappearing in the form of, in some cases, heat, in others of light, and rarely as electricity. These, therefore, must be regarded as the direct outcome of the respiratory process. The heat produced by germinating seeds has been already referred to, but the production of heat is, of course, according to the theory, general in the vegetable kingdom. The more active the destructive metabolism going on, the greater is the amount of heat produced; hence actively growing plants, germinating seeds, shooting buds, opening flowers show a well marked rise in temperature. Much heat is of course lost to the plant through radiation, convection, etc., but the most important source of its loss is due to the process of transpiration, involving, as it does, the conversion of water into aqueous vapour.

Turning to the case of the production of light, which is equally dependent on the respiratory process, we find it a phenomenon well known since the time of Pliny and Aristotle, usually under the name of phosphorescence. Much of this so-called phosphorescence observed in flowering plants is due to the encrustment of foreign mineral matter on the plant, and to the parasitism of fungi; and it is believed to be confined entirely to the latter and to *Algæ*. That this phenomenon, where existent, depends upon the destructive metabolism has been shown in various ways; *e.g.*, *Agaricus Melleus in vacuo* or in an oxygen-less atmosphere is no longer phosphorescent, and is luminous in water only so long as the latter has not been deprived of its free oxygen by boiling. The true nature of the phenomenon is unknown; it does not depend upon a previous exposure to light, nor yet upon the oxidation of some compound of phosphorus. We only know that its presence is due to the transformation of some of the kinetic energy produced by destructive metabolism.

Lastly, the rare cases of the production of electricity have been shown to be directly connected with the process of respiration; electrical disturbance, when existing, being no doubt due to some alteration in the protoplasm, which alteration is directly dependent upon respiration.

Obituary.

HENRY GROVES.

Henry Groves, the youngest son of Richard Groves, pharmacist of Weymouth, Dorset, and brother of T. B. Groves, was born in the year 1835, and educated mainly in London, at the then well known school in the Old Kent Road, under the care of Mr. Walton. He was apprenticed to his father, and on the completion of the term studied at the school of the Pharmaceutical Society, where in 1856 he obtained a certificate in the examination for botany and materia medica. Subsequently he was for two years with John Bell and Co., and then for three years with C. Delacre of Brussels. Returning home he assisted his father for a time, and then having heard of an opening in Florence repaired thither and completed the pharmacy which a Mr. Frazer had commenced at 15, Via Borgognissante. It is remarkable that Mr. Frazer's death was sudden, having been caused by accidentally swallowing a small set of false teeth. For nearly thirty years the business was carried on by Mr. Groves with great success, his pharmacy being the common resort of the English speaking residents and visitors of Florence, where it was understood that in addition to good medicines, kindly advice and help might always be relied upon. Naturally of a healthy and robust constitution, he for many years enjoyed life to the full, but some ten years ago symptoms of diabetes manifested themselves, which necessitated caution. Then a slight attack of paralysis supervened, from which, however, he had partially recovered, when a repetition on March 1, 1891, terminated his life almost instantaneously. The funeral took place at the Protestant Cemetery, outside the Porta Romana, Florence, and was very numerously attended by persons of all ranks and conditions. The flowers and wreaths, many of great beauty, required a special carriage for their conveyance. The newspapers, English and Italian, expressed in feeling terms the following day the general regret at the loss of one so universally loved and respected.

Mr. Groves, though an all-round chemist of unusually wide and varied experience, devoted himself mainly to the prosecution of botany, which for the greater part of his life he followed with ardour. When a lad he would walk to Portland Bill and back, a distance of twelve miles or more, in pursuit of his favourite occupation, starting at daybreak and returning in time for commencing the day's business. As a collector he speedily exhausted the Weymouth district, so that he gladly welcomed the fresh fields and pastures new offered by Italy. In 1871 he married a Genoese lady who thoroughly sympathized with his tastes, helped him with his collections and often accompanied him on his excursions. These were undertaken during the summer, when business at Florence comes to an almost complete standstill, and often were continued for [illegible] weeks at a stretch, the most out of the way and unexplored localities being chosen for investigation. In rn were visited Monte Argentaro, the Maremma, e Abruzzi, including Monte Marrone, Monte Majella, o., the Appian Alps, Monte Gioja, the Appenines, uth Italy, including Otranto, Taranto and Gallipoli, cily and Tunis.

Some of these trips exposed the party to considerable ivation, owing to the absence of places of shelter her than that offered by the squalid cabins of shepards, or the more wholesome if somewhat airy refuge orded by caverns. The necessaries of life had to carred on mule back, and the only meat obtainable s miscischia, the salted and air-dried flesh of some fortunate sheep or goat, killed by falling from a prepice. *Chenopodium Bonus-Henricus* was found not a d substitute for the usual green food of civilization.

In this way Mr. Groves amassed a very large collecon of dried plants, and obtained a knowledge of alian botany not perhaps excelled in his day. But addition to the plants of his own collecting he quired a vast number of European species by means exchange with the numerous small Exchange cieties to which he was affiliated. At the time of s death the total number of specimens in his erbarium amounted to close upon 50,000, the arrangent and custody of which had absorbed the greater rt of his spare time, leaving but little recreation. e whole of these, with the exception of a comparavely small number of cryptogams, has been left to e Central Botanical Society of Tuscany, to be inrporated with its present collection. Of this Society was one of the founders and sometime President. r. Groves succeeded in adding not a few new plants the Flora of Tuscany, and one new to science ceived the specific name of "Adalgisa," in honour of s wife. His contributions to pharmaceutical literature re as a rule connected with his favourite science. e might mention papers on Florentine Orris, on alian Saffron, and on Indigenous Tuscan Remedies. s last communication, "Then and Now," appeared t long since in the *Chemist and Druggist*, and was nerally regarded as both "witty and wise."

It is much to be regretted that an exhaustive paper *Statice*, his favourite genus, on which he had stowed great pains and spent much time in excurns to various points on the Mediterranean shore, s left at his death unfinished. It is hoped some mpathetic friend will put the finishing touches to it, d see it through the press. Mr. Groves contributed o to the Journal of the Linnean Society, of which was a Fellow, as well as to the proceedings of various alian societies.

Notice has also been received of the death of the llowing:—

On the 11th of March, Mr. William Henry Follett, emist and Druggist, Grantown Road, Everton, verpool. Aged 61 years.

On the 17th of March, Mr. Henry Thornber, Chemist d Druggist, Gadsby Street, Bedford. Aged 81 years.

BOOKS RECEIVED.

SYSTEM OF INORGANIC CHEMISTRY. By WILLIAM RAMSAY, Ph.D., F.R.S. London: J. and A. Churchill. 1891. From the Publishers.

W OFFICIAL REMEDIES, containing all the Drugs and Preparations contained in the Addendum (1890) to the British Pharmacopœia of 1885. By RALPH STOCKMAN, M.D., F.R.C.P.E. London: Percival and Co. 1891. From the Publishers.

TES ON THE EXAMINATION OF THE SPUTUM, VOMIT, FÆCES, AND URINE. By SIDNEY COUPLAND, M.D., F.R.C.P., etc. London: H. K. Lewis. 1891. From the Publishers.

TMENTS AND OLEATES, especially in Diseases of he Skin. By JOHN V. SHOEMAKER, A.M., M.D., etc., econd edition. London: F. A. Davis, 1890.

Correspondence.

THE EXAMINATION SCHEDULE.

Sir,—If it should be the intention of the Council to publish a new edition of the 'Schedule of Subjects for Major and Minor Examination,' on account of the alterations desirable, owing to the publication of the B.P. 'Addendum,' may I be permitted to suggest the importance of adding the subject of "Urine Analysis" to the practical examination in chemistry for Major candidates.

Probably this has been fully considered before the publication of the present schedule, but my inability to perceive the reason of its rejection must serve as my apology for making this suggestion. R. A. CRIPPS.

6, *Hampton Road, Birmingham.*

REUNIONS OF THE SOCIETY.

Sir,—It has been suggested that a few reunions of the Pharmaceutical Society might be held in the British Museum. It is now lighted by electricity and thrown open to the public certain evenings in every week.

No formal reception would be necessary, but a notice might be inserted in the *Pharmaceutical Journal* and other papers, to the effect that in a certain court on given dates there would be a reunion of pharmacists and their friends. I think many informal but pleasant evenings might thus be arranged, without any expense to the Society. RAGLAN.

THE NOMENCLATURE OF CERTAIN DRUGS.

Sir,—The excellent synopsis of herbal remedies by Mr. Holmes in a recent Journal, showing how two distinct species may be supplied under one vernacular name, reminds me that the fresh "mandrake root" supplied by herbalists and druggists in the north is (according to my experience) always that of *Tamus communis*, L., and not that of *Bryonia dioica*, L. It is used as a topical remedy for facial bruises. As an additional test to that of structure, I have repeatedly grown it from bought specimens, and always with the same result.

I have recently examined three examples bought as "Liverwort;" they all consisted of *Parmelia perlata*, L. I have also known *Cetraria islandica*, L., supplied for the same drug. In one of the numerous pamphlets issued by vendors of proprietary articles, "Liverwort is figured, the plant thus portrayed in fruiting condition is undoubtedly *Fegatella conica*, L.; the latter plant is much more common in this district than *Marchantia polymorpha*, L. *Salvia agrestis*, L. and *Teucrium Scorodonia*, L., are both sold as wood-sage; *Teucrium Canadense*, L., and *T. Chamædrys*, L., are both sold as germander. *Solidago odora*, Aiton, and *S. Virga-aurea*, L., are both sold as golden-rod. I have seen *Spiræa "alba"* quoted as meadow-sweet in a drug-list. Darby, in his 'Botany of the Southern States,' gives both "Meadow-sweet" and "Queen of the Meadow" under *Spiræa salicifolia*, L. *Sambucus Canadensis*, L., is supplied for elder as well as *S. nigra*, L. The bark of *Larix Americana*, Mich., is supplied as larch bark as well as that of *L. Europæa*, D.C. *Melissa officinalis*, L., is generally sold in this district as balm, but in a drug list I saw another Labiate plant, *Dracocephalum canariense*, offered as balm (sweet).

Bradford. WM. WEST.

THE IMPURITY OF SNOW.

Sir,—In the course of an investigation, I had occasion to examine some snow that fell during the recent storm.

As snow is always considered to be such an efficient cleanser of the atmosphere and nourisher of the soil, a certain amount of organic contamination was expected, but not having seen reports of other analyses of snow water, I am unable to state whether the proportions in this particular instance are abnormal.

Clean snow was collected on the morning of the 10th inst., and the water obtained by melting was fairly bright, but with a considerable amount of fibrous matter in suspension. On careful evaporation the blackish residue corresponded to 2·4 grains per gallon of total solids. Chlorides existed in faint traces and nitrites were absent.

Simple distillation and subsequent distillation after addition of alkaline permanganate yielded the following proportions of "free" and "albuminoid" ammonias:—

Ammonia—free . . . 0·16 parts per million.
Ammonia—albuminoid . 0·54 „ „ „

The presence of iron was proved very distinctly on the addition of NH_4HS. Possibly the greater part of this may be due to the comparative proximity of the "Black Country," and the northerly to north-easterly direction of the wind prevailing with great force through the storm.

Purity of snow, as a figure of speech, appears therefore to have no foundation in fact, even when collected in the heart of an agricultural area. Comparisons with results obtained from that falling in the centre of manufacturing districts would furnish much interesting matter for discussion. ALFRED MANDER.

MIST. OL. RICINI.

Sir,—In some notes on the "Pharmacopœia Additions," published in a recent number of this Journal (*Pharm. Journ.*, xxi., 598), I referred to the official formula for this preparation, and expressed the opinion—based on experience of other emulsions of the same class—that a neutral soap would have yielded a more perfect emulsion. Since the publication of these notes numerous experimenters have recorded their experience of the official process. Most of the experiments resulted in failure to produce a good emulsion while some few resulted in success.

Suspecting that these varying results were due not to manipulation, for the failures were generally recorded by pharmacists of the first rank, but to difference in the oil, and bearing in mind the soap theory, a small quantity of the emulsion was made with strict attention to official directions. The result was—so far as the production of an emulsion is concerned—a complete failure. The oil used was then tested for free fatty acid and found to be above reproach. The next step was to add a few drops of oleic acid to the abortive emulsion; the result was all that could be desired. Another lot of emulsion was then made, the oleic acid being added to the oil before commencing the operation. The emulsion "went" beautifully throughout.

In my opinion this simple experiment proves conclusively that the presence of free fatty acid in the oil is necessary to the production of a good emulsion by the official process. There is no doubt that the free fatty acid acts by combining with the potash to form a soap, and that it would therefore be a much more pharmaceutical method to use a neutral oil and a small quantity of neutral and tasteless soap, as suggested in the article mentioned above.

The result of this experiment brings to mind a much recommended formula for the production of an emulsion of almond oil by means of a minute quantity of ammonia. Sometimes this process gave perfect results, while at other times it was apparently useless. There can be little doubt that in this case also the varying results were due to the presence or absence of free fatty acid in the oil used.

G. GRIERSON.

AN INCOMPATIBLE PRESCRIPTION.

Sir,—In answer to your correspondent's letter, headed "An Incompatible Prescription," I may say that I prepared it with complete success in the following manner:—

Dissolve the soap (ʒij.) in the tincture and glycerine by means of a water-bath. Melt the lanoline in a dish and gradually stir the soap, etc., in, until cold. The resulting preparation is homogeneous and of a dirty lemon colour. If vaseline were used instead of glycerine the product would be much firmer. E. GEO. GAUL, *Pupil*.

18, *Borough High Street, London Bridge*.

Sir,—A nice preparation can be made of Mr. J. Clower's prescription given in last week's Journal by proceeding as follows:

Place the lanolin in a warm mortar with either the vaseline or the glycerine (either gives a satisfactory result) and mix well. Then add the tincture of jaborandi gradually, mixing thoroughly after each addition until all is incorporated. A little soft soap may then be added, but is useless as regards helping the mixing of the ingredients, as lanolin being a cholesterin, and not a fat, cannot be emulsified by alkalies. The result is a smooth, homogeneous ointment. G. L. WESTMACOTT.

Market Street, Manchester.

LIME WATER.

Sir,—Some twelve or fifteen months ago I placed ab a pound of well-washed calcium hydrate in a wide-mouth pottle bottle and filled this with distilled water supplied b a manufacturing chemist. The cork was securely capp with parchment paper and, after being well shaken for minute or two, the bottle was placed upon a shelf in t cellar. When, in a few days, the shop round needed r plenishing, I carefully decanted about a quart of the li water, immediately refilled pottle with distilled wa then corked, capped, shook and put away as at first. T operation has been repeated in every detail, at intervals two to fourteen days, up to the present time. No fr lime has been added, but the old has never been exposed the air and the pottle has been kept constantly full to t bung. Occasional tests were invariably favourable, to-day I tried it again alongside a sample prepared f fresh lime twenty-four hours ago and shaken at frequ intervals. Filtering off equal quantities of the two applying the B.P. volumetric test, the freshly made indicated 11·94 grains in the pint, and that made by continuous process 10·832 grains, *i.e.*, rather more 1 grain under the former. The temperature of the fluids was about 50° F., so that the weaker solution slightly above the B.P. estimate. Though som hurriedly performed in spare moments the experim were twice confirmed.

Sheffield. JOHN HUMPH

Sir,—In my letter in last Saturday's Journal, I gested an alternative process for making lime wa stating, however, that I had not tried it. I have now so, with the following result: Made with tap water, specimen contained only 2 grains CaO per half although it had been standing a week. The outs the calico that had been immersed was found t covered with a coating of granular crystals of cal carbonate, which coating possibly interfered with sol of the lime inside. A second lot, made with dist water (by continuous distillation) contained 9 grains half pint. Upon the whole, therefore, the process be recommended as a satisfactory one.

WILLIAM JOH

ESTIMATION OF CONIINE.

Sir,—In the very valuable paper upon tincture of con which appeared in last week's *Pharmaceutical Journal*, notice that Messrs. Wright and Farr have adapted process for the estimation of the alkaloids of fruits to the tincture of that drug, with the necess modifications. I, however, observe that they have a solution of dry HCl in chloroform for the final opera of converting the alkaloids into hydrochlorates. I shall be glad to know if this alteration is intentional, as I have always employed a solution of dry HCl in anhydr ether, and have not observed any disadvantages atten its use; on the other hand it possesses two manifest vantages, viz.:—(1) The evaporation in a current of proceeds much more rapidly. (2) The ethereal HCl ke well, whereas the chloroformic solution undergoes de position with liberation of chlorine; this, if used, w probably produce chlorinated substitution products of alkaloids, thus vitiating the final result.

Of course, the decomposed chloroformic solution be purified by suitable treatment; but the ethereal s tion requires nothing of the kind.

R. A. CRIP

A Chemist of Twenty-Five Years' Standing.—The ject of your suggestion is provided for in respect to future legislation by the "Interpretation Act."

W. J. T.—Lead chloride is formed and free chlorine.

NOTICE OF MEETINGS.

Photographic Society.—Tuesday, March 31.—Exhib of Lantern Slides.

Chemists' Assistants' Association.—Thursday, April Musical and Social Evening.

COMMUNICATIONS, LETTERS, etc., have been received fr Messrs. Andrews, Sutton, Gill, Warden, Mahommed.

THE PRELIMINARY EXAMINATION.

BY J. E. SAUL.

I purpose, in the course of this article, addressing a few straightforward observations to the pharmacists of Great Britain on a subject which has long lain near my heart. I ask especially the attention of members of Council and of other influential members of the Society. During the tumult of discussion on the projected institution of a compulsory curriculum, through which for a decade we have now passed, the subject which is the *raison d'être* of this paper has received the very scantiest attention. And yet every pharmacist of position with whom I have conversed has admitted the soundness of the views I now desire to lay before your readers.

There are two unpleasant facts which have for a long period been notorious. The first is that the proportion of failures in the Minor examination is exceedingly high; and the second that a very considerable number of those who are successful have not that sound knowledge of their subjects which will stand in after life the cold test of practical experience. To meet these two most serious evils, one remedy has been officially proposed, and that remedy, the value of which is almost universally admitted by educationalists, is the establishment of a compulsory curriculum. It is very confidently anticipated that such a course will not only emasculate the "cramming" system, but that the slaughter of the innocents, the terrible percentage of failures in the Minor, will become a thing of the past. Now I am prepared to agree in the main with the first of these anticipations. The consideration of its soundness does not, at any rate, concern us here. But the second, I am convinced, is only in a partial and most limited sense admissible. I am, as may be expected, rather intimately acquainted with the mental calibre, the state of culture, the general quality of the persons who are now candidates for the technical examinations. I have made it my business, in the execution of my duty as an examiner, to keep an observant eye on the broader phases of pharmaceutical education. I have not rested satisfied with simply estimating the knowledge of individuals, but have watched with keen interest the general standard of the whole body of candidates. My experience has impressed me deeply. A very great number, almost the majority, of those who are entering or endeavouring to enter our calling are seriously deficient, not only in general education, but also in intellectual capacity. They have not had a moderate, much less a liberal, education; and —here is the fundamental misfortune—very many of them have not the minds to appreciate or derive adequate profit from such a training. My esteemed colleagues on the English Board of Examiners have over and over again deplored to me the general lack of culture which is everywhere apparent. Now it is abundantly manifest that the establishment of a compulsory course of technical training will only very partially meet this difficulty. The proverb tells us out of what it is impossible to make a silk purse, and I will defy the most gifted professor to manufacture thinking practical pharmacists from young men without brains, or who are hopelessly deficient in elementary education. This fact is a commonplace of educational practice. In all the professions, where theoretical science has to be acquired, a good scholastic training, tested by examination, is insisted upon. In pharmacy a very considerable amount of scientific knowledge is demanded by the Legislature. Pharmacists themselves, keenly alive to the necessities of their calling, have endeavoured to maintain a high standard in the technical examinations. The theoretical knowledge required of candidates may be said to be almost unusually broad; so wide, indeed, is the field, that if the energy of a man of parts, now diffused, were concentrated on one only of the numerous subjects, he would almost necessarily become conspicuous for the depth and thoroughness of his special attainments. And, we may ask, on what broad basis of early education is this great fabric to be reared? The answer, to tell the truth, is ludicrously short. A little English grammar and composition, a little elementary arithmetic, and some equally elementary Latin. The student may have found that ancient Bridge of Sighs, the *pons asinorum*, insurmountable, and the expression $a \times b$, incomprehensible. There is no occasion for him to have discovered that the 'Iliad' is not the work of the ex-premier, that English is not the only speech worth knowing, that Paris is situated in France, that Queen Anne has gone over to the majority. Of Euclid, elementary algebra, general literature, modern languages, geography and history, he need never have read, much less have studied a line.

Now the pharmacist, above all things, should be an accurate man. The law gives him control of poisons so virulent that a single grain, miscalculated or badly weighed, may rob a nation of its darling hero. To inculcate this accuracy, the sheet-anchor of the pharmacist, there is nothing to equal the mental gymnastics of a course of training in Euclid or algebra. In addition to extreme accuracy, the pharmacist requires to be master of a mind, broad and well stored with general information. Otherwise it is hopeless for him to learn intelligently, much less to assimilate and systematize the numerous subjects of his examinational schedule. Our present system, I submit, is a reversal of the right order of things, an attempt to place the pyramid upon its apex. Logically, the Preliminary examination should be proportionally more difficult than, or at least as difficult as, those which are to follow it. Looked at from the common-sense standpoint, the imposition of a narrow easy Preliminary, followed by a broad difficult technical examination is, to speak plainly, a cruel thing. True kindness would say to the misguided youth who was never destined in after life to pass his Minor, "Friend, you have neither the ability nor the elementary attainments that would be required to convert you into a creditable pharmacist. Go, whilst you are still young, before money and time have been wasted upon a useless apprenticeship, and learn to dig, or to sell bacon, or to shoot the Queen's enemies. If you cannot pass the Preliminary you will never be able to pass the Minor." Now we only require the converse to be true, and the ideal state is reached. A man who has passed the first examination should *ipso facto* be thoroughly satisfied that given health, strength, opportunity and perseverance he need never dread the Minor or the Major. This is what the institution of a compulsory curriculum is hoped to effect. Well, it is, no doubt, Utopian to anticipate under any human system the attainment of the ideal—the absolutely perfect. But of this I am convinced, from my experience of pharmaceutical candidates, that until a thoroughly efficient Preliminary examination is established, an examination that shall strain out the half educated and the brainless, no compulsory curriculum in technical subjects will ever effect this result.

It is pitiable that a man who has passed his Preliminary in his boyhood, who has gone though the drudgery of an apprenticeship, and has been engaged in pharmacy for six or eight or ten long years in the heyday of his youth, should find it practically impossible to obtain the qualification he yearns for, but which deficiency of intellect or of training places altogether beyond his reach. And yet this is what is occurring month by month under the present system. In these days fairly high class education is easily available to all who are likely to succeed as pharmacists, and I wish to impress upon all members of the Society the necessity of broadening the Preliminary by bringing it more into accord with the present conditions of middle-class education. A growing proportion of our youths are passing the numerous excellent examinations which are accepted in lieu of the Preliminary. In no instance, I think, will it be found that such examinations have only been passed in the three subjects we require. Now if the policy of abolishing our own Preliminary altogether and accepting only for a scholastic examination the certificate of a scholastic body—which, indeed, may be said to have been adopted when conduct of the Preliminary was handed over to the College of Preceptors—if this for various reasons be considered impolitic, then the reasonable course should be followed of making the examination a real test of general education.

It is unnecessary for me here to go into details, but I would suggest that the present schedule should be amended by the suppression of Cæsar as an alternative with Virgil. In addition, I would add elementary algebra as far as simple equations, the first book of Euclid, one modern foreign language, and English history or geography at choice. The inclusion of an elementary physical science as a compulsory subject I am not disposed for various reasons to advocate.

Such I consider to be the *minimum* requisites of an examination professing to indicate the possession of a moderate not to say a liberal education. I observe that it is in contemplation to make some alterations in the Society's Bye-laws. It is therefore seasonable to direct attention to a change that I am convinced is at least as urgently required as the much talked-of curriculum.

THE MERCURIC TEST FOR MYDRIATIC BASES.

BY A. W. GERRARD.

In the *Pharmaceutical Journal* of March 8, 1884, I described a group test distinguishing atropine, hyoscyamine, daturine, and.. homatropine from other alkaloids. The test pointed out that the above pure bases, when gently warmed with a 5 per cent. solution of mercuric chloride in spirit and water, gave a red precipitate of mercuric oxide. Since its publication the test has been confirmed by Professor Flückiger, Dr. Schweissinger, and others. With the publication of the recent 'Additions' to the British Pharmacopœia the test has appeared officially in that work in connection with hydrobromate of homatropine. The official test differs from mine by the use of a 2 per cent. solution of mercuric chloride instead of a 5 per cent. solution, a difference of little moment. Quite recently the test has been criticized by P. W. and A. H. Squire in their 'Supplement to the Companion to the B.P.,' especially as regards hyoscyamine. These authors remark that treated in the same way as hydrobromate of homatropine, "hyoscyamine salts give the yellow precipitate which, however, does not turn red." Having but little doubt of the correctness of my former work, it was yet thought desirable to repeat my experiments. This has been done, and the results are fully confirmatory of former statements. Fortunately I possess samples of the different bases prepared by myself, so can vouch for their authenticity. Together with these purchased samples have been tested; in all cases the results were the same.

As the method of applying the test requires care it is as well to repeat it here. Place about $\frac{1}{16}$ grain of pure hyoscyamine, extracted from a salt by ammonia and chloroform, upon a watch glass or in a test tube, carefully add 20 minims of 2 per cent. solution of mercuric chloride in proof spirit, watching the change. At first the hyoscyamine becomes pale yellow, then darkens a little, finally on heating a well marked red precipitate is formed. How the Messrs. Squire failed to obtain a like result it is difficult to understand, but either the testing or the hyoscyamine must have been at fault.

As regards hyoscine Messrs. Squire state that it yields no mercuric oxide under the above test. This I have confirmed, so it is a character which enables us easily to distinguish hyoscine from other mydriatic bases.

NATAL ALOES.

BY E. M. HOLMES, F.L.S.

There has for many years been a difficulty in determining the botanical source of the article known in commerce as "Natal," or sometimes as "Hepatic" Cape aloes.

In appearance the drug bears a strong resemblance in colour and opacity to true Hepatic aloes, but differs from it in four particulars, (1), in odour, which resembles that of Cape aloes; (2), in the colour of the powder, which has a greenish-brown, not yellowish-brown, tint; (3) in the chemical reaction with nitric acid, and (4) in the fact that it yields a distinct aloin.

Some months since, hoping that more light might be thrown on the question by examining the juice of leaves of authenticated plants, I suggested to Messrs. Bainbridge and Morrow that they should investigate the subject from this point of view. Their results, published in the *Pharmaceutical Journal* ([3], xx., p. 570), were unexpected, and led to the conclusion that *Aloe succotrina* alone, of all the leaves examined, was the most likely source of the Natal aloes of commerce.

I then wrote to Mr. J. Medley Wood asking him to make further inquiry concerning the botanical source of the drug, and the Director of Kew

Gardens, who had already most courteously furthered my wishes by supplying the aloe leaves necessary for Messrs. Bainbridge and Morrow's investigation, also wrote officially to Mr. Wood, with the result that the latter sent some aloes prepared in Natal (as described in the Kew *Bulletin*, No. 44), to Kew (see *ante*, p. 495). A small portion of this was kindly placed at my disposal by the Director. This specimen, however, resembled Cape aloes in its translucent appearance, and not Natal aloes.

This specimen I handed to Mr. Bainbridge to test in the same manner as the aloes previously examined. As will be seen from the table given by Mr. Bainbridge the aloes, although translucent, agrees with the opaque Natal aloes and with the juice of *A. succotrina*, in its chemical reactions.

I then asked him to make comparative experiments with some aloes and aloe juice obtained from plants growing near Port Elizabeth, which were presented February 9, 1885, by Mr. Albert Walsh, of the firm of B. G. Lennon and Co., together with a living plant. The plant I had compared at Kew with the living specimens in the collection there, and it appeared to agree fairly well as regards the leaf with *Aloe platylepis*, Baker. The plant presented by Mr. Walsh was handed to the then Curator of Kew Gardens, Mr. Smith, for cultivation, but it died without flowering.

The results of Mr. Bainbridge's examination shows that this aloes corresponds with the Cape aloes, and not with that known as Natal.

I may add that I carefully evaporated some of the juice in a water-bath soon after its arrival, but that the resulting aloes was *translucent*.

I think it may therefore be concluded, since the translucent Natal aloes sent by Mr. J. M. Wood gave the same reactions as opaque or Hepatic Natal aloes, that the aloes known in English commerce as Natal, or Hepatic Cape aloes, is the product either of *Aloe succotrina** or some species the juice of which gives the same chemical reaction, and that its opacity is probably due to some peculiarity in the mode of manufacture. Further, it appears probable that different species are used in different districts in Natal, and that no botanist has yet seen the opaque aloes manufactured.

It may be hoped that Mr. J. Medley Wood, aided by the light already thrown on the subject by Messrs. Bainbridge and Morrow, may be able ultimately to clear up the history of the opaque Natal aloes.

EXAMINATION OF SPECIMENS OF SOUTH AFRICAN ALOES.

BY J. BAINBRIDGE.

Some specimens of aloes and aloes juice were recently handed to me for examination by the Curator of the London Museums of the Pharmaceutical Society. These consisted of, (1), a small sample of the aloes from Natal, sent to Kew by Mr. J. Medley Wood, a note upon which, quoted from the Kew *Bulletin*, has already appeared in the *Pharmaceutical Journal* (p. 495); (2), aloes prepared from a South African species, and believed by Mr. E. M. Holmes to be *Aloe platylepis*, or an undescribed species closely allied to it; (3), some juice of the last-named, which had been in the Museum since 1885.

For the sake of uniformity in the results the same method of testing was adopted for these samples as described in the *Pharmaceutical Journal*, January 18, 1890, p. 570.

There is an absolute identity in the results between the specimen of *A. ferox*, obtained from Mr. Wood, and the large number of commercial specimens of Natal aloes that had been previously examined. In comparison with the aloes obtained from plants grown at Kew, I find that it resembles most closely in its reactions those obtained from *A. succotrina*. The only reaction in which they do not agree is the bromine test, but this reaction is not considered as a proof that the commercial Natal aloes are not derived from this species, but that it is possible that the property might be lost on keeping or by fermentation. The reactions of the aloes from the plant supposed to be *A. platylepis* are similar to those of commercial Cape aloes.

The results are recorded in the following table:—

Table of Results.

Specimens.	HNO_3.	H_2SO_4 and vapour of HNO_3.	Cripps and Dymond.	C. and D., with NH_4HO.	Bromine test.	Fe_2Cl_6.
Natal aloes, from "*A. ferox*," J. M. Wood . .	Permanent crimson.	Blue.	Deep crimson.	Intense brown-red.	No effect.	Olive-green.
A. ferox, grown at Kew.	Evanescent crimson.	Green.	Pale yellow.	Red.	Violet.	Olive-green.
Commercial Natal aloes .	Permanent crimson.	Blue.	Deep crimson.	Intense brown-red.	No effect.	Olive-green.
A. succotrina, grown at Kew	Permanent crimson.	Deep blue.	Crimson.	Intense brown-red.	Deep purplish-red.	Olive-green.
Aloes prepared from *A. platylepis*, grown near Port Elizabeth . . .	Green after standing a few mins.	Nil.	Orange-red.	Pale claret.	Nil.	Olive-green.
Juice of *A. platylepis*. .	Beautiful emer-green	Nil.	Orange-red.	Pale claret.	Nil.	Olive-green.

THE ALKALOIDS OF WHITE HELLEBORE ROOT (VERATRUM ALBUM).

BY GEORG SALZBERGER.

(*Concluded from page* 746.)

PROTOVERATRINE.

The protoveratrine crystallizes, as already noticed, very readily. The crystals and mother liquor contained in the flask after distillation of the ether are washed into a crystallizing dish with a little ether, and allowed to stand under a bell jar for a few days, until the crystallization is complete. The mother liquor is then poured off, the crystals washed upon a filter with a little ether, and recrystallized out of absolute alcohol. The latter operation requires some care, as the alkaloid with increasing purity dissolves with the more difficulty in absolute alcohol, and possesses also the unpleasant characteristic of only partially crystallizing out from dilute alcohol, the dissolved portion separating as a yellow syrup, impossible to again obtain crystalline upon evaporation of the solvent. A large loss may however be avoided by boiling the crystals a few minutes with a small quantity of alcohol, filtering with the aid of a hot water funnel into a crystallizing dish, in which the crystallization is soon complete, and employing the mother liquor to dissolve a fresh quantity. In this way the whole mass can be recrystallized, a little fresh alcohol being added from time to time to replace that lost by evaporation in the frequent boiling. The total yield of protoveratrine is however very small, amounting to only about 0·3 gram per kilo of root.

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* Since the reactions given by the juice of *A. ferox*, Mill., in the Kew Gardens and those of the juice of the plant believed by Mr. Wood to be *A. ferox* are different, it is obvious that the evidence is not sufficient to attribute Natal aloes (as distinct from Cape), to *A. ferox*. Further comparison of Mr. Wood's *A. ferox* with allied species may show that it is distinct.

The alkaloid crystallizes out of dilute solutions in extremely thin microscopic plates, generally rectangular, but sometimes of hexagonal shape through removal of two diagonal corners. Out of concentrated solutions the base separates in finely formed, one to two mm. long, colourless, shining crystals, belonging to the monoclinic system. Protoveratrine does not decompose when exposed to air. In quite pure condition it is soluble with difficulty in nearly all general solvents, and quite insoluble in water, benzol and petroleum ether. Chloroform and boiling 96 per cent. alcohol dissolve comparatively considerable quantities; cold ether takes up very little, boiling ether somewhat more. The alcoholic solution distinctly blues red litmus paper. Dilute acids, with exception of acetic acid, dissolve the alkaloid rapidly.

The solution is at first tasteless, but a bitterness is gradually noticeable, and a marked feeling of numbness of the skin of the mouth and lips. The smallest particles introduced into the nostrils cause extraordinarily violent sneezing. Protoveratrine is extremely poisonous, and in subcutaneous doses of 0·5 milligram kills full-grown rabbits.

The powdered crystals dissolve slowly in concentrated sulphuric acid with greenish coloration, the solution then becoming blue and finally, after some hours, violet. Mixed with sugar and concentrated sulphuric acid, as for the veratrine colour test, it can readily be distinguished from the latter alkaloid, as a green colour at first appears, changing gradually to olive-green, dirty green and finally to dark-brown. Warmed with concentrated sulphuric, hydrochloric or phosphoric acid, protoveratrine colours, at first bright and later dark cherry-red, and evolves vapours of the odour of isobutyric acid. The base is precipitated from cold concentrated solutions of its salts by ammonia, but dilute solutions are only precipitated upon warming, when the whole of the alkaloid falls out of solution in the form of four-sided plates. Nessler's reagent, gold chloride, potassium-mercuric iodide, potassium-cadmium iodide and phosphotungstic and picric acids also produce voluminous precipitates in the alkaloidal solutions, but tannic acid and platinum and mercuric chlorides form no insoluble compounds.

Protoveratrine blackens and melts at 245–250°C. The elementary analysis of the substance dried at 115° gave the following results:—

	Found		Calculated for
	I.	II.	$C_{32}H_{51}NO_{11}$.
C . . .	61·06	61·26	61·44
H . . .	7·95	8·04	8·16
N . . .	2·22		2·24

Protoveratrine Gold Chloride.

$C_{32}H_{51}NO_{11}HCl,AuCl_3$.—This salt, which separates as a voluminous, golden-yellow, amorphous precipitate from a freshly prepared dilute hydrochloric acid solution of the base upon addition of gold chloride, affords a means of estimating its molecular weight. Since all attempts to obtain the salt crystalline proved fruitless, it was prepared for analysis by washing upon a pump-filter with water, pressing between unglazed paper and drying over sulphuric acid protected from light. The substance so obtained did not lose weight at 120° and therefore contained no water of crystallization. Upon incineration a distinct odour of isobutyric acid was observed and 20·26 per cent. gold was obtained as residue in place of 20·38 per cent. calculated. This is the only salt obtained sufficiently pure for analysis.

From various observations and experiments it appears that protoveratrine quickly decomposes in acid solution; even neutral solutions show a decrease in physiological activity after some days. In sulphuric acid solution the characteristic smell of isobutyric acid becomes so quickly and distinctly apparent, that the reaction may well serve for the identification of protoveratrine. This property suggests that the new base is analogous in constitution to veratrine and contains an ester group within its molecule. As a matter of fact, in an attempt to prepare the sulphate by slow evaporation of the sulphuric acid solution, rhombic plates crystallized out, which gave a beautiful violet colour with concentrated sulphuric acid, and upon recrystallization were converted into prisms with a melting point between 150° and 160°C. As their physiological activity was also less than that of protoveratrine, there is little doubt that the substance was a decomposition product of that alkaloid, but unfortunately material did not suffice for the continuation of experiments in this direction.

Although a comparison of the empirical formulæ of protoveratrine $C_{32}H_{51}NO_{11}$ and veratrine $C_{32}H_{49}NO_9$ demonstrate an apparent near relationship of the two alkaloids, the previous description of the properties of the former exclude all idea of their identity. Furthermore the physiological action of the protoveratrine is not only quantitatively but qualitatively different from that of the veratrine. Nearer information concerning its pharmacological value is reserved for another paper.

PROTOVERATRIDINE.

By the baryta method of extraction, besides jervine and rubijervine, two bases crystallizing in four-sided plates, and giving a reddish violet colour with concentrated sulphuric acid, were obtained, but by the metaphosphoric acid treatment these bodies were not met with. As just observed, however, a body giving the same colour reaction may be derived from protoveratrine. A sufficient quantity of these two bases was available for a cursory examination, and the name protoveratridine was given to one, the formula of which was established with some degree of certainty, since it, if not the both, is probably a decomposition product of protoveratrine.

Of protoveratridine about 6 grams remained undissolved upon the recrystallization of the crude jervine obtained by the baryta method. The base could only be brought into solution by large quantities of chloroform or 95 per cent. alcohol, and after several recrystallizations separated in the form of colourless, four-sided plates with a melting-point of 265° C., soluble with great difficulty in alcohol, chloroform, methyl alcohol and acetone, and insoluble in benzol, petroleum ether and ether. Protoveratridine does not excite sneezing and is non-poisonous, but its solutions in dilute acids taste very bitter. With a drop of sulphuric acid a violet, afterwards a cherry red colour, similar to the final colour with veratrine, obtains. A solution in strong hydrochloric acid turns also, like that of veratrine, of a bright red hue upon warming.

but with protoveratridine a distinct odour of isobutyric acid is also evident. The same is observed when sulphuric acid is employed, thus demonstrating the near relationship of this base to protoveratrine. Protoveratridine dissolves quickly in weak acids and is reprecipitated by ammonia in a crystalline state. The solution of its sulphate gives copious precipitates with phosphotungstic, picric and tannic acids, and also with potassium-mercuric iodide, but none with platinum chloride, potassium-cadmium iodide or Millon's reagent. Upon heating the air-dried substance to 105° C. no loss of weight occurred, and upon combustion the following mean results were obtained :—

	Found.	Calculated for $C_{26}H_{45}NO_8$.
C . . .	62·38	62·52 per cent.
H . . .	8·75	9·01 „ „
N . . .	3·08	2·8 „ „

Protoveratridine Platinochloride—

$(C_{26}H_{45}NO_8,HCl)_2PtCl_4+6HO_2$.

For the estimation of the molecular weight of protoveratridine this salt was employed. As already remarked, platinum chloride produces no precipitate in the aqueous solutions of the salts of the base, but upon addition of alcohol, the double salt separates out after some time in large hexagonal plates. These were collected upon a filter, washed with alcohol, and dried over sulphuric acid. Upon heating to 100° C. the salt lost 6·99 per cent. water of crystallization, and upon careful incineration, during which a distinct skatol odour was recognized, 13·58 per cent. platinum remained as ash, results that agree with the above formula.

In the attempts to purify the amorphous base separated by the baryta method, a second base was isolated, agreeing with protoveratridine in colour reaction and crystalline form, but distinguished by another melting point, between 190° and 200°, and its easy solubility in alcohol. Only sufficient substance was obtained to furnish two elementary analyses affording results agreeing with the formula $C_{26}H_{45}NO_{10}$.

PSEUDOJERVINE.

Pseudojervine was discovered by Wright and Luff, who isolated it in a pure state, analysed and assigned to it the formula $C_{29}H_{43}NO_7$. It is not obtained by the baryta method above described, probably owing to its extreme insolubility in ether. It is removed by chloroform, however, from the mother-liquors obtained by the metaphosphoric acid treatment after their previous extraction with ether. The chloroform residue is at first amorphous, but assumes a crystalline structure upon treatment with strong alcohol. Recrystallized out of alcohol, in which it is with difficulty soluble, it is obtained in broad thin hexagonal tablets with rounded corners, which refract light strongly. The yield is small, only about two and a half grams altogether being isolated. Pseudojervine does not dissolve easily in benzol, is almost insoluble in petroleum ether, ether and toluol, and dissolves in concentrated sulphuric acid with a green coloration. The alcoholic solution blues litmus paper.

The sulphate crystallizes in long shapely prisms which are easily soluble in water; the hydrochloride may be obtained in indistinct sphæro-crystals, but separates in a gelatinous condition from alcohol and is soluble with difficulty in water, although not sufficiently so to render washing with hot water advisable, as recommended by Wright and Luff. The base is precipitated from solution of its salts by ammonia in a cheesy condition, whilst gold chloride, potassium-mercuric iodide, potassium-cadmium iodide, picric, tannic and phosphotungstic acids also produce precipitates, though platinum chloride does not.

Pseudojervine has no water of crystallization and, dried by 110°, gave the following results upon analysis :—

	Found. I.	Found. II.	Calculated for $C_{29}H_{43}NO_7$.
C. . .	67·15	67.33	67·31 per cent.
H. . .	8·48	8·25	8·31 „
N. . .	2·89	—	2·70 „

It was observed to melt between 300° and 307°, though Wright and Luff give 299° as its melting point.

The gold salt, $C_{29}H_{43}NO_7HCl,AuCl_3$, was obtained as a yellow, flocculent precipitate upon addition of gold chloride to the hydrochloric acid solution of the base; filtered, pressed between unglazed paper and dried over sulphuric acid, the product did not lose in weight at 80° and gave 22·78 per cent. gold upon incineration, against 22·95 per cent. required by the above formula. These results agree well with Wright and Luff's observations and assigned formula.

JERVINE.

This alkaloid is the most abundant in *V. album*, and is obtained in comparatively large quantities by both the baryta and metaphosphoric acid methods of extraction. In the first case the crystals which separate from the ethereal solution consist principally of jervine, whilst in the second method the greater part is precipitated by the metaphosphoric acid. For its separation from rubijervine Wright and Luff's method of trituration of the crystalline mass upon the water bath with dilute sulphuric acid was found most convenient. The almost insoluble jervine sulphate is filtered off from the aqueous solution of rubijervine sulphate, and the free base regenerated from the washed and dried product by boiling with alcohol and carbonate of soda. Recrystallized several times out of alcohol, it is obtained in the form of satiny prismatic crystals.

Jervine is fairly soluble in methyl, ethyl and amyl alcohols, chloroform and acetone, with difficulty in ether, and almost insoluble in benzol and petroleum ether. Solutions of its salts yield precipitates with picric and phosphotungstic acids, potassium-mercuric iodide, gold and platinic chlorides; they are rendered turbid by tannic acid and potassium-cadmium iodide, but remain unchanged by mercuric chloride. The base is precipitated in fine needles by ammonia.

In concentrated sulphuric acid jervine dissolves first with a yellow, then with a green coloration, thus resembling pseudojervine in colour reaction. Upon boiling with strong hydrochloric acid only a slight yellow coloration is observed.

The alkaloid forms fairly insoluble salts with sulphuric, hydrochloric, and nitric acids, but the acetate and phosphate are easily soluble. The melting point of the pure body is from 238° to 242°C. (Wright and Luff give 237°.) No water of crystallization was observed in the product dried over sulphuric acid. The mean of five elementary analyses gave the following results :—

	Found.	Calculated for $C_{26}H_{37}NO_3$.
C . . .	75·70	75·91 per cent.
H . . .	9·16	9·00 „ „
N . . .	3·49	3·41 „ „

Jervine hydrochloride, $C_{26}H_{37}NO_3$, $HCl+2HO_2$.—This salt separates in micro-crystals upon addition of sal-ammoniac to the acetic acid solution of the alkaloid. Out of strong alcohol it crystallizes in fine quadrilateral prisms. It dissolves with difficulty in alcohol and gives the same colour reaction as the free base with concentrated sulphuric acid. The chlorine weighed as silver chloride gave in two estimations 7·91 and 7·81 per cent. HCl, as compared with 8·15 per cent. required for the above formula. The air-dried substance lost 8·53 and 8·18 per cent. of its weight at 100°, against 7·44 per cent. theoretically required for two molecules of water of crystallization, an error probably caused by a slight mechanical admixture of water with the air-dried salt.

Jervine Nitrate, $C_{26}H_{37}NO_3,HNO_3$.—Upon dilution of a solution of a half gram pure jervine in glacial acetic acid, and addition of a saltpetre solution, the nitrate at once crystallized out, and by recrystallization from alcohol was obtained in fine hexagonal prisms without water of crystallization. The nitrate dissolves in concentrated sulphuric acid with a golden yellow colour, changing to brown.

Jervine Gold Chloride, $C_{26}H_{37}NO_3,HCl,AuCl_3$, has been already described and analysed by Wright and Luff. It may be prepared by adding sufficient gold chloride to a boiling hydrochloric acid solution of the alkaloid. After a short time the salt crystallizes in fine prisms on the sides of the vessel, and is collected and dried away from light over sulphuric acid. The former authors ascribe to it a molecule of water of crystallization, removable at 100° C., but no loss of weight was observed at 85°, whilst above that temperature partial decomposition, accompanied by violet coloration, occurred. An unmistakable coniine odour was observed upon careful incineration.

Jervine Platinum Chloride, $(C_{26}H_{37}NO_3,HCl)_2PtCl_4 + 1\frac{1}{2}H_2O$, falls as a pale orange-red precipitate upon addition of platinum chloride solution to a solution of the base in glacial acetic acid.

The results of analyses of the free base, its hydrochloride and nitrate and its gold and platinum compounds, all agreed with Wright and Luff's formula for jervine, $C_{26}H_{37}NO_3$, and not with that of Tobien, $C_{27}H_{47}N_2O_3$.

An attempt to introduce a methyl group into the jervine molecule failed, the hydriodide, crystallizing in prisms and melting by 275°, being obtained.

RUBIJERVINE.

This alkaloid is precipitated by ammonia from the filtrate from crude jervine sulphate in a gelatinous condition. Out of alcohol it crystallizes in well-formed long prisms, resembling jervine. The pure base dissolves easily in phosphoric, acetic and dilute nitric acids, but with more difficulty in dilute hydrochloric acid. Moistened with concentrated sulphuric acid the crystals dissolve with a yellow colour, which gradually changes to orange and finally to dark red. By cautiously warming with strong hydrochloric acid a reddish violet solution is obtained, which throws down an amorphous precipitate upon continued heating. A beautiful violet-coloured solution also obtains when the alkaloid is warmed with phosphoric acid upon the water-bath, the colour turning to orange upon evaporation of the solution. No characteristic odour was observed in any of these reactions.

Rubijervine dissolves easily in warm chloroform, benzol and methyl alcohol, with more difficulty in ethyl alcohol and very slightly in ether and petroleum ether. The alcoholic solution blues red litmus paper. Copious precipitates are produced in sulphuric acid solutions by gold chloride, potassium-cadmium iodide, potassium-mercuric iodide, and picric and phosphotungstic acids; stannic acid causes only a slight turbidity and Millon's reagent and platinum chloride produce no visible effect. The melting point of rubijervine is between 240° and 246° C. (Wright and Luff found 236°). The air-dried alkoidal lost one molecule of water of crystallization at 120° and gave the following results upon analysis:—

	Found.		Calculated for
	Salzberger.	Wright and Luff.	$C_{26}H_{43}NO_2+H_2O$.
C . .	77·44	77·48	77·80
H . .	10·50	10·89	10·72
N . .	3·14	3·38	3·49
H_2O .	4·48		4·29

The following five alkaloidal constituents of white hellebore are therefore recognized with certainty:—

Protoveratrine, $C_{32}H_{51}NO_{11}$.
Protoveratridine, $C_{26}H_{45}NO_8$.
Pseudojervine, $C_{29}H_{43}NO_7$.
Jervine, $C_{26}H_{37}NO_3$.
Rubijervine, $C_{26}H_{43}NO_2$.

ON GRASS-TREE GUM.*

BY J. H. MAIDEN, F.L.S.

Part I.—Particulars more or less applicable to all the Species.

Botanical Origin.—Grass-tree "gum" is the produce of various species of *Xanthorrœa*. There are twelve species of this genus, which belongs to the Liliaceæ, and several (perhaps all) exude resin from the caudex. A synonym of one or more species is *Acaroides resinifera*, Gray.†

Writers on the subject have usually simply alluded to the resin as that of *Xanthorrhœa*, without denoting the species, and sometimes without giving a description of the resin. Under these circumstances, it is frequently impossible to denote with certainty the species alluded to. Still of the species obtained from Sydney, it may generally be said that the light (yellow) coloured resin is the product of *X. hastilis*, while the darker (red) one must have been obtained from *X. arborea*.

The plants are always known as "grass trees," owing to the rush-like or grassy tufts of leaves which adorn the stem. In the very early days they were sometimes called "dwarf palm trees." The term grass-tree "gum" is of course scientifically untenable, as it is insoluble in water; it is soluble in spirit and it is a true resin. It is occasionally called "black-boy gum," and in English books now and then "acaroid resin" or "gum acroides." It has also been called "Botany Bay resin."

Collection and Commerce.—"Grass-tree gum" is in small demand, the ordinary retail price being from fourpence to sixpence a pound in Sydney, and the wholesale price of course much less. As usually found in commerce, the resin of *X. hastilis* is in very small pieces (almost powder), or else these small pieces are aggregated, forming a friable mass. In this state it is more or less impure, being mixed with soil and fragments of the bases of the leaves. *X. arborea* resin is usually in larger masses. After a bush-fire (or even the heat of the sun) has passed over grass-trees, the heat causes the resin to run into more or less spherical masses, which are sometimes also darkened, either from destructive distillation, or possibly by admixture with carbon particles. I have some pieces as spherical as if turned in a lathe. These masses can be picked out either from the interior of the charred stump, or from the ground at the place where a grass-tree once grew. Such masses present the resin in a very pure form, but collecting in this way would entail too much labour to be profitable commercially.

Following is a description of the method of obtaining grass-tree "gum."

The articles required are an axe, a flail, a coarse sieve, and a sheet. The stems of the grass-trees are chopped down, broken up into convenient pieces, and allowed to fall into the sheet. A stout stick or flail completes the work of disintegration. The substance is then passed through the sieve, the ligneous portions of the grass-tree for the most part failing to pass hrough its meshes. A general breeze is considered suffiient to winnow what has passed through the sieve, nd render it ready for the market. But it often comes Sydney without having been subjected to any winowing process.

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* From the 'Proceedings of the Linnean Society of New South Wales.'

† I have been at much pains to endeavour to trace this genus. It has nothing to do with Asa Gray's visit to Australia, as it was in use at least as early as 1796 (see 'Bibliography'). It is not to be found in the *Genera Plantarum* of Bentham and Hooker, nor in any of the works of similar scope in the French and German languages to which I have had access. I suppose, therefore, that it never had any claim to the acceptance of botanists, and it might be consigned to oblivion except that it originated the names "acaroid resin" and "gum accroides," which are to be seen in English standard works by the score. The former is even used in a work of high importance published in the present year (Morley and Muir's Watts' 'Dictionary of Chemistry'). It is apparently a name coined by English druggists to denote a product which came to them without a name, and it has never been used in Australia, so far as I can learn.

An interesting (though now somewhat out of date) ccount of grass-tree "gum," by Mr. P. L. Simmonds, ill be found, *Pharm. Journ.*, [2], viii., 78. It is, howver, to be observed that the collection of the resin ow gives employment to very few persons.

Following are some remarks on *Xanthorrhœa* resins y the expert appointed to report on such substances t the Colonial and Indian Exhibition ('Reports,' p. 86). Coming from such a source they carry weight, nd are an encouragement to endeavour to properly lace grass-tree "gum" on the market. The complaint s to the unequal quality of the commercial article hould be taken to heart by those concerned.

"One may regard the resinous element of the *Xanhorrhœa* gums as the constituent more immediately o be utilized industrially, as one would suppose the European markets to be open to receive a very large mount of this material, if sold in such a form that he average consumer could see it readily. The crude um does not look very attractive to the purchaser in he European market, as it contains a large—and what s worse, a very variable—percentage of matter inoluble in alcohol; and its purchase would involve an ssay of each consignment, together with the attendant nconveniences, and the possibility of misunderstandng. Apart from this, it must be remembered that manufacturers—especially small manufacturers—have rooted, and not altogether unreasonable, objection to use a variable article, as it disturbs the routine of their operations. All these considerations—to say nothing of the saving of freight—point strongly to the desirability of roughly purifying the resin before sendng it to Europe. A sufficient purification is a very simple matter, and could be well carried out on the spot where the material is found, thus saving expense n land as well as ocean transit. It would suffice to soften the crude gum by heat, and to squeeze the softened resin through cloth or through a fine iron wire netting, such as is used for straining gutta-percha. The heat of boiling water is sufficient for the purpose. The separated resin could well be put on the market as an approximately constant article—varying mainly as regards colour—and one which numberless small producers could use in their trades. The water in which the crude gum is boiled dissolves out more or less colouring matter, and also astringent or tanning substances,* and possibly, if the purification were undertaken on a larger scale, these might be turned to account."

Uses.—The aboriginals prepare cakes of it for the purpose of fastening on the heads of spears, etc. But I have no doubt that a good deal of the "black gum" which is frequently referred to in books as being used for that purpose, is the product of a *Myoporum*, probably *M. platycarpum*.

The complete heads of W.A. spears are "stained with the gum of *Xanthorrhœa* to render them smooth and impervious to moisture" (Brough Smyth, i., 336, 340, 341).

Grass-tree "gum" is frequently used instead of shellac, in the manufacture of inferior sealing wax.

It is used by Chinese polishers, and also by some Europeans, as a substitute for shellac in French polishng; but its use for such a purpose is to be deprecated, for the following reasons:—Work done with it is more or less sticky at first, though afterwards it frequently becomes so hard and brittle as to peel off like blistered paint. The result, whichever of the two things happens, s that French polish cannot subsequently be used on the article except after stripping. Other objections are that the wood darkens and often shows a play of colours. Also, water leaves white marks if splashed on the grass-tree gum polish; from benzoin or shellac polish it can be wiped off without injury.

Mr. Charles Moore ('Reports, Sydney Int. Exhibition,' 1879) states that grass-tree gum is "used for coating the bottoms of punts and small boats, and is said to be a good preservative."

It could probably be used in candle-making, for it burns by itself with a bright flame, and mixes with fat in all proportions. It is used in the manufacture of sealing-wax, lacquers, japanners' gold size, etc., and generally as a substitute for shellac. "An excellent spirit varnish" is said to be made from this resin by adding to about one gallon of methylated spirit (cold) about 2½ lbs. of "gum," about ¾ lb. of common resin, and ½ lb. of shellac, and then straining through a muslin cloth.

The medicinal properties of grass-tree gum appear to be not well-marked. As early as 1795 acaroid resin was said by Kite "to neither vomit, purge, nor bind the belly, nor to act materially as a diuretic or diaphoretic. Dr. Fish (*Boston Journ.*, x., 94) employed it in the form of tincture with opium in fluxus hepaticus and the colliquative diarrhœa of phthisis, and it has been recommended in chronic catarrhs. A tincture of acaroid resin which has been given in doses of 1 to 2 fluid drachms, with milk or a mucilaginous liquid, has been recommended to be made of equal weights of the resin and alcohol, and, according to another formula, of 2 ounces of resin to 1 pint of alcohol. If used at all, the latter formula would appear to furnish a preparation of the proper strength" [Prof. H. C. Maisch].

The *Xanthorrhœa* resins have been repeatedly suggested as possessing some value in perfumery, but they are inferior for this purpose to benzoin, storax, and the balsams of peru and tolu. Some of them which contain benzoic acid are aromatic when burnt, and owe their pleasant odour wholly or in part to that substance. Abundance of picric acid, a very powerful yellow dye, can be obtained from grass-tree "gum." But this substance can be so cheaply made from coal-tar, that grass-tree gum is not now thought of for that purpose. The result is that many storekeepers in the colonies, who eagerly bought up grass-tree "gum" as a speculation, with the view of exporting it to England, have for years past had stocks on hand, and quantities now sold have frequently been gathered say fifteen or twenty years.

Part II.—Xanthorrhœa hastilis (the species usually alluded to by writers as grass-tree "gum").

XANTHORRHŒA HASTILIS, R.Br., 'B.Fl.,' vii., 115.—Found in New South Wales and Queensland.

This remarkable plant, and its exudation of resin, attracted the very early attention of the first colonists. Probably their attention would have been invited to it in the first instance by the blacks, who still use it as a cement, as has already been mentioned. For the earliest actual allusions to the resin of *X. hastilis*, I am indebted to Barton's 'History of New South Wales.'

On the 15th of May, 1788, Governor Phillip alludes to "the yellow gum found on the dwarf palm tree."

On the 18th of November of the same year "an officer of marines" speaks of "some of which have been used medicinally with success by the surgeon Mr. Considen, particularly the yellow gum, a substitute for balsam of tolu." The statement is hard to comprehend, as grass-tree "gum" is as unlike balsam of tolu as it can possibly be, nor has its use in medicine been continued.

Both Surgeon-General White and Governor Phillip notice it in the books they wrote on the Colony. Following are their statements:—

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* These products are only present in insignificant quantities, and utterly unworthy of commercial notice.—J. H.M.

"*The Yellow Resin Tree.*—But the most valuable product of this plant seems to be its resin, the properties of which vie with those of the most fragrant balsams. The resin exudes spontaneously from the trunk; the more readily if incisions are made in its bark.[*] It is of a yellow colour; fluid at first, but being inspissated in the sun, it acquires a solid form. Burnt on hot coals it emits a smell very much resembling that of a mixture of balsam of tolu and benzoin, somewhat approaching to storax. It is perfectly soluble in spirit of wine, but not in water, nor even in essential oil of turpentine, unless it be digested in a strong heat. The varnish which it makes with ether is very weak, and of little use. With respect to its medicinal qualities, Mr. White has found it in many cases a good pectoral medicine, and very balsamic." (Dr. James Smith, in "Journal of a Voyage to New South Wales," by John White, Esq., Surgeon-General to the Settlement, 1790, p. 235. No figure of this plant is given, but some old basal leaves are figured.)

In "The Voyage of Governor Phillip to Botany Bay," 1790, a crude figure of this *Xanthorrhæa* is given, and (p. 51), concerning the resin, it says . . . . "in appearance it strongly resembles gamboge, but has not the property of staining. . . . The resin is generally dug up out of the soil under the tree, not collected from it, and may perhaps be that which Tasman calls 'gum-lac of the ground.'"

Its ordinary appearance in the bush is of a dirty crimson colour. It readily fractures, and it is then seen that this colour is only superficial, and that the resin is yellow or orange coloured, strikingly like (in appearance) gamboge, and sometimes like the artificial Burgundy pitch of the shops.

It is well known for the pleasant perfume it exhales when exposed to sufficient heat to volatilize it without decomposing it completely. In Curtis' *Bot. Mag.*, 79, 4722, it is alluded to as "spear-yellow gum," and the statement is made that it is "now used, we are told, as incense in the Roman Catholic churches of the Colony."

In Wagner's 'Chemical Technology' (Crookes), p. 484, the statement is made that "New Zealand resin, the produce of *Xanthorræa hastilis*,[†] is now frequently used instead of shellac." No species of *Xanthorrhæa* extends to New Zealand.

The following are a few experimental notes on this interesting resin.

A sample collected by the author near Sydney represents the resin in a very pure form, as no pains have been spared to pick out lumps free as possible from adventitious matter. It possesses a sweet odour, similar to that of benzoin, which is much increased on powdering the substance. It fractures readily with a shining fracture and is reducible with the greatest facility to an impalpable powder. No substance bears a greater resemblance to it than powdered gamboge, although that pigment is perhaps a shade darker. Exposure to the light causes the resin to change its colour to Indian red, which is the external colour of masses of pure resin. This colour is only superficial. It does not soften in the mouth, but crunches readily, tinging the saliva yellow, and tasting of benzoic acid to a far greater extent than *X. arborea*.

In boiling water the resin melts, the water becoming slightly turbid and of a lightish yellow colour.

Petroleum spirit extracts 1 per cent. of a fragrant body, but apparently containing no benzoic acid.

Alcohol digested on the residue dissolves 94·6 per cent., forming a beautiful yellow liquid. As evaporation proceeds, benzoic acid in beautiful feathery crystals separates out, and the resin collects at the bottom of the vessel, the whole smelling strongly of benzoic acid. This resin melts at 97·7° C. Beyond applying the usual tests for that substance,[*] nothing further was done in regard to it, for lack of time.

The accidental impurity was 5·3 per cent. (vegetable débris and sand).

A second sample purchased in Sydney is in small pieces admixed with a little ligneous matter. The description already given of this resin will apply here, except that it has a lower melting point, the heat of a Sydney summer fusing it and causing it to run together in the bottles. It is very strongly and deliciously aromatic. Petroleum spirit extracts 2 per cent. of a pale coloured sticky substance, which is probably a mixture of essential oil and resin.

A third sample from Shoalhaven, N.S.W., collected August 14, 1886, was then examined.

Petroleum spirit dissolves out 2 per cent. The general effect of cold alcohol and subsequent slow evaporation is the same in this sample as in that already described. The alcohol dissolves out 91·7 per cent. of resin and benzoic acid combined. The residue (accidental impurity) amounts to 8·1 per cent.

This interesting resin has formed the subject of chemical researches for nearly one hundred years. Following are abstracts from some of them,—none of them recent. A modern research is a desideratum.

"Of a darker reddish-yellow than gamboge, frequently covered with a greenish-grey crust. Brittle, of shining fracture, triturable to a greenish-yellow powder. Does not stick to the teeth. Tastes sour and aromatic, and has an agreeable balsamic odour. Contains a very small quantity of an agreeably-smelling volatile oil; a resin soluble in alcohol and ether, and also in alkalis and baryta- and lime-water; a little benzoic acid and bassorin (Laugier, *Ann. Chim.* 76, 265). Its solution in ether or alcohol leaves on evaporation a dark resin, containing, at 120°, 66·98 per cent. C, 5·73 H, 27·29 O, corresponding to the formula $C_{40}H_{20}O_{12}$, and almost entirely precipitable from its alcoholic solution by water, even in the presence of a large quantity of ammonia." (Johnston, *Phil. Trans.*, 1839, 292).

"The resin gives up to boiling water benzoic acid and gum. It dissolves in oil of vitriol, forming a pale brown solution, which is precipitated of a violet-red by water. It colours acetic acid yellow, without dissolving in it to any great extent, and dissolves easily in alcohol, ether, some volatile oils, and partially in fatty oils, forming in all cases fine yellow solutions" (Widmann; Lichtenstein), [Gmelin's 'Handbook.']

"Colour deep yellow, with a slightly reddish shade, considerably resembling gamboge, but darker and less pleasing. The colour of its powder is greenish-yellow. When gently heated it melts, and when strongly heated it burns with a strong smoky flame, and emits a fragrant odour resembling balsam of tolu. The resin contains a trace of an essential oil, to which much of its agreeable smell is owing. This oil passes into the receiver when the resin is distilled with a mixture of carbonate of soda and water, but its quantity is so small that I was unable to examine it more closely. The resin is insoluble in water, but dissolves readily both in alcohol and in ether, especially in the former. Its solution in alcohol has a brownish-yellow colour; the addition of water precipitates it as a dark yellow mass, but it does not crystallize out of its alcoholic solution when left to spontaneous evaporation, but remains as a varnish. When digested with strong alkaline lyes it readily dissolves and forms a brownish-red solution; and when the alkali is neutralized with muriatic acid, the resin is precipitated considerably altered as a dark brownish brittle mass.

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[*] I have never heard of a *Xanthorrhœa* being subjected to this treatment. It has no bark, but shows scars of leaves like a tree-fern.

[†] Perhaps kauri resin (*Dammara australis*) is, however, meant.

[*] Stenhouse obtained a quantity of cinnamic acid in far greater abundance than the benzoic acid, from a sample of *X. hastilis* resin examined by him. But, although I carefully examined the groups of crystals obtained, with regard to physical appearance, and also mixed both them and samples of the original resin with binoxide of manganese and sulphuric acid, I failed to obtain cinnamic acid. I hope some time, however, to give the resin a more thorough examination.

"On concentrating the solution out of which the resin has been precipitated, and allowing it to cool, a quantity of impure reddish crystals resembling benzoic acid are gradually deposited. It requires repeated and long-continued digestions with the strongest alkaline lyes to remove the whole of this crystalline acid from the resin, which retains it with very great tenacity. The quantity of the acid is by no means great. It is not easily purified, as its crystals are apt to retain a trace of a reddish colouring matter, from which it is very difficult to free them. The easiest way of getting rid of it is by dissolving the impure crystals in a small quantity of alcohol and then adding water; the greater portion of the colouring matter is retained in solution, while the crystals are precipitated tolerably white. When purified by repeated crystallizations, they become quite colourless. In appearance, taste and smell they closely resemble benzoic acid.

"The quantity of carbazotic (picric) acid which Botany Bay resin yields when treated with nitric acid is so great, and it is so easily purified, that this resin seems likely to prove the best source of that substance. When the resin is subjected to destructive distillation in an iron or copper retort, it yields a very large quantity of a heavy acid oil mixed with a very small quantity of a neutral oil, which is lighter than water. If, however, the resin has been previously digested with alkaline lyes, so as to remove all the cinnamic and benzoic acids it contains, the heavy oil is obtained as before, but none of the light essential oil. The acid oil is readily soluble in soda and potash lyes; in its smell and properties it resembles creosote; when it is digested with nitric acid, it is wholly converted into carbazotic acid, and when a slip of fir-wood is dipped in it, and then moistened with either muriatic or nitric acid, the deep blue colour passing quickly into brown, so characteristic of hydrate of phenyl, is immediately produced, with which substance the oil appears completely identical. The light oil above mentioned, the quantity of which is extremely small, is separated from the hydrate of phenyl by saturating it with an alkali and distilling the mixture in a glass retort with a gentle heat. In smell and properties it resembles benzine, and is most probably a mixture of benzine and cinnamene; unfortunately the quantity obtained was so small, that I was unable to subject it to more particular examination." (Stenhouse, *Phil. Mag.*, June, 1846.)

In *Journ. Soc. Chem. Ind.*, iv., 97, will be found a series of constants, by Mills and Muter, of bromine absorptions, for eight samples of *Xanthorrhœa* resin, comprising *X. hastilis*, *X. Preissii*, and possibly others.

Part III.—Other Species of Xanthorrhœa.

Xanthorrhœa arborea, R.Br., 'B.Fl.,' vii., 115.—Found in New South Wales and Queensland. Monga, near Braidwood, N.S.W., 4th and 5th October, 1886.

This sample is in large concentric masses, consisting of the remains of leaves (*in situ*) cemented together with the resin, the resin usually being so abundantly in excess that large pieces of the pure substance are readily obtainable. The inner portion of these masses is a true mould of the caudex. Where the resin weathers it is seen to be of a liver-colour, but it readily fractures (in a very similar manner to gamboge), and shows a very bright fracture. The colour is pleasing, and I can only describe it as of a rich purplish-brown inclining to crimson. It is readily reducible to a fairly fine powder, which is of a dull burnt sienna-brown, admixed with a few dark particles. The powder possesses a faint aromatic odour, from which the lump appears quite free. It tastes slightly of benzoic acid. It softens in boiling water, but does not appear to dissolve to any extent. It almost entirely dissolves in rectified spirit, forming a rich port wine-coloured liquid.

Petroleum spirit digested on the resin extract ·3 per cent. of a yellowish resin destitute of odour. If the residue be digested in alcohol, 94·2 per cent. is dissolved out. This consists almost entirely of a deep orange-brown resin. As evaporation proceeds, a few minute needles of benzoic acid are observed to crystallize out, while the concentrated alcoholic liquid smells slightly of the same substance. But in no instance was the benzoic acid in anything like the comparative abundance in which it was obtained in the case of *X. hastilis*. Therefore, when only these two resins are in question, they may readily be distinguished (1) by their colour, (2) by the difference in quantity of benzoic acid.

The accidental impurity amounted to 5·5 per cent.

Neither of this nor of any other *Xanthorrhœa* resins did time permit me to make a qualitative examination of the resin; nor were the products of distillation inquired into.

Sample from Oatley's Grant, George's River, near Sydney.

Petroleum spirit extracts ·3 per cent.

The effect of alcohol is the same as on the preceding sample. It extracted 89·8 per cent. The residue (9·9 per cent.) consisted of débris from the bases of the leaves, and no trace of free carbon could be detected by means of a lens. This observation is interesting in view of the statement I have made above to the effect that the darkening of *Xanthorrhœa* resin may be due to the presence of carbon after bush-fires. This particular sample was gathered by me from the midst of a freshly-extinguished bush-fire, where everything was black and charred, and the resin, dug up almost from the surface of the ground, was black likewise. The resin is a little darker in tint than the other samples of *X. arborea*, both before and after treatment with alcohol, an effect which seems simply due to the heat alone, without admixture of carbon. Numerous other samples will require to be collected and examined before this point is settled.

Three different *Xanthorrhœa* resins were found by Hirschsohn to be incompletely soluble in chloroform and ether, but to dissolve completely in alcohol, the solution acquiring a brown-black colour with ferric chloride. "The solution of the acaroid resin is yellow,* and yields with lead acetate a precipitate, while the solutions of the other two resins are red, that of *X. quadrangulare* being not disturbed by acetate of lead, while that of *X. arborea* produces with the same reagent a turbidity; the chloroformic solution of the latter is yellow; that of the former colourless."

The specimen labelled *X. arborea* at page 148, Cat. Museum Pharm. Soc. (London), is *X. hastilis*, from the description of the resin given.

Xanthorrhœa australis, R.Br., 'B.Fl.,' vii., 116.—Found in Tasmania and Victoria.

The shapes which the resins of the various species of *Xanthorrhœa* assume are quite accidental. Some of these forms are described under various species, and refer to specimens which have actually been examined. The resin of this species "is found in masses of irregular globular shape, within the body of the tree, and exuding in large tears and drops near its roots. It is a dark red friable substance, the purer homogeneous specimens exhibiting a most brilliant ruby colour when crushed into fragments; it fuses readily with the same deep colour, and exhales the characteristic odour of gum benzoin and dragon's blood under such circumstances. In many respects it resembles the last-named substance, but its solutions are less intensely red, inclining to yellow, while as a varnish it has much more body and gloss. It is very soluble in alcohol, and in the essential oils from the *Eucalypti*, that from the Dandenong Peppermint (*E. amygdalina*) proving an exception. Ether takes up a portion only, leaving behind a resinous substance coloured more intensely red than that which it dissolves; turpentine exercises no solvent action upon it, and the drying oils but very little." (Rep. of Indigenous Vegetable Substances, Victorian Exhib., 1861).

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* *X. hastilis* is evidently meant here.

XANTHORRHŒA PREISSII, Endl., 'B.Fl.,' vii., 117.—"Boro Blackboy." Syn. *X. Drummondi*, Harv. Found in Western Australia.

It grows from 20–30 feet high, and is said to produce more resin than any other Western species. From its tenacity, it is used by the natives in making their hatchets, hammers, etc., and in fixing the glass to their spears. They also are said to make from it a bright yellow paint, with which they smear their bodies. This species is referred to in the following:—

"In 1854, Captain Wray, R.E., submitted a report to the authorities of Western Australia on the manufacture of illuminating gas from grass trees, at one-third the expense of lighting with oil and candles. The method of obtaining the material was as follows: —In the first instance, the leaves and resin were separated from the core by breaking up the plant with an axe, and sifting the resin from the leaves: but it was found by experience that as much gas was obtained from an equal weight of the leaves and resin together as from the resin alone. The quantity of resin obtained from an average 'grass-tree' was about 45 lbs. weight. This was collected easily at the rate of 5 lbs. per hour by a person with an axe and sieve. The quantity of pure gas obtained was at least four cubic feet to the pound of resin and leaves; but much more might be obtained by a more complete apparatus. A cart-load of the plants, eight in number, weighed 1,048 lbs. When the core was removed, the leaves and resin weighed 628 lbs. The core is very good fuel when mixed with other wood. The specific gravity of the gas is ·888. The products of the distillation are gas, tar, and coke. The tar obtained was about one quart for every ten pounds, and this, when redistilled, gave 8 per cent. of naphtha and 20 per cent. of a sweet, spirituous, non-inflammable liquor. The coke remaining was about one-quarter the original weight, and with other fuel burns well. The coke of the leaf has a bright, shining appearance, and when ground with oil is a very good substitute for lamp-black in paint. The gas has a smell somewhat similar to coal-gas, not nearly so offensive, but sufficiently strong to make any escape immediately perceptible. Its illuminating power appears to be very superior to coal-gas, and its light very white." (P. L. Simmonds in *Journ. Soc. Arts.*)

XANTHORRHŒA TATEANA, F.v.M., in Muell. 'Cens. Supp.' 1, for 1885.—Kangaroo Island, South Australia.

There years ago I received from Mr. J. E. Brown, the Conservator of Forests of South Australia (now Director-General of Forests of this Colony), the handsome resin of this new species. It is obtainable in large pieces free from woody matter. It is more or less vesicular. It breaks up and powders with the utmost facility. The fresh fracture is very bright, and of a rich pure ruby colour; the powder is dead, and of the colour of excellent chrome-orange. The colour of the lumps, originally of a ruby colour, becomes dulled by the friction of the masses against each other, and so becomes from liver-colour to chrome-orange.

Neither in lump nor in powder has the resin any odour at ordinary temperatures.

The finely-powdered substance give up a little colour (yellow) to cold water, when digested in it. The colour appears to be most marked in this species, although in other *Xanthorrhœa* resins there is a trace of colour. When the water is heated, the resin melts and becomes of a blood-red colour, the liquid becoming turbid at the same time.

Petroleum spirit extracts ·1 per cent. of resin, which appears to be without colour, and is without odour. Rectified spirit dissolves the whole of the remainder (there is but a trace of impurity), forming a beautiful ruby-coloured liquid. Benzoic acid crystallizes out from the resin, and appears to be intermediate in quality between that yielded by *X. arborea* and *X. hastilis*, under similar circumstances.

THE PHARMACY ACTS AMENDMENT BILL.

The following criticism of the Pharmacy Bill appeared in the *Globe* for the 25th ult.:--

"Sir,—You kindly published last year my letters bearing upon this subject, and I again ask your permission to call attention to an error in the proposed 'Bill to Amend the Pharmacy Acts,' which was read for the first time in the House of Commons on Friday last, March 20. The Bill is certainly a great improvement in every respect on previous Acts, especially as it provides for an efficient and compulsory education of all who enter the business; but, unfortunately, a very vital mistake has been made in inserting in Clause 6 words which will render the Bill perfectly useless for protecting the public from incompetent and ignorant dispensers. I quote the paragraph to which I allude—'And it shall be unlawful for any person to compound medical prescriptions for sale unless he be a person holding one or other of the qualifications set forth in the foregoing portion of this section, "or be acting under the supervision of such qualified person."' I certainly do not agree with the words, 'or be acting under the supervision.' This is, undoubtedly, a loophole evidently put in to please a few members of the trade who keep a plurality of shops to enable them to evade the Act by employing any number of unqualified persons under the guise of 'supervision.' Even if it contained the words 'immediate supervision,' as the Bill was originally drafted, it would not be a sufficient safeguard to the public. As a practical man, I can say it is impossible for a qualified person to look after one assistant, and to guarantee correctness of dispensing, unless he did nothing else but to watch every bottle which the assistant takes from the shelf and see that he has the right quantity in his measure or the right weight in his scales. There is now plenty of time, and it is hoped Parliament will interfere and strike out these objectionable words before the Bill becomes law. A solicitor may employ an unqualified clerk to draw up deeds, but the solicitor has the advantage that he can detect an error if he chooses to read the deed; but certainly a chemist cannot detect an error so easily. He may tell whether one pungent ingredient has been used instead of another by the smell, or he may detect an error in the directions for taking the medicine, but he cannot say without analysing the mixture whether some poisonous substance has been used instead of some harmless ingredient. If a chemist has more prescriptions to dispense than he can do himself, he can afford and ought to engage a qualified assistant to assist him, or he may employ unqualified men or women in any other branch of his business, but he has no right to risk the life of his customers to an ignorant person, any more than a medical man is justified in sending an unqualified assistant to see to his patients.—I am, Sir, etc.,

CHEMICUS."

The Pharmaceutical Journal.

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SATURDAY, APRIL 4, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

THE Council meeting last Wednesday was attended by eighteen members. Two pharmaceutical chemists were elected members and one chemist and druggist. Forty-one persons were elected associates of the Society, thirty-four were elected apprentices or students, and several persons were restored to their former status in the Society. The SECRETARY reported that he had received twenty-five nominations for the fourteen vacancies in the Council, and that nine of the nominees had declined or not expressed their willingness to become candidates, so that in addition to the members of Council who retire, and will be again candidates for election, there are only two candidates for a seat upon the Council, Mr. H. N. B. SPINK, of Westminster, and Mr. C. W. BOTWOOD, of Dartford. For the appointments as Auditor five nominations have been received for the re-election of those now holding the office, all of whom have expressed their willingness to accept office if elected.

On the motion of the PRESIDENT, seconded by Mr. HAMPSON, the proposed Bye-laws approved at the last meeting of Council were read for the second time. The report of the Finance Committee presented no feature of exceptional interest to require notice and it was adopted unanimously. On the recommendation of the Benevolent Fund Committee two grants of fifteen pounds each and three grants of ten pounds each were made, and the VICE-PRESIDENT drew attention to the fact that Mr. WM. HOW of Bournemouth will be a candidate for an annuity at the next election of the Royal Masonic Benevolent Institution, with the view of obtaining for him the support of masonic brethren. The request was supported by Mr. RICHARDSON, who mentioned that a masonic lodge has now been established in connection with the pharmaceutical craft, and by Mr. ATKINS, who stated that Mr. How's case is deserving of all support.

In the report of the Library, etc., Committee the final result of a reconsideration of the question as to the official celebration of the Society's jubilee was communicated. It has been decided that there shall be a reception in the Society's House on the evening before the annual meeting, at which ladies are to be invited to be present. A committee has been appointed to make the necessary arrangements. It was also recommended that the presentation of the Hanbury Medal should take place on the same occasion. In reference to the decision as to the official celebration of the jubilee the PRESIDENT stated that some difficulty had been experienced in arranging for the official work, and for anything in the shape of entertainment within the time that was available; but that while conforming to the decision of the Council not to hold a conversazione of the usual character, it was intended to provide refreshments in the Examination Hall as well as instrumental music. Invitations to the reception and to the dinner on the Wednesday evening have already been sent to a number of persons, abroad and at home, holding official positions connected with pharmaceutical work, but as yet no opinion can be formed as to the number of those likely to attend the official celebration. Possibly, as Mr. ATKINS suggested, that part of the function might not be regarded with very great interest, except by those who are more closely connected with the work of the Society, and while they would find ample accommodation in the lecture theatre, many others would prefer to have opportunities of conversing with friends in other parts of the Society's premises.

Speaking on behalf of the Committee of the Chemists' Ball, the PRESIDENT mentioned that he had been deputed to hand to the Treasurer of the Benevolent Fund a cheque for £27 1*s.* 6*d.* as a contribution from the proceeds of this year's Ball. This makes up a total of five hundred guineas contributed to the Fund from that source during the twenty-five years that it has been established.

Mention has been made on a previous occasion of a proposal to found and endow a scholarship in connection with pharmaceutical education which was made when the PRESIDENT attended the meeting that took place in Manchester last October. The arrangements for carrying this into effect have now been completed, and the deed of trust relating to the scholarship was laid on the table by the PRESIDENT at the meeting last Wednesday. The donor does not wish his name to be disclosed, but from the appreciation he has for the services rendered to education by the Pharmaceutical Society, he desires that body to act as trustee of a fund of about one thousand pounds for the furtherance of its work in that direction. The title chosen is that of the "Manchester Pharmaceutical Association Scholarship," and one condition of its award is that the apprentices or assistants who become candidates must reside in Lancashire or in the neighbouring parts of Derbyshire. The successful candidate at any award will have the option of carrying on his studies in the laboratory of the Pharmaceutical Society or in a school approved of by the Council in the provinces. This condition has been made with the view of enabling a student to pursue his studies without coming in London, and in anticipation of the future establishment of schools suitable for the education of pharmacists in various parts of the country and among others in Manchester. On the motion of the **President**, seconded by Mr. **Hampson**, a cordial vote of thanks was unanimously passed to the generous founder of the scholarship, and wishes were expressed that his example might be followed by other members of the calling throughout the kingdom as a suitable mode of providing a stimulus to education that would be very advantageous. That such a result is to be looked for in other localities may be regarded as certain if the maxim as to the influence of Lancashire leading, to which Mr. **Harrison** referred, be still as applicable as it has been in the past.

A communication from the Sheffield Chemists' Association relating to infringements of the Pharmacy Act was referred to the General Purposes Committee. The report of that Committee stated that in several cases of prosecution the defendants have paid penalties, some others are standing for trial, and proceedings were recommended in three cases that have been reported. The report and recommendations were unanimously adopted.

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next at 17, Bloomsbury Square, when a paper will be read on "The Arrow Poison of the Pigmies," by Staff-Surgeon Parke, of the Stanley Expedition, and Mr. E. M. Holmes. The chair will be taken at eight o'clock, but the theatre will be open an hour previously, in order to afford facilities for the examination of specimens and apparatus that may be exhibited.

* * *

On another page will be found a "First List of Stewards" for the forthcoming Jubilee Dinner of the members of the Pharmaceutical Society and their friends, which is to take place at the Criterion Restaurant on Wednesday, May 27. It will be seen that a large number of gentlemen, including nearly all the surviving "Founders" of the Society, have already come forward to assist in securing the success of the festival. No doubt there are many others who are desirous of cooperating, and they are requested to communicate at once with the Honorary Secretary, Mr. Richard Bremridge, 17, Bloomsbury Square.

* * *

The programme for the Summer Term of the Society's School of Pharmacy, which extends from April to July, will be found this week among the official announcements in the front part of the Journal. It will be seen that the second course of lectures on Chemistry, which will include Physical, Theoretical and Organic Chemistry, will be commenced on Tuesday morning, the 21st inst., at nine o'clock, and be continued on succeeding Tuesday, Wednesday, and Thursday mornings. The Laboratory for the study of Practical Chemistry is open now, and intending students are recommended to enter as early as possible. The second course of lectures on Botany (Systematic) will commence on Friday morning, the 24th inst., and that on Materia Medica on Monday morning, the 20th inst. Provision is also made for instruction in Practical Pharmacy and Dispensing.

* * *

By the favour of the Registrar of the Medical Council we are in receipt of early copies of the Medical Register and the Dental Register for [illegible] as well as the List of Medical Students registered during the year 1890. From the statistics supplied by the Registrar it appears that the new Register contains the names of 29,163 qualified medical practitioners, showing an increase of 815 names as compared with the Register of last year, and 7163 as compared with that of 1876, the earliest date with which comparison can be made. During the year 1890 the registration of 1266 medical practitioners was effected: 637 in England, [illegible] in Scotland and 167 in Ireland. The number of names erased from the Register during the same time in consequence of reported deaths, etc., has been 556. For the first time the Medical Register contains a separate Colonial Register, appended in accordance with the provisions of the Medical Act, 1886, which gives power to the Medical Council to recognize qualifications conferred in those colonies to which, by direction of the Privy Council, the operation of the Act has been extended. The list of such colonial qualifications now registrable includes those of the Universities of Melbourne, Sidney, and New Zealand. The Dentists Register shows that there are now 4817 persons qualified to practise as dentists. This is a decrease of [illegible] as compared with the number of names appearing in the first Register in 1879, due principally to a diminution in the number of persons registered as having been "in practice," the proportion of whom to the whole has fallen from 90·87 per cent to 76·32 per cent. The Medical Students Register shows that 1846 students were registered in [illegible]

* * *

A letter appeared in the *Globe* last Wednesday week in reference to the Pharmacy Act Amendment Bill, which is especially deserving of consideration by those who claim that unregistered persons acting as managers of chemists' branch shops should be exempted from some of the provisions of the Bill. The letter is written from point of view of the general public, and the point specially referred to is that of dispensing. connection with this letter it may be useful refer to the remarks made in the House Lords in March, 1888, in reference to the question as to the propriety of allowing unregistered assistants and managers practically to the position of duly registered persons as their deputies in the conduct of chemists' branch shops. It is thought by some that when the consideration of this question was promised some time since, ground for expecting the recognition of unregistered managers was furnished; but it must be remembered that by the subsequent decision in the Wheeldon case and the views then expressed the judges that possibility has been altogether done away with.

* * *

Professor Attfield has been elected an Honorary Member of the Maryland College of Pharmacy.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 1, 1891.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martindale, Newsholme, Richardson, Storrar, Warren and Watt.

The minutes of the previous meeting were read and confirmed.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Lang, John West	Stockport.
Wilson, William	Nuneaton.

Chemist and Druggist.

The following, who was registered as being in business before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society:—

Craven, John	Thurso.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Allan, Henry Wemyss F.	Kirkcaldy.
Blackham, William George	London.
Bloodworth, Thomas	Spalding.
Dougall, Wm. Robert B.	Auchterarder.
Fairburn, Henry	Northallerton.
Fowle, Sydney	London.
Freeland, James	Bathgate.
Lyon, Thomas	Falkirk.
Mackenzie, James Calder	Birmingham.
McNair, Robert Hunter	Leith.
Miller, John	Brighton.
Miller, John Wilson	Glasgow.
Parsons, Henry Imber	Axminster.
Sanderson, Joseph	Glasgow.
Simpson, Charles	Aberdeen.
Simpson, Peter	Carlisle.
Spence, James	Aberdeen.
Thomas, Henry	Merthyr Tydfil.
Toone, Arthur Henry	Exmouth.
U'Ren, William Condy	Plymouth.
Ward, Thomas Armistead	Blackburn.
Waterworth, Eli	Preston.
Whitehead, John Henry	Walsall Wood.
Williams, Thomas	Isleworth.
Wylie, David N.	Edinburgh.

ASSOCIATES.

The following, having passed the Minor examination, and tendered or paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Bannerman, James Murdoch	Edinburgh.
Barclay, James Christian	Aberdeen.
Brown, James	London.
Charles, David	Llanelly.
Driver, Arthur Silvester	Elmesthorpe.
Elliott, Edward Matthews	Walsall.
Green, Edward Joseph	Boroughbridge.
Jones, Thomas Lloyd	Denbigh.
Litchfield, Ernest	Nottingham.
McDonald, James	Dundee.
Mitchell, James	Blairgowrie.
Ness, Thomas	Edinburgh.
Perrett, Frederick James	Weston-super-Mare.
Rhodes, Herbert Walter	Wrawby.
Richards, William David	Aberystwith.
Speedie, Robert	Edinburgh.
Streatfield, Edward Henry	Maidstone.
West, Henry Thomas	Manchester.
Wolstenholme, William	Sheffield.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Alexander, David Alfred	Birkenhead.
Anness, Joseph Leonard	Ipswich
Bennett, Wm. Fredk. Cockayne	Sheffield.
Brawn, Harry Samuel	Spalding.
Callaway, Alfred James	Salisbury.
Caunt, John William	Derby.
Clarke, Arthur Bertram	Coventry.
Clowser, David William	Winchester.
Daniel, William James	Marske by the Sea.
Fell, Thomas	Newcastle-on-Tyne.
Gale, Richard Percy	Hull.
Gordon, Robert	Grantown.
Griffiths, Charles John	Shanklin.
Happold, Charles	Barrow in Furness.
Hodgson, John Duncanson	Sunderland.
Hughes, Thomas John	Bethesda.
Islip, Frank	Dartford.
Jones, Alfred Lancelot	Brynmawr.
Jones, David	Machynlleth.
Leighton, William Nicholls	West Kirby.
Le Gros, Alfred Joshua	Jersey.
Lodder, Arthur Edward	Reading.
Lyon, Harold	Chatteris.
Martin, William Francis	Leith.
Martin, William Montagu	Plymouth.
Mousley, William Joyce	Redditch.
Murray, Alexander	Edinburgh.
Newman, George Franklin	Portsmouth.
Reed, Joseph	Dumfries.
Sharman, Herbert Broughton	London.
Troupe, George Robert	Middlesborough.
Waite, Herbert Shuttleworth	Bradford.
Wilkinson, William	Worksop.
Williamson, Frederick Arthur	Ashton-on-Ribble.
Wilson, Luther	Keighley.
Young, Frederick George	Newport, Mon.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

James Crichton Pirie, East London, South Africa.
James Rae, 15, Avenham Lane, Preston.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

NOMINATIONS FOR THE COUNCIL.

The Secretary reported that he had received *twenty-five* nominations to fill the fourteen vacant seats on the Council, and that the following *sixteen* had declared their willingness to accept office if elected:—

Abraham, Alfred Clay, 87, Bold Street, Liverpool.
Allen, Charles Bowen, 20, High Road, Kilburn, London, N.W.

Atkins, Samuel Ralph, Market Place, Salisbury.
Bottle, Alexander, 37, Townwall Street, Dover.
Botwood, Charles Walker, Dartford, Kent.
Cross, William Gowen, Mardol, Shrewsbury.
Gostling, Thomas Preston, Market Hill, Diss.
Greenish, Thomas, 20, New Street, Dorset Square, London, N.W.
Harrison, John, 33, Bridge Street, Sunderland.
Leigh, Marshall, 46, Dyke Road, Brighton.
Martindale, William, 10, New Cavendish Street, London, W.
Newsholme, G. T. Wilkinson, 74, Market Place, Sheffield.
Schacht, George Frederick, 52, Royal York Crescent, Clifton, Bristol.
Southall, Alfred, 17, Bull Street, Birmingham.
Spink, Harry Nelson Bowman, 3, Marsham Street, Westminster, London, S.W.
Watt, James, High Street, Haddington, N.B.

The following *nine* nominees had declined or had not expressed their willingness to accept office if elected:—

Broad, John Morris, 510, Hornsey Road, London, N.
Coleman, Alfred, 87, St. Mary Street, Cardiff.
Grose, Nicholas Male, 5, Castle Street, Swansea.
Hopkin, William King, 14, Mowbray Road, Brondesbury, London, N.W.
Icke, Henry Scott, 37, Vestry Road, Camberwell, London, S.E.
Lance, Wm. Nathaniel George, 207, Copenhagen Street, London, N.
Savory, Arthur Ledsam, 143, New Bond Street, London, W.
Wells, Frederic Thos. Percy, 26, Cambridge Gardens, Kensington, London, W.
Woolley, George Stephen, 69, Market Street, Manchester.

NOMINATION OF AUDITORS.

The Secretary also reported that he had received the following *five* nominations to fill the office of auditor and that all the nominees had expressed their willingness to accept office if elected:—

Lescher, Frank Harwood, 60, Bartholomew Close, London, E.C.
Stacey, Samuel Lloyd, 300, High Holborn, London, W.C.
Umney, Charles, 50, Southwark Street, London, S.E.
Watts, William Manning, 2, Whitecross Street, London, E.C.
Yates, Francis, 64, Park St., Southwark, London, S.E.

THE BYE LAWS.

On the motion of the **PRESIDENT**, seconded by Mr. **HAMPSON**, the new Bye-laws, as approved at the last meeting of the Council, were formally read a second time.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee was of the usual character, and recommended sundry accounts for payment.

Mr. **CROSS** (who had acted as Chairman of the Committee) moved the adoption of the report. He said there was nothing in it requiring comment, and it was passed unanimously.

REPORT OF THE BENEVOLENT FUND COMMITTEE.

The report of this Committee included a recommendation of the following grants:—

£15 to the widow (aged 47) of a member. Applicant has had three previous grants amounting to £40 since 1873, and she is now paralysed. (Yorks).

£10 to the widow (67) of a registered chemist and druggist. She has had four previous grants of like amount. She lives with relatives who do what they can for her, but is unable to earn anyth (Birmingham).

£10 to a registered chemist and druggist (aged 8 He has a small allowance from his grandchildre and earns a little as clerk to a school boa He has four children dependent on him. (Aberdee shire).

£10 to a former member and subscriber to the Fu (age 71). He is past work, and wholly dependent a son who is in a subordinate position. He has had previous grant of £5. (Glasgow).

£15 to the widow (age 40) of a member and sub scriber. She has three young children and has h two previous grants. This money is for the purcha of laundry utensils.

One application had been deferred for further in formation.

The **VICE-PRESIDENT**, in moving the adoption the report and recommendations, said the cases we of the usual character, but it was very gratifying know that in one case there was every hope that th assistance rendered would enable the applicant, widow, to provide for herself in the future. He wished to bespeak the support of masonic breth for Mr. Wm. How, of Bournemouth, who was candidate for an annuity from the Masonic Instit at the next election.

Mr. **RICHARDSON** supported this appeal, saying th was now a masonic lodge established in connecti with the pharmaceutical craft, and they hoped friends would assist them in such cases.

Mr. **ATKINS** said Mr. How was in business at Do chester many years, and his case was really deservi of all support.

The motion was then put and carried unanimou

THE CHEMISTS' BALL.

The **PRESIDENT** said he had been deputed by Committee of the Chemists' Ball, at its recent meeti to thank the Council for allowing the use of a ro for meetings, and also to hand to the Treasurer for the Benevolent Fund a cheque for £27 1*s*. 6*d*., maki a total for the twenty-five years during which meetings had been held of five hundred guineas.

REPORT OF THE LIBRARY, MUSEUM, LABORAT AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, in cluding the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Aver
February	Day . .	633	41	11	[illegible]
	Evening .	260	21	6	[illegible]

Circulation of books.	Total.	Town.	Country.	Carriage pa
February . . .	215	112	108	£1 3s. 10d

The undermentioned donations had been recei and the Committee recommended that the letter of thanks be sent to the respective donors:—

For the Library in London—

Year-Book of Pharmacy, 1874 to 1885, and Gen Index. From Mr. JOHN STRICK
Royal College of Physicians of London, List Fellows, etc., 1891. From the COLL
Royal Society of New South Wales, Journal Proceedings, vol. 24, part 1. From the SOCIE

For the Library in Edinburgh—

Victoria, Pharmaceutical Register for 1890. From the PHARMACY BOAR
American Pharmaceutical Association, Proceedings, 1890. From the ASSOCIATIO

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Muter, Analytical Chemistry, 4th ed.

Maisch, Organic Materia Medica, 4th ed.
Stockman, New Official Remedies, 1890.

The Committee had ordered the Library and Museum be closed for the Easter vacation.

Museum.

The Curator's report had been received, and included following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
February	Morning	795	53	16	33
	Evening	134	20	1	5

The following donations had been received, and Committee recommended that the usual letter of nks be sent to the respective donors:—

Specimens of true winter's bark, and of the fruits of *Myrica cerifera*.

From Messrs. POTTER and CLARKE.

The Society's Jubilee.

The Committee also reported that the subject of the ebration of the Society's jubilee had been again cussed, and it was recommended that an Official ebration be held on the evening before the annual eting for the reception of addresses, etc., and that ies should be invited to be present. The President, e-President, Treasurer, Messrs. Greenish and Hills, Staff of the Society's School, and Dr. Paul had been pointed a committee to make the arrangements. It s also recommended that the presentation of the nbury Gold Medal should take place on the evening May 26, and that instrumental music be provided the Examination Hall after the Official Celebration.

Research Laboratory.

It was recommended that another room be appro- ated for the Research Laboratory, and that certain niture and fittings be provided.

The painting of the outside of the Society's house d some necessary repairs to the premises were re- nmended, also the purchase of additional lengths of hose.

The **PRESIDENT** moved the adoption of the report d recommendations. With regard to the jubilee ebration it would be remembered that after a dis- ssion at the last meeting of the Council this matter d been referred back to the Committee with power act. In addition to what was stated in the report, might mention that it was intended to provide reshments, and it was hoped that there would be portunity for social intercourse after the actual busi- ss was concluded. It was also contemplated to have dinner on the Wednesday evening, and invitations d already been sent to certain official persons who re interested in pharmaceutical work, at home d abroad. Wednesday would be occupied with the nual meeting and the dinner. With regard to a nversazione there was great difficulty in getting the cial work and anything in the shape of an enter- nment into those two days. If they could induce ir friends to come to London and stay from Monday Thursday morning, arrangements might be made for athering on the Monday evening, or for something Tuesday afternoon. But, on careful consideration, Committee came to the conclusion that the Official lebration would be much more successful, and would ract a larger number both of members and visitors, t were held in the evening; and having regard to t fact and to the decision of the Council that it was desirable to hold a Conversazione of the usual char- er in the Society's house, the present recommenda- n was made. It was also found that practically there s no place available for such a purpose, except South nsington, and that could not be obtained on a Tues- y evening, as it was then open to the public. Other lls had been considered, but none could be found, in which there were pictures or anything to look at, which was large enough for the purpose. The Committee thought the official business would take from one and a half to two hours, and after that there would be an opportunity for conversation, for meeting one another and for listening to music. It was not held out as a conversazione in the ordinary sense, but simply as a pleasant conclusion to the evening. The recommendations relating to the Research Laboratory were simply to carry out what had already been mentioned by the Council; and the house repairs and cleaning were things which were absolutely necessary.

Mr. **GOSTLING** asked if invitations would be sent out.

The **PRESIDENT** said invitations would be sent to strangers; but everyone connected with the Society would be entitled to attend.

Mr. **LEIGH** was a little disappointed that something more worthy of the Jubilee celebration was not going to be attempted. It had been customary for many years to have a conversazione, and now that there was a grand opportunity of doing so it seemed a pity it could not be taken advantage of. Having, however, received the financial statement within the last day or two he could quite see that there was a good deal to be said for the course recommended, and he should not press the matter any further.

Mr. **NEWSHOLME** said he was very much in sympathy with Mr. Leigh, and thought it a great pity to drop the conversazione this year when there was such a good opportunity of making it a grand success. He also had seen the financial statement, and thought it a pity the state of affairs was not discovered earlier, and that two or three hundred pounds might very well have been spent on this occasion.

Mr. **HARRISON** did not contest the propriety of the decision to which the Committee had come, but it occurred to him that the lecture theatre would afford very poor accommodation for the large number of persons who might be expected to attend. Many country friends would be in town, some with their wives, and with the London members there would be probably many more than 200, which he thought was about the limit of accommodation. Was there not a larger hall within a reasonable distance which could be secured for the purpose?

The **PRESIDENT** said the theatre would hold 300 or rather more, and, of course, if there were too many the overflow must be provided for in other parts of the building. There was a difficulty in going to another building, and it was much better on such occasions to have a room full than to have a large hall partly empty. The Committee was distinctly instructed by the Council not to have a conversazione in the Society's house, but to have an Official Celebration. If the Sub-Committee had reason to suppose that there would be a very large attendance, it would be within its power to make arrangements for engaging a larger hall.

Mr. **ATKINS** hoped it would not go abroad that the proceedings were to be confined to the Society's premises simply on financial grounds; if that had been the case, it would have been easy to make a special effort for the purpose. But the Committee had resolved for various reasons not to go to South Kensington, and then, as the President had already said, there was practically no other place suitable. With regard to the point raised by Mr. Harrison, it should be remembered that what might be called the official function of receiving addresses, etc., would probably not be regarded with a vast amount of interest except by those who were closely connected with the work of the Society, and probably three hundred would be quite as many as would desire to be present. Then came the general reception and conversazione of friends, which could take place throughout the building, and on the whole he hoped that an agreeable and interesting evening would be spent.

Mr. **Hampson** thought the arrangements made by the Committee were sufficient, under the circumstances, and he should not like it to be supposed that there was any shortcoming. If the Society had had larger rooms of course more could have been done, but under the circumstances the Committee had done all that was possible.

The **President** remarked that one great difficulty was the time at which the anniversary took place, which was so near the Whitsuntide holidays. Every suitable room in London was already engaged, and some could have been booked several times over. The real difficulty was to get the friends from the country to stay long enough in London to allow of several gatherings being held. Many only came up on Tuesday afternoon and went back again on Wednesday. The convenience of the officers of the Society and of the Council had also to be considered, and on the whole he thought the Committee had done the best. Personally he agreed very much with Mr. Newsholme, and should have been glad to have a very attractive conversazione in the Society's house, as the Committee at first recommended, but that had been vetoed by the Council, and there was therefore nothing more to be said.

The motion for the adoption of the report was then put and carried unanimously.

The Auditors' Report.

The financial statement, duly audited, was laid on the table.

The **President** moved, and it was duly seconded and carried, that the seal of the Society be affixed to a sub-lease of No. 15, Bloomsbury Square, which had been let to a firm of solicitors for seven, fourteen or twenty-one years.

A Scholarship for Manchester and District.

The **President** said that at a meeting of the Manchester Pharmaceutical Association, held some months ago, it was announced by Mr. Benger, the Vice-President, that it was proposed by a generous member of that body to found a scholarship, and he was happy to say that he now held in his hand the deed of trust for the Manchester Pharmaceutical Association Scholarship. Debentures to the amount of about £1000 were in the hands of the Solicitor, a deed had been signed by the donor, and it was now necessary that it should also receive the seal of the Society. There were the usual powers in the deed for re-investment of the property when the Council thought proper. The donor did not wish his name to be disclosed, but he might say that he was present at a meeting of the trade not long ago, when he (the President) delivered an address, and the value of education seemed to have been very strongly impressed at any rate on this gentleman, for he immediately announced his intention of making the Society the custodian of this sum of money. Of course the Society received no benefit; it would simply act as trustee. The conditions of the scholarship were similar to those affecting the existing scholarships, though there was some difference with regard to age, and one condition was, that candidates, who would be assistants or apprentices, must reside in Lancashire or in the neighbouring parts of Derbyshire. The conditions would be published in due course, when the scholarship was competed for, which would probably be about July twelve months. The successful candidate would be called the Manchester Pharmaceutical Association Scholar, and would have to carry on his studies either in the laboratory of the Pharmaceutical Society, or if he elected to go to any school approved of by the Society in the provinces, he would be at liberty to do so. The donor hoped that before long there would be a number of places suitable for the education of pharmacists in different centres; and, therefore, this condition was introduced so that such a scholar might pursue his studies in Manchester instead of coming to London, but it was provided that in all cases the Council should approve of the school selected.

Mr. **Atkins** said he presumed the deed assumed the continuity of the Manchester Association.

The **President** said that was so. Although the Society derived no pecuniary benefit from this gift, it was gratifying to find members of the calling taking such an active interest in education, and he should not be sorry if other gentlemen in different parts of Great Britain were to emulate this example. There was no doubt that a stimulus of this kind would be of very great advantage in many districts to the younger members of the trade. He would, therefore, move that the seal of the Society be affixed to the deed of trust of the Manchester Pharmaceutical Association Scholarship, and that the cordial thanks of the Council be tendered by the President to the generous founder of the scholarship.

Mr. **Richardson** thought it was rather an important point which Mr. Atkins had raised.

The **President** said that was provided for.

Mr. **Abraham** inquired if it were provided that the scholarship should not be awarded to anyone holding another scholarship.

The **President** said that was provided for. It would be a separate competition altogether with a different limit of age, and would not be open to the holders of other scholarships. The examination would be held in the neighbourhood of Manchester.

Mr. **Hampson** had great pleasure, as a Lancashire lad, in seconding the motion, and he hoped others would follow this good example. Even if the Pharmacy Bill did not pass they would certainly have to thank the President, and the influence of his eloquence for arousing this enthusiasm, and producing such happy results. There might appear at first sight to be some disadvantage in the competition being limited to the Lancashire district, but on the other hand he thought there would be incidental advantages, and the members of Council would certainly be unanimous in according the donor their hearty thanks.

Mr. **Martindale** said he understood the proceeds of this fund would be given to the candidate on certain conditions, but that he would not be required to pursue his studies in the Society's school.

The **President** said not necessarily so.

Mr. **Harrison** said Mr. Hampson appeared to think there might be some disadvantage from the benefits of this trust being localized, but he would remind Mr. Hampson, in the words of one whom he delighted to follow, that what Lancashire said to-day England said to-morrow, and consequently they might hope, especially if the President were spared to make further expeditions through the country, that other parts would follow so good an example. He thought it was a manifest advantage that this benefit should be localized, as it tended to foster a healthy public spirit, and led other men to come forward and support the craft to which they belonged, and encouraged those who did not enter it under advantageous conditions. There would be no question about their thanks being very heartily given to this generous donor, who had evidently acted in the best possible spirit, not at all for his own glory, because he desired that his name should be kept private. He had, therefore, great pleasure, as another Lancashire lad, in supporting the motion.

Mr. **Hampson** quite agreed that the localization of this gift would be on the whole an advantage.

The motion having been carried unanimously,

The PRESIDENT said a letter had been received from the Sheffield Chemists' Association reporting certain infringements of the Act. The communication was referred to the General Purposes Committee.

REPORT OF THE GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor stating the progress made with cases placed in his hands. Some cases were standing for trial and several defendants had paid penalties.

Three cases of alleged infringement of the Act had been reported, and proceedings were recommended.

The Council, as usual, went into committee to consider this report. On resuming, the report and recommendations were unanimously adopted.

Proceedings of Societies in London.

ROYAL INSTITUTION.

HYDROPHOBIA.

A lecture on Hydrophobia was delivered at the Royal Institution by Professor Victor Horsley on Friday evening, the 20th ult. The lecturer remarked that hydrophobia, like tetanus, has been for a long time considered to be of a spontaneous character, and attempts have been recently made to revive this view by anti-vivisectionists, although the absurdity of the hypothesis is only equalled by the correlative statement that hydrophobia might result from a broken leg or similar injury. Pasteur has shown the disease to be of a zymotic or microbic nature, but the particular germs have never been isolated and artificially cultivated in the way that pathology demands. Micrococci have, however, been observed in the tissue of animals suffering or dead from hydrophobia in a position that might well account for several symptoms of the disease, and as micrococci, differing from bacilli, are readily killed by drying, this characteristic has been made use of by Pasteur in the elaboration of a cure for hydrophobia. A weighty factor in this terrible disease is the lengthy incubation of the germs in animal tissue, which in all animals extends over six weeks and in human beings may be prolonged for a period of two years, so that great mental suffering and anxiety is caused by the uncertainty regarding infection. Hydrophobia is met with in two phases, the infected animal appearing either in an excitable and spasmodic or in a paralytic condition. The second form, the so-called "dumb-rabies," is experienced among rabbits, which appear to suffer little pain, but gradually lose power over the hind limbs, drop the lower jaw, and pass finally into a state of coma. In dogs hydrophobia generally assumes the furious form, which is associated with great irritability, consequent upon the feverish condition of the animal. When the disease reaches the virulent stage, the domestic dog escapes from home and strays abroad, snapping indiscriminately at any object that may excite its attention. This tendency to stray is discerned in the statistics of hydrophobia, since of twenty-six rabid dogs seized in London during the first seven months of last year, nineteen were classed as stray dogs. Even such timid animals as deer become aggressive when affected by the disease in its furious form, and will worry a stick or other object presented to them. In all cases, however, the final stages of the disease are accompanied by paralysis, although in human beings the paralytic condition is frequently preceded by syncope. The more immediate effects of the virus appear to be the irritation of the medulla oblongata and of the muscles of the neck and mouth, giving rise to all the signs of suffocation and great difficulty in swallowing food. The changes produced in the anatomical tissue are especially discernible in the nerve centres, the alimentary canal being affected if the disease runs its full course, and the larynx and tongue much congested. The appearance of vesicles under the tongue is thought to be of little moment, but the black spots observed on the mucous membrane of the stomach, probably foci of hæmorrhage, are no doubt intimately connected with the depraved appetite of the infected animal, which causes it to seize any foreign body. Pasteur also considers that the virus of the disease is concentrated in the central nervous system. Hydrophobia occurs in all climates, and in spite of contradictory statements is very prevalent in Constantinople and Cairo, whilst Algiers is a hot-bed of the malady. In England outbreaks of the disease occur around manufacturing centres, and the number of cases of rabies and of human deaths between the years 1864 and 1883 has preponderated in Lancashire and the home counties. In America and Africa the disease is not so wide-spread, owing to the mountain-wastes and immense spaces existing between the centres of civilization, which practically prevent infected animals straying from one town to another, and no doubt Scotland owes its immunity principally to the prevalence of the same conditions. With regard to the treatment of hydrophobia, the lecturer said that there is no doubt that if the disease has once well-developed no cure is possible, and the utmost that can be done for the patient is to procure relief from the spasms, for which Turkish baths have been recommended and apparently proved efficacious in a few isolated cases, though reported to complicate matters in other cases. Attempts have been made to inhibit the growth of the microbes by the introduction of inimical substances into the system and the long period of incubation offers advantages to this mode of operation. The products developed in the life-history of the microbes are no doubt strongly antiseptic, but owing to their unstable nature cannot be readily isolated by chemical means. Pasteur therefore adopted with a great degree of success the plan of drying the spinal cords of rabbits dead from rabies in an aseptic vessel, by which means the microbes are more quickly destroyed, *i.e.*, in about fourteen days, than their chemical products. The second problem relating to the method of introduction of the prepared substances into the system was solved in the following way. The dried spinal cord was powdered and an emulsion formed with the powder and sterilized bouillon, which was then injected hypodermically. A more concentrated form, consisting of an extract, was subsequently employed, the two injections, termed respectively the simple and intensive treatment, being employed with remarkable success in Russia, where great ravages are committed by rabid wolves. In Odessa and Warsaw only 0·64 and 0·30 per cent. respectively of the cases treated proved fatal, although trial experiments on rabbits led to the conclusion that 94 per cent. of the patients would infallibly have died from rabies if not operated upon. With respect to the continuance of rabies in England, Pasteur has expressed great surprise that the insular position of the country has not been taken advantage of to exercise a strict quarantine, such as exists in Australia, where rabies is unknown. The advisability of the adoption of some such measures is well illustrated by the two islands of Mauritius and Reunion, in both of which hydrophobia had at one time established itself, but consequent upon the establishment of quarantine in the latter island the disease has disappeared, although still prevalent in the Mauritius. In Scandinavia the same result has been effected by muzzling, but this measure has at present failed in this country owing to the loose and erratic manner in which it has been enforced. Professor Victor Horsley said that the value of the muzzle was twofold, it prevents the transmission of the virus and labels the dog for the police, and to its employment in Prussia he attributes the fact that only two deaths from rabies have been recorded in the latter country during the last two years as against eighty in England in the same period. In a similar way the disease appears to have been stamped out of Holland, only a few isolated cases occurring on the Belgian frontier, according with the fact that muzzling is not enforced in Belgium. The statistics of the disease in London also show a marked decrease in the number of cases reported after the enforcement of the muzzling regulations and a corresponding increase following their removal. In this country the lecturer said the value of the muzzling regulations have been underrated throughout by discreditable agitation. In considering the advantages and disadvantages of muzzles Professor Victor Horsley pointed out that the duty of seizure devolved upon the police, and yet this admirable body of men had only been repaid for their extra work by implications of base motives and even by prosecutions. Thus one pamphleteer referred to the dangers incurred by the police in the seizure of rabid animals as confined to a few instances in which "the well-gloved fingers of a policeman had been pricked by a puppy," although as a matter of fact 376 policemen had been bitten, in eighteen cases by incontestably rabid dogs, and of these fifteen had been sent to Paris for treatment. In conclusion, the lecturer referred to the advantage of the muzzle in preventing the spread of distemper, concerning which he believed no other disease causes so much suffering to the animal kingdom, although some people look upon it in the same light as certain infantile diseases, as a necessary evil rather to be courted than avoided. As one of the principal symptoms of distemper is a catarrhal inflammation of the respiratory passage, and the virus is no doubt contained in these runnings, the disease is readily communicated by the mode of salutation common amongst dogs, to which greetings the muzzle offers a physical obstacle. By reference to the statistics of the last decade it will be seen that as with rabies, distemper has decreased with the enforcement and increased with the abandonment of the muzzling regulations, and indeed the fluctuation is more marked, as the period of incubation is much shorter than in rabies, and therefore the spread of the malady much quicker.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held on Thursday evening, February 19, Mr. A. Campbell Stark in the Chair, a paper was read on—

COAL.

BY GEORGE WALMSLEY.

The author commenced by defining coal as a solid mineral substance, infusible under its point of ignition and containing sufficient carbon to allow of its continuous combustion in an ordinary grate. After quoting various other definitions he referred to the litigation in 1850 between the proprietors and lessees of the Torbanehill estate, which turned upon a dispute whether a thin seam of mineral that was being raised was bituminous shale, as contended by the lessors, or gas or cannel coal, as contended by the lessees. A verdict in favour of the lessees was returned by the jury, who read the term "coal" in the popular sense, but as the outcome of further litigation a compromise was effected. Different kinds of coal were then treated of by the author in three groups, anthracite or non-bituminous, cannel or highly bituminous and household or less bituminous. Anthracite coal contains never less than 80 per cent. of carbon, whilst some varieties consist almost entirely of it. Cannel coal, of which jet is a variety, contains under 50 per cent. of carbon, and is the most valuable kind on account of its gas yielding property. Household coals spoken of as those suitable for burning and purposes, containing from 60 to 80 per cent. of car Lignite, or brown coal, was then referred to as of more recent formation and less mineralized th ordinary coal, some still distinctly exhibiting woody structure, while the products of its distill resemble those distilled from wood more closely th those from coal. This led to a discussion of the ditions under which coal was probably formed, the author quoted a very imaginative passage fr book entitled "The World's Foundations," in wh an attempt is made to picture these conditions. T next subject dealt with was the fossils found in the measures, the vegetable portion of which was stated t consist largely of vascular cryptogams. Ferns are fou most abundantly, one authority stating that two hu dred and fifty kinds could be traced. Among th different kinds mentioned were the *Neuropteris*, so what resembling the modern *Osmunda*, and the *Sp nopteris*, resembling the present *Adiantum*. T *Calamites*, belonging to the Equisetaceæ, were gigantic proportions as compared with the pres horsetails, and seem to have formed dense bru in the then existing woods. The Lepidodendra w a remarkable family now completely extinct, and t *Sigillaria* were something like them, but their tru were fluted and ornamented with parallel, perp dicular seal-like impressions, probably scars of t bases of fallen leaves. The remains of Coniferæ fou in the coal measures consist mostly of stumps, lo fruits and leaves. These conifers differed greatly fro those of to-day, the nearest resemblance to them se appearing to be in the genera *Aurucaria* and Salisbu of Japan and China. Among the animal fossils fou in the coal measures are huge sauroid fishes, a f minute land shells and skeletons of some small reptil of the frog and lizard kind. In glancing at the di tribution of coal, the coal fields of Great Britain we stated to extend over one twenty-second part of th whole area, and to have hitherto yielded an en mously larger quantity of coal than those of any oth country, although the workable deposits in the Uni States are of much greater extent. In Ireland co has been formed in more or less quantity in seven counties. It is also found in other countries o Europe, Belgium, for its size, being relatively th most important in this respect. In Asia coal has l been worked in China and in India; North Ame contains vast deposits, whilst in the south of the co tinent a considerable quantity of coal occurs in B and Chili; an abundance has also been found Australia and New Zealand. The first mention coal as a fuel is by Theophrastus (about 300 B.C.) speaks of it as being found in Liguria and in El the way to Olympia, and says that it was used by brass workers. It is thought probable that the an Britons were acquainted with the use of coal, and they imparted that knowledge to the Romans. Aft further tracing the history of coal, the author ref to its utilization for domestic purposes, in sme and other manufacturing operations, as a source energy, and its distillation for the sake of illumin gas and other bodies, the paper concluding with a scription of the process of distillation and the pr cipal products.

The President said, chemically coal had alwa seemed to him a remarkable instance of the conser tion of energy. Would it be possible to repeat experiment and make coal artificially by burying in large quantities? He understood that the q of a coal was determined by the amount of ash yi and it would be of interest to know of what this was composed. He was not aware that the remain saurians had been found in coal. He remarked that ger steamships used 250 to 300 tons per day, and he sumed that at least two-thirds of the heat evolved its consumption was wasted.

Mr. Strother asked if there were any better means of lizing the heating efficiency of coal and of consum- the smoke. What was the author's opinion of the l fields of Dover?

Mr. Pickering said there was a machine on exhibition ently in London, for which it was claimed that by sing the smoke through water tanks all the soluble d solid constituents would be retained. Anthracite l contained 94 per cent. of carbon; it was discovered 1210 at Preston; and the Monks of New Battle were rmitted to work the mine. The total area of the ited States coal fields was estimated at 200,000 are miles.

Mr. W. Lloyd Williams thought that petroleum uld form the fuel of the future. It was curious t in Burmah all the mineral fuels—petroleum, shale d coal—were found together. With reference to the estion of mining for coal in London, Dover and ermediate districts, Professor Bonny, of University llege, had made a careful study of this subject. art from the non-desirability, this authority did not ink it was probable that coal would be found in ndon, judging from the nature of the strata that has en bored through for various purposes. He had mpared the London basin to the palm of the hand, d stated that coal, if present, would be low down, d the vein if found would be thin and unproductive. was his opinion that if coal were found in London it uld be in the neighbourhood of Croydon.

Mr. Seccombe said it would be interesting to know e approximate date of the formation of coal. He d not see that the biblical narrative to which Mr. almsley had referred threw much light upon it. He uld refer those who liked such imaginative science a very interesting work by Donelly, entitled "The ge of Drift and Gravel." He would have liked to ve heard a fuller account of coal mining operations.

Mr. E. S. Taylor had always thought petroleum to a decomposition product of coal, but he had cently come across the statement that it originated om fossil fish.

Mr. Walmsley, replying to some of the points raised, id that doubtless coal was still in process of formation, though not under such auspicious circumstances formerly, partly owing to climatic differences and rtly to the fact that the upheaval and sinking of the nd no longer takes place to that extent which it ust have done during the carboniferous epoch. hether it is possible to find coal beneath the chalk Kent is a point now engaging the attention of ologists. Four thousand feet would be the greatest ssible depth at which coal could be worked. atural petroleum was formed from bituminous shale the action of subterranean heat. In reply to Mr. ccombe's remarks as to the date of coal formation, r. Walmsley said he could not claim to have studied e subject deeply, but it was supposed to extend from e commencement of the third day to the commencement of the fifth of the Scripture narrative, an opinion hich was supported by geological investigation.

Provincial Transactions.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

At the usual weekly meeting held on Thursday eveng, 19th ult., Mr. George Little, Vice-President, in e Chair, Mr. James A. Kinnear read an excellent per on "Alkaloids." The chemistry and constituon of these bodies having been described, Mr. innear referred to the synthetical study of the alkaloids which had already yielded valuable results. The history of the subject was then carefully traced and the preparation of the B.P. alkaloids minutely detailed. The thanks of the Association were awarded to the author for his elaborate paper.

ABERDEEN CHEMISTS AND DRUGGISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the present session was held in the Silver Street Hall, on Friday evening, March 20, Mr. George Cowie, President, occupying the chair. The minutes of the previous meeting having been read and approved, the Chairman called upon Mr. Wallace to read his paper on "The Classification of Plants." Having expressed his pleasure in contributing to work of the session, Mr. Wallace at the outset briefly touched upon the earlier artificial systems of classification and then lucidly described the Linnæan and natural systems, pointing out the uses of the former as also its defects as compared with the latter. He concluded with a word of caution as to what may be termed plant "echoes" which crop up in several orders and by giving some useful and practical hints as to the prosecution of the study of botany. The paper was much appreciated.

A short paper was then read on "The Eye," by the Secretary, in the absence of its author, Mr. Falconer. It treated chiefly of its structure and diseases. A short discussion followed the reading of each paper, and a hearty vote of thanks having been awarded to the authors, the meeting closed.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The Prize Committee attended in the Association's Rooms, on Wednesday evening, March 25, for the purpose of conducting the examination under the prize scheme. There was a good attendance of members as candidates, and eleven papers were handed in—five senior and six junior. The senior paper was mainly on dispensing, the junior being on elementary botany, pharmacy and chemistry.

The following is the result of the competition:—

Junior Section.—I. Thomas Henry Kellett ("Quassia"), who as first prizeman last year declines the prize, it in consequence going to II., Robert McClumpha ("Mack"), who is second on the list. III. Matthew Bell ("Atropia") to whom is awarded the second prize.

Senior Section.—I. Hedley Pattinson ("Pharmacy"). II. William Smith ("Cyclops").

The prizes are in each section, I. Books to value of one guinea, presented by the editor of one of the trade journals, and II., a copy of Remington's 'Pharmacy,' presented by Messrs. Burroughs, Wellcome and Co.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The tenth meeting, being the third open meeting of the thirteenth session, was held in the Pharmaceutical Society's House, 36, York Place, on Wednesday, March 25, at 9·15 p.m., Mr. Donald McEwan, President, in the chair.

The minutes of the last meeting having been read and approved, the Secretary read the report of the Prize Committee on the "Ainslie" Pharmacy Prize Competition, from which it appeared that the "Ainslie" prize had been gained by Mr. J. M. Cameron, 17, North Bridge, with 85 per cent. of marks; and the second prize by Alexander Murray, 139, Princes Street, with 70 per cent. of marks. The third prize was not awarded, as the next candidate had not attained a sufficient standard of excellence.

Mr. George Lunan, ex-President, then presented the first prizeman with Attfield's 'Chemistry' and

Bentley's 'Botany,' and the second prizeman with Balfour Stewart's 'Physics' and Gerrard's 'Materia Medica.' The Secretary also read a report anent certain changes in the prize schemes, and it was resolved to consider these at the Annual Business Meeting.

The following paper was then read—

PILULA ASAFŒTIDÆ COMPOSITA.

BY WILLIAM SMITH.

In taking up a subject such as this it is usual to begin by stating the objections to the official formula. The B.P. method of making these pills consists in melting asafœtida, galbanum, and myrrh in treacle to a suitable consistence. First of all I would notice that the directions are indefinite. It is not mentioned whether the gums are to be powdered or not, and if the lumps are used it is almost impossible to melt them completely. When, however, the gums are powdered and melted according to the B.P. process, a mass is produced which soon becomes so hard as to be almost unworkable. It is, perhaps, owing to the pills becoming so hard and comparatively insoluble that they are not so much used now as formerly, because there is no doubt that they possess considerable medicinal value. Why this mass should be heated at all is not very clear. Asafœtida, galbanum and myrrh, each consist essentially of a volatile oil, a resin, and a gum, and during the process of heating a certain amount of the oils, and therefore of the active ingredients, must be driven off. It occurred to me that it would be an advantage if they could be prepared in a respectable form without heat. I therefore made a quantity, using instead of treacle a little tragacanth, making up the weight with liquorice powder, and using as an excipient rectified spirit 5 parts, water 2 parts, and glycerine 1 part. A very good mass was formed by beating up in a mortar in the usual way. The pills smell more strongly than the official ones, indicating no loss of volatile constituents. The only objection to this method is that the pills pit slightly when kept for a week or more.

I made another quantity on the same lines as the B.P., using glycerine instead of treacle, and the result was a better pill in every respect than the official one. The gums melted more readily than in the treacle, it was a nicer mass to work and the pills kept their shape very well. Owing to the gums melting more readily in the glycerine, less heat is required, and this, of course, is an advantage.

The formula I would suggest is:—asafœtida, galbanum and myrrh, of each 2 parts; glycerine, 1 part. Powder the gums with a drop of spirit and melt along with the glycerine on a water-bath to a suitable consistence. If the pills should be wanted in a hurry and were not likely to be kept very long, the other formula might be used without hesitation. It is—asafœtida, galbanum, and myrrh, of each ʒj., tragacanth, 10 grains, liquorice powder, 20 grains, and 10 minims of the excipient containing 5 parts rectified spirit, 2 parts water, and 1 part glycerine.

Mr. Hill then gave a description of the manufacture of nitric acid, illustrated by diagrams and experiments.

The discussion which followed was taken part in by Messrs. Boa, Cowie, Henry, Hill, Lunan, McEwan, Murray, and Petrie, and on the motion of the Chairman cordial votes of thanks were awarded to the authors of papers, and to Mr. Lunan, who had charge of the arrangements.

Obituary.

Notice has been received of the death of the following:—

On the 14th of March, Mr. Thomas Archer, Pharmaceutical Chemist, Southam, Warwickshire. Aged 65 years. Mr. Archer had been a Member of the Pharmaceutical Society since 1853.

On the 16th of March Mr. Edward Matthews, Chemist and Druggist, Aldersgate Street, London. Aged 42 years.

On the 17th of March, Mr. Thomas Norwood, Pharmaceutical Chemist, Wellington Place, Hastings. Aged 77 years. Mr. Norwood had been a Member of the Pharmaceutical Society since 1853.

On the 27th of March, Mr. William Orme, Chemist and Druggist, Long Street, Atherstone. Aged years.

On the 31st of March, Mr. Francis Hallam, Chemist and Druggist, High Street, Burton-on-Trent. Aged 55 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

APOMORPHINE AND APOCODEINE.

Sir,—There is an interesting note on "Apomorphine and Apocodeine as Expectorants" in your last issue. It is certainly surprising to learn that there are patients who take 1½ or 2 grains* of apomorphine hydrochloride three times a day. I agree that the deterioration on keeping the solution of apomorphine hydrochloride has been exaggerated, and perhaps not without apparent reason. The product of the oxidation of the apomorphine has so intense a deep green colour, that a very small amount of it causes a solution to appear suspiciously dark. The oxidation of the salt in solution, however, really proceeds very slowly, so that it is probable that the old solution used by Dr. Murrell actually contained 99 per cent. of the alkaloid originally present. When it is further considered that the oxidised derivative probably also possesses to some extent emetic properties, there is nothing unlikely in a moderately efficient solution of apomorphine hydrochloride possessing full activity. As regards apocodeine, one would like to know how it was prepared and its identity established, because it is well known that what was originally described under that name turned out to be something else or a mixture of things else.

D. B. Dott.

Edinburgh.

*** By a printer's error this was printed last week "1½ or 2 grams."—ED. PH. J.

Some Dangers of Pharmacy.—Referring to the paper on this subject reported upon in last week's Journal (p. 890), the Secretary to the Newcastle Chemists' Assistants' Association writes:—"In the report I erroneously mentioned 'Syphons of Soda Water' as explosive. What Mr. Weddell said was that syphons of aerated waters, being always at hand in most establishments, formed most effective engines in cases of outbreak of fire." We take the opportunity to add that as Mr. Weddell intends to collect data with a view of putting forward more fully, at some future time, the dangers of pharmacy, he will be glad to receive suggestions upon the subject.

NOTICES OF MEETINGS.

Society of Chemical Industry (London Section).—Monday, April 6.—"The Analysis of Illuminating Gases" and "The Products of Checked Combustion," by Professor V. B. Lewes.

School of Pharmacy Students' Association.—Thursday, April 9.—Discussion on the Pharmacopœia Addendum, opened by Mr. F. Browne. Report on Physics, by Mr. P. J. Robbins.

Chemists' Assistants' Association.—Thursday, April 9.—"The Teeth in Relation to Health," by Mr. W. Rushton, L.D.S.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. De Vrij, Humphrey, Kemp & Co., Catcliffe, Squire, and Farr.

THE ARROW POISON OF THE PIGMIES.*

BY SURGEON PARKE, ARMY MEDICAL STAFF, AND E. M. HOLMES, F.L.S.

PART I.—DESCRIPTION OF THE MATERIAL.

BY SURGEON PARKE.

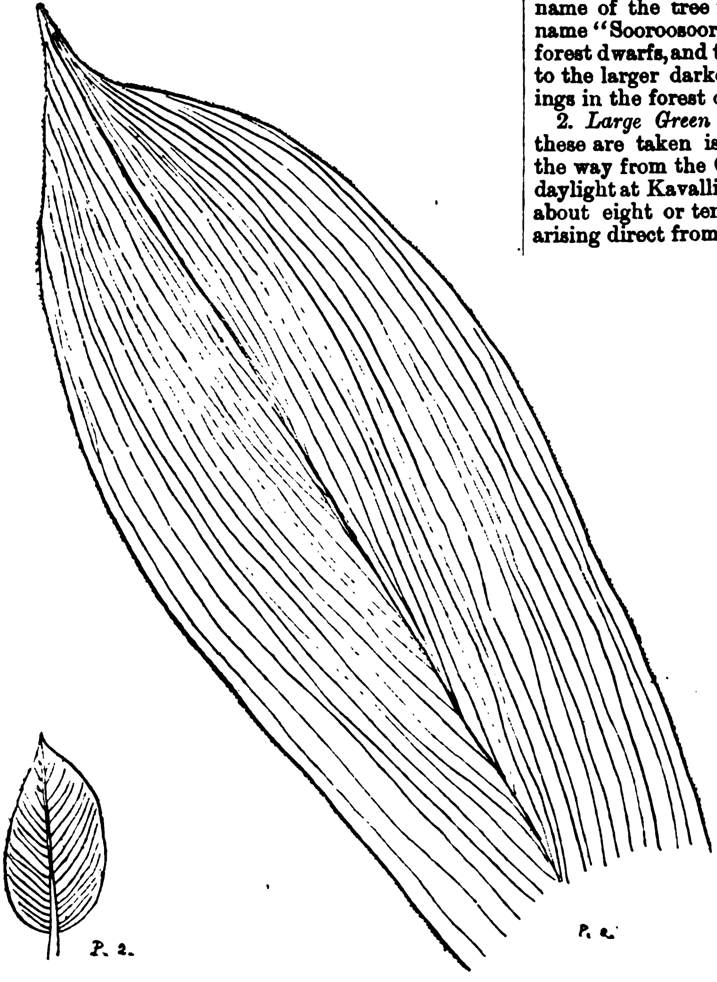
The Poison.

1.—The arrow poison used by the pigmy race in Central Africa is of a very fatal character. Of all the men wounded by poisoned arrows at the action of Ava-Sheba only one survived, viz., Lieutenant Stairs, and his recovery was probably due to the fact that the poison was immediately sucked from the wound. It seemed very important, therefore, in the interests of humanity, to ascertain, if possible, the composition of the poison and to learn the nature of the antidote used by the pigmies. This I was at length able to do through one of the pigmy women who followed our caravan. It was, however, a long time before she would show me the plants used and the method of preparing the poison, and then only on the express condition that no other person should accompany us to the place where the plants grew.

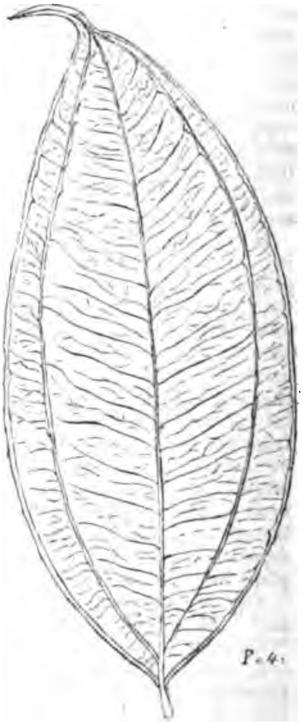
Five plants are employed to make the poison. Of these I have brought home such portions as I was able to procure at the time. They consist of (1) a bark, (2) a large green leaf, (3) a thorny creeper, (4) a green stem, (5) a bean-like seed.

1. *Bark.*—This is obtained from a forest tree which grows to a great height and is very common in the neighbourhood of Fort Bodo. The trunk grows to several feet in diameter, has no branches low down, but is much branched above. The leaves are compound and pinnate, of a light green colour; the leaflets are small, about ½ to 1 inch long, not always opposite, but occasionally alternate, the rachis being about 1 foot long. The tree had no flowers or fruit on it that I could see. The bark is used fresh; it is of a dark brown colour on the outside, and slightly rough. On the inside it is of a whitish pink colour and red colour when broken transversely; it is from ¼ to ½ inch in thickness. A piece about 2 inches square is used, pounded with the other ingredients, to make a cupful of the poison. The Mombutti name of the tree is "Elinda" and the Wasongora name "Sooroosooroo." The word Mombutti means forest dwarfs, and the name of Wasongora is applied to the larger darker natives who occupy the clearings in the forest only.

2. *Large Green Leaves.*—The plant from which these are taken is very common in the forest all the way from the Congo to where we emerged into daylight at Kavallis. It is a herbaceous plant, with about eight or ten large oblong lanceolate leaves arising direct from the ground, and having at their



"Poison" 2.—*Palisota Barteri*, Bth. The larger drawing is from a portion of the leaf brought home by Surgeon Parke, half life size. The smaller one is a sketch drawn by Surgeon Parke showing the shape of the leaf.



"Poison" 4.—*Strychnos Icaja* Baill. Drawn from a leaf in the Hanbury Herbarium.

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* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, April 8.

base a bundle of small cord-like roots about the thickness of a crowquill. The leaves are usually 3 or 4 feet long and the old ones attain even the length of 6 feet. The largest are of a dark green colour and the younger of a lighter shade; the petiole is short and thick, about two inches in diameter, and the midrib is channelled or grooved longitudinally on its upper surface and is prominent below, and the slender lateral veins branch off at an acute angle. When handled, the leaf feels like gutta percha tissue.

The short petiole is pinkish and very juicy, but only the blade of the leaf is used, about two dozen being sufficient for a cupful of the poison.

The flower is very handsome, white, several inches in diameter, very fragrant, and soon fades when gathered. The lower lip of the flower is semicircular and larger than the upper part.

The Mombutti names of the plant are Kaukaungee and Bunbeedo, and the Wasangora names Kaukaungee and Koko.

3. *A Thorny Creeper.*—This is also very common in the forest. It is a creeper which grows 20, 30 or even 40 yards long, but never exceeds 1 or 2 inches in diameter; it climbs up trees but prefers to creep along the undergrowth close to the ground. The stem is of a brownish colour, green, softer and more pliable in the younger parts, and near the apex pinkish or of a lighter shade of green. For the last 2 or 3 inches the thorns are softer, rudimentary, and resemble small leaves, but on the older stems they are very sharp and hard. There is such a gradual increase in diameter, that it is hardly noticeable in a length of 5 yards. When it runs on the surface of the ground it sends out rootlets into the ground.

When old the bark becomes very thin and falls off in shreds and the wood becomes brittle. The stem has a well-marked pith. The portion used is that towards the end of the shoot, but not the soft green extremity of it; a piece about ½ inch in diameter and 3 feet long is sufficient for making a cupful of the poison. The plant had no leaves, flowers, or seeds when I gathered it. The Mombutti names are "Oferupar, Topoongo, Cuckoo-oo, and Mombuadu-beedu," and the Wasongora names are Putooroh and Beeiah.

4. *Green Stem.*—This is obtained from a branching shrub which is very common in the forest. It grows to a height of 10 or 12 feet and the stem in the thickest part is not more than 2 inches in diameter; it is of a dark green colour in the upper part of the plant. The leaves are dark green on the upper surface, and of a paler tint below; there are three principal veins or ribs, and the lateral veins are given off at an acute angle from each of these. The leaf is from 3 to 6 or even 8 inches long and about half as broad, the large veins are depressed on the upper and prominent on the lower surface of the leaf. The scraping of the bark only is used to the extent of a dessertspoonful for a teacupful of the poison. The plant had neither flowers nor fruit when I saw it.

The Mombutti names of the tree are "Tarfa" and "Macaboo-oh," and the Wasangora name is "Soomba."

5. *Seeds.*—These resemble a small bean in appearance. They are of a dark brown colour and about ½ inch in length, and grow to a very large tree. About eight would be sufficient for a cupful of the poison, only the yellow kernel being used.

The Mombutti name is Boongaheah, and the Wasangora name of the tree is Baymahrah and Exeecu.

Preparation of the Poison.

The large leaves, the bark, the pink thorny stem, and the scrapings of the green stem and four of the small seeds are all pounded together into a paste, which is stuck on the top of the arrow and allowed to dry. At first it is of a greenish colour, but becomes paler, and forms a hard crust like clay on the arrow. The Mombutti woman said it lost its strength after three or four days. As I was anxious to ascertain if these ingredients really were those used to prepare the poison, Lieutenant Stairs kindly lent me his dog to experiment upon. For a long time I thought that those who died from tetanus died from traumatic tetanus, but this poison undoubtedly causes tetanus; but there are different poisons used by different tribes.

Some of the poison prepared as above, on the 23rd of November, 1888, was used on the 24th.

An incision about ½ inch long was made in the back of the animal, as well as light scratches over a surface of about 1 inch square, and the poison was rubbed in at about 9·30 a.m., the operation being performed in the presence of Stairs and Nelson.

The Mombutti woman said at the time, that the poison would not kill the dog, as the poison must be on an arrow and the arrow must go in 2 inches into the body. However, on the next day (25th) the dog died at 1.45 p.m., 28¼ hours after the introduction of the poison.

Symptoms.—The following symptoms were observed. When the incision was made the dog flinched a little, but did not appear to suffer pain from the cut on the introduction of the poison. He was restless for an hour or two, but this was probably due to the muzzle. He afterwards lay at his ease like other dogs, his forelegs stretched out in front with his head resting between them and his hind legs drawn up under him. He moved very little and made no attempt to scratch the wound or roll on his back or rub against anything. His four legs were tied until 4 p.m., when Stairs brought him out for a walk of 100 yards. He then appeared to be in bad spirits and unusually drowsy and heavy, as if under the influence of some narcotic. The pupils of the eye, however, were not affected. He ate two toasted heads of Indian corn (his usual food). During the night he did not make any noise, and there appeared to be no change in his condition, but he still remained heavy and not inclined for play or exercise. At 1.30 p.m. on the 25th he was lying in the above position with his tongue partially protruded, and there was a slight discharge of saliva from his mouth, which was half open. The pupils were normal; his head would fall over if not supported. He was unable to take any notice, his eyelids being only half open and a mucous secretion was present between the eyelids. The respiration was laboured and very slow. The heart's action was healthy but slow (I felt the femoral artery). Urine and fæces had been expelled, and his tail (naturally curled) was lax and extended. When removed to a clean, flat surface he lay on his side and extended his legs; a trembling movement was observed in his forelegs, which soon ceased and commenced in his hindlegs. The trembling was a symmetrical movement in both forelegs and in both hindlegs respectively, the two forelegs moving independently of the hinder ones, and *vice versâ*; the leg moved with a jerk, which extended through the entire leg from shoulder to paw. There was no irregular contraction of independent muscles. The muscles did not become hard, nor did the dog's body feel harder or hotter than usual. The spasmodic jerkings and movements occurred once every ten seconds, and the legs now moved after the fashion of a horse trotting. The dog would not drink water. It became very rigid and stiff in about two or two and a half hours after death.

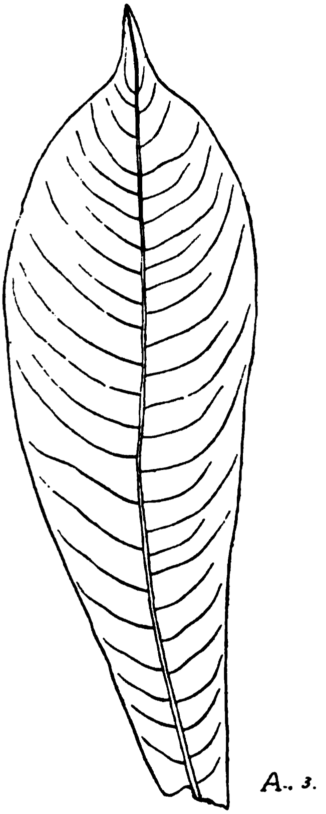
The Mombutti woman said that the dog would die in three days, and remarked that when natives die from the poison they always have their eyes open like the dog, and also pass dark-coloured fæces under them. I had the opportunity of observing the action of the poisoned arrows on human beings, in the following cases:—

At Fort Bodo.—A Zanzibari was wounded by a very small puncture from a poisoned arrow at 9.30. He walked one mile into camp, was very anxious and alarmed, said there was no pain, suddenly vomited some watery fluid, commenced to breathe stertorously and protruded his tongue, and the conjunctiva lost sensitiveness; involuntary excretion of fæces took place, there was no pulse, and only an occasional gasp or respiration. He vomited about one hour and twenty minutes after being wounded, and died in about seven minutes after he had vomited.

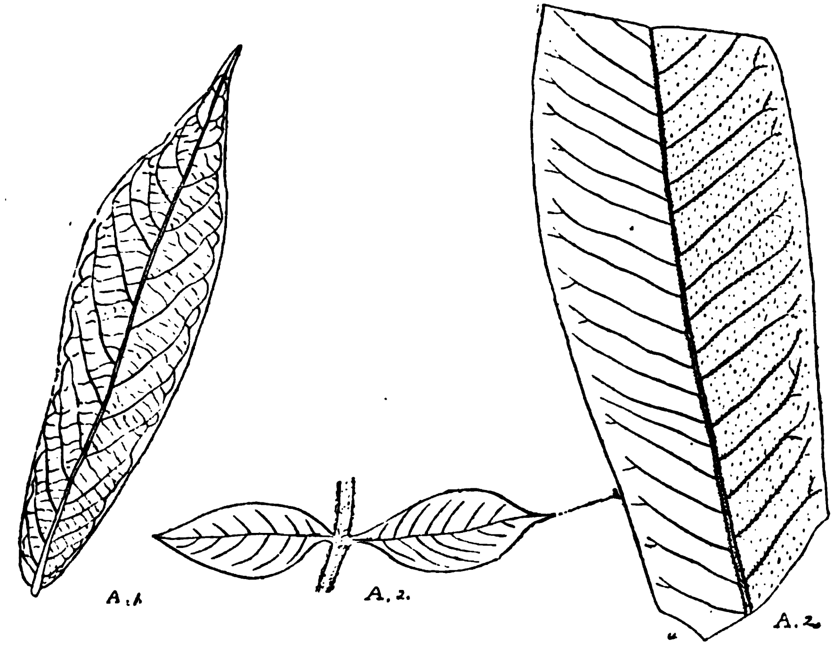
At Arisibba.—Many men were wounded by poisoned arrows on August 14, 1887, and died of undoubted tetanus six days afterwards.

The Antidote.

The antidote used by the pigmies is prepared from parts of three plants and a white powder.



"Antidote" 3.—Botanical source unknown.



"Antidote" 1.—Unona species. 2.—Botanical source unknown. Showing upper surface on the left and under surface on the right of the large figure.

1. *Leaves.*—These are from 3 or 4 inches to nearly a foot long, and are about 3 inches in the broadest part, of a yellowish or slightly mauve colour on the upper surface, and underneath of a pale slate colour (glaucous). The plant on which they grow is a bush which rarely exceeds 10 or 12 feet in height and is one of the commonest plants in the forest. The stem is of a dark green colour, rather rough, and rarely exceeds a couple of inches in diameter.

The wood of the stem is tough. The tap root is long and tapering with very few branches. The extreme top of each branch is of a brown colour and velvety appearance, owing to the number of short brown hairs with which it is covered; there are none of those hairs on the lower part of the branches. Only the light coloured yellowish leaves are used and the midrib of these is removed. Some trees have no light coloured leaves, and they occur only in the proportion of 1 to 100 or so when they are found. These yellowish leaves are dried in the sun, and then become browner above and of a darker slate colour beneath. There were no flowers or fruit on the bush. I have frequently seen my donkey eat these leaves.

The Mombutti name of the tree is Bandeeree and the Wasangora name is the same.

2. *Leaves.*—These leaves are dark green above and of a paler green underneath; the midrib is covered with brownish hairs. On the upper surface of the leaf these hairs are visible only on the midrib, but on the underside they occur along the lateral veins and are scattered over the whole surface (see A 2, p. 919). The leaf is feather-veined, the lateral veins being alternate below, but more or less opposite towards the upper half of the leaf.

The leaves are obtained from a large tree which grows to a great height in the forest; it is generally 1 or 1½ feet in diameter. In the specimen seen by me the tree had been cut about 3 feet from the ground and young shoots had sprung up at the margin of the cut surface. These shoots were 5 or 6 feet long, of a brown colour for the lower third, and the upper two-thirds were covered with very numerous small grey-coloured hairs, the bark being light green in the angle of the junction of the shoots, and on the cut end of the stem or main trunk. The leaves appear to mostly grow opposite each other on the branch, but this is not invariably the case. In outline they are lanceolate with an acuminate apex. In size they are from 8 to 14 inches long and about three inches broad. The lamina without the midrib is used.

The Mombutti name of the tree is Meahngahcee and the Wasangora name Epoongah.

3. *The leaves and scrapings of the young branches.*—The tree from which the leaves are obtained grows to a great height in the forest and is generally about two feet in diameter. The stem of the specimen I saw was only a few inches in diameter. The small shoots which grow from the cut surface were taken, but the small branches of the tree would also do. The branches are of a light green colour, like young grass, quite pliable and smooth, except where the leaves come off. The leaf is like No. 2 in shape, but is not hairy, and is smaller, about 6 inches long and 2½ broad, dark green above and a lighter colour beneath.

The midrib of the leaf is thrown away and the lamina of the leaf pounded with a little of the scrapings of the bark of the smooth branches.

The Mombutti name for the tree is Echahngah and the Wasangora name is Whohro.

PART II.—IDENTIFICATION OF THE MATERIAL.

BY E. M. HOLMES, F.L.S.

The Poison.

The specimens above described have been kindly presented to the Museum of this Society by Surgeon Parke. It has been found possible by means of the material existing in the Museum to identify some of them, and it is hoped that in course of time, when the botany of the Congo is better known, it may be possible to identify the whole. Even with the knowledge now obtained it may be possible for therapeutists to suggest a reliable antidote for travellers to use when passing through the g Central African forest.

1. *The Bark.*—I at once recognized this as bark of *Erythrophlœum Guineense*, Don. A speci of this bark exists in the Museum, obtained, gether with specimens of the leaves and flow by Dr. S. F. McGill, from Cape Palmas, in Libe These were shown to Surgeon Parke, who re nized the leaves as being like those of the tree f which the No. 1. bark was taken by the M butti woman. In structure, as well as in app ance, the bark agrees with that of *Erythrophl* *Guineense.* As only one species of this genus is kn to occur in the mainland of Africa, althoug second (*E. Couminga*, Baill.) is found in the S chelles, there can be little doubt of the identi tion here given. The Mombutti and Wasan names add further synonyms to the many na already given by different races to this bark, v Sassy, Mancona, Casca, etc.

An excellent summary of the literature of Sa bark will be found in Stillé and Maisch's 'Nati Dispensatory' (4th ed.), p. 588.

The following quotation from that work will s that the symptoms exhibited by Lieutenant St dog were evidently largely due to Sassy b Remarking on its effects on animals (as recor by Dr. S. Weir Mitchell and W. A. Hammond, Philadelphia, in 1859) the authors say:—

> "Its most conspicuous effect was general musc relaxation, so that the animal would remain quies in whatever position it was placed. . . . When a la dose was administered the head fell and was car up again and at last reposed on the fore paws, vom ing usually took place, the pupils contracted, the hea became slow and irregular, the respiration quick a laboured, and at length death occurred with gen convulsions and sudden dilatation of the pupils."

2. *Large Green Leaf.*—This has been identi for me by Dr. C. B. Clarke (who has paid speci attention to the group of plants to which it belong as *Palisota Barteri*, Benth., of the natural or *Commelynaceæ.* The plant is figured in the Bo *nical Magazine*, t. 5318.

There is, however, some little difficulty conce ing this plant. I have myself seen the specim of *P. Barteri* in the Kew Herbarium, and find th the leaves of different specimens vary slightly i hairiness, etc., but the leaf brought by Surg Parke exactly corresponds with one specimen of *Barteri* in the Kew Herbarium, collected in the l of the Mombutti by Dr. Schweinfurth, in Ap 1870, No. 3721.

Surgeon Parke mentions the flower as b strongly perfumed and several inches in diam But the flowers of *Palisota Barteri* are very s and are arranged in a dense raceme 2 or 3 in long. The description of the flower given by Su geon Parke would apply to a *Hedychium* but n to the *Palisota.*

Surgeon Parke assures me, however, that there no doubt about the leaf being the one used, although he may be mistaken about the flower, which may have belonged to another plant with leaves similar in appearance. The leaves of *Palisota Barteri* are described in the *Botanical Magazine* as being only "1 to 2 feet long with a petiole of variable length, which is only half or one-third the size of those ob served by Dr. Parke. There can, however, be no question that the leaf used for the arrow poison is at of a Commelynaceous plant and very little doubt at it is the leaf of *P. Barteri*. The plants of this atural order are not, that I am aware of, known possess poisonous properties, although several e used as diuretics, etc. This ingredient of the oison need not therefore be considered an important one.

3. *Thorny Creeper.*—This consists of a hollow oody stem about 3 or 4 lines in diameter, with horls of three spines at intervals of about 4 or inches. The spines, which are the hardened bases f the petioles of fallen leaves, are slightly bent backard and have the remains of a hairy leaf bud in the il. The bark is smooth and laminate in structure, e laminæ breaking up easily into flat fibres. On amination with a lens the medullary rays are en to be very numerous and narrow, and the season's growth is marked by an irregular ring of large orous vessels. When a little of the bark is chewed e taste is not perceptibly bitter. On showing the em to Mr. N. E. Brown, of the Kew Herbarium, e suggested the genus *Combretum* as containing me plants having a similar habit of growth. On oking through the African species in the Kew Herarium, however, I could not find any stem exactly ke it. I then forwarded a piece of the stem to r. Radlkofer, of Munich, who is probably the reatest authority in Europe on stem structure. e replied, "the stem is a *Combretum*."

In the 'Flora of Tropical Africa,' vol. ii., pp. 21 to 433, there are two species which resemble r. Parke's thorny creeper in certain particulars. ne is *C. confertum*, Laws., a native of the Congo nd Fernando Po, which has smooth dark brown ark, and the bases of the leaves form persistent pines. It is also described as a twining shrub, and the 'Niger Flora' the young branches and petioles re said to be puberulent, which agrees with the fact hat small brown simple hairs are present on the af-bud.

In another species, *C. grandiflorum*, Don., which also found in the Congo and is a scandent hrub, the internodes are 4 or 5 inches apart, and he bark is of a dark colour.

But in neither of these species in the herbaria Kew and the British Museum are there three horns in a whorl.

In the absence of leaves, therefore, the most that an be said is that the stem is derived from a species *Combretum*, and probably either that of *C. conrtum* or *C. grandiflorum* or of an undescribed pecies.

Comparatively little is known of the physiogical action of the plants of this natural order. he species of the genus *Terminalia* are remarkble for their astringency and some of them for a ellow colouring matter; those of *Quisqualis* posess anthelmintic properties, *Q. indica* occasionlly causing spasms and other ill effects; and the eeds of *Cacoucia coccinea* are used as a poison or bats in British Guiana.

A few preliminary experiments made at my equest upon a small portion of the thorny creeper, Dr. F. W. Passmore, indicate that there is no kaloid and no tannin present, but evidence was btained of the presence of a glucoside.

(It may be interesting to mention in this connecion that the seed of the *Cacoucia* was examined by r. F. Short, Demonstrator in the Society's Laboraory, and was found to contain a crystalline body which gave the reactions for an alkaloid. It is quite possible therefore that the thorny creeper may possess a poisonous action, although the taste does not indicate it.)

4. *Green Stem.*—Judging from the structure of the stem* and from the character of the single imperfect leaf brought home by Surgeon Parke, this ingredient consists of the stems of a species of *Strychnos*, probably *S. Icaja*, Baillon. The scars on the stem are opposite and indicate opposite leaves, and the venation of the leaf is that characteristic of the genus *Strychnos*. Of this genus there are several African species known, but only two of these have leaves as large as the one under consideration. Of these the *S. Icaja*, Baill. (*S. M'boundou* of Heckel) is known to be used in the Gaboon as an arrow poison and to be employed by the pigmies.†

In the Hanbury Herbarium there exists a specimen of this plant, and on seeing Surgeon Parke's specimen, I at once recognized the strong resemblance to this plant which it possessed. On showing the Hanbury specimen to Surgeon Parke he pointed out the acuminate apex of the leaf as having particularly attracted his attention in the growing plant and expressed no doubt concerning their identity. The physiological action of this *Strychnos* has not been very satisfactorily determined, although it is known to be poisonous. Rabuteau (1870) attributed its action to brucine, Kauffeisen to two alkaloids, the one a convulsant and the other a narcotic. According to Heckel and Schlagdenhauffen the bark contains strychnine but not brucine. They state that the parenchyma of the liber can be proved to contain this alkaloid by the use of sulphuric acid and bichromate of potassium, which give the well known colour reaction of strychnine in this part of the tissue of the bark.

It seems possible, therefore, that the tetanic symptoms which were observed in all the men who died at Arisibba, may have been due to the action of strychnine contained in these leaves, and which might have been absorbed more slowly than the Sassy poison. At all events Surgeon Parke notes that it is remarkable that all those wounded by poisoned arrows died of tetanus, whilst those who were otherwise wounded did not suffer from tetanus. At first he felt inclined to think the tetanus might be traumatic, but his subsequent experience did not confirm this opinion.

5. *Seeds.*—These seeds Surgeon Parke tells me

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* In this I am confirmed by D. L. Radlkofer, who has seen the stem.

† *Strychnos Icaja* was so named by Dr. H. Baillon from specimens given to him by MM. Franquet and Aubrey Lecomte in 1853–4. These specimens were not in flower and consisted of leaves and roots. The plant grows in the Gaboon, especially about the Isle of Koniquet. It has also been gathered near the river Como. Dr. Baillon described *S. Icaja* as having leaves 10–15 centimetres long, and 7 or 8 broad, with a petiole of 1 centimetre long, the veinlets between the three main ribs of the leaf being tranverse or oblique. In the Kew Herbarium there is a specimen of a plant collected by Dr. Schweinfurth, No. 3597, in the land of the Mombutti, in flower in April, 1870, which answers to the above description. This plant is referred to *S. densiflora*, Baill., a species collected by Heudelot near Fouta Dhiallon in Senegambia, but which differs from *S. Icaja* in the shorter leaves with a shorter acuminate point. In the absence of the flowers of *S. Icaja*, Baill., it is not possible to say whether this plant is merely a form of *S. densiflora* or a distinct species (see 'Adansonia,' xii., p. 369). The leaf brought home by Surgeon Parke, however, resembles the *S. Icaja* more than the typical *S. densiflora*

were found in a hut, and were not gathered from the plant. They are about the size of a small apple pip, being a quarter of an inch long and rather more than one-eighth of an inch broad at the larger end. The hilum is small, oval, and placed on the tapering end of the seed. In transverse section the seed is seen to be exalbuminous with the radicle accumbent. Thinking the seed might be that of a *Tephrosia*, several plants of this genus being used as fish poisons in Africa, I compared it with the seed of *Tephrosia Vogelii*, a well-known African species, with which it agrees perfectly. By the kindness of the Curator of the Kew Museum, Mr. J. R. Jackson, I am enabled to show some of this seed for comparison. The properties of the genus *Tephrosia* appear to be of a narcotic character, but required further investigation.*

It is obvious, therefore, that in this arrow poison the two chief active ingredients are erythrophlœine and strychnine, poisons the action of which is known, and for which it is by no means impossible that a physiological antidote could be provided.

Antidotes.

The native antidotes consist of (1) a white powder; (2) the leaves of three plants and (3) the young bark of one of the plants. The white powder has been examined by Sir Charles Cameron, of Dublin, and proves to consist simply of wood ashes.

Of the three plants employed only leaves and stem were brought home, and these do not possess any very definite distinctive character except No. 1, the leaves of which have a remarkable glaucous appearance on the under surface, and under the microscope present numerous resin glands. Professor Oliver, late Keeper of the Kew Herbarium, suggests the genus *Unona* as that to which the leaf probably belongs. I have compared the leaves with the plants of the genus both at Kew and the British Museum, and find that they approach very nearly to *U. lucidula*, Oliv., but differ slightly in venation and in the presence of appressed hairs, those of the antidote being spreading. The plants of the *Anonaceæ* are chiefly remarkable for aromatic and stimulant properties.

Nos. 2 and 3 must therefore remain unidentified until better material can be obtained. This, however, is of comparatively little importance, since, the nature of the poison being known, it may be quite possible for therapeutists to devise an antidote superior to the one used by the pigmies.

[*The discussion on this paper is printed on p.* 927.]

NOTE ON COMMERCIAL OIL OF CITRONELLA.†

BY JOHN C. UMNEY,

Pharmaceutical Chemist.

The more common Indian grass oils, known in trade as verbena, ginger-grass, and citronella, the products respectively of *Andropogon citratus*, *A. Schœnanthus*, and *A. Nardus* differ considerably in appearance. The first two are usually of a yellowish brown colour; the third varies, being sometimes yellow, at others emerald green, the yellow oil generally becoming green on exposure to light.

In order to determine on what the difference in colour of this last and the change from yellow to green which takes place depend, eight samples of citronella oil were obtained from various sources, and a small quantity of each exposed to direct sunlight. Of this number five (A, B, C, F, G) were decidedly green before exposure, two (D and E) were yellow at first, but rapidly became green, whilst one (H) was yellow originally and underwent no change. The fact that the presence of copper has been shown (Guibourt and Histed) to be reason of the green colour of commercial cajeput oil, led me to suspect the same contamination in the case of this oil. (Since writing this note my attention has been called to the fact that Kremers* mentions incidentally the presence of copper in a sample of this oil which he examined.)

250 c.c. of the sample *a* was shaken with a dilute solution of ferrocyanide of potassium, when a rapid separation of a red precipitate took place, which after washing with spirit to free it from traces of oil and then with water to remove any excess of potassium ferrocyanide, was proved to be ferrocyanide of copper. Examination was then made of all the samples, with the following results:—

	Sp. gr. at 15° C.	Colour.	Remarks.
A	·896	emerald green.	copper present.
B	·895	greenish.	„
C	·890	„	„
D	·887	yel., becoming green.	„
E	·896	„ „ „	„
F	·896	emerald green.	„
G	·897	greenish.	„
H	·870	brownish yellow.	copper entirely absent.

From the fact that only those samples which were green, or became so on exposure, contained copper, it appeared almost certain that the change in colour might be due directly to the presence of that metal, which was readily proved by precipitating all the copper from the most markedly green sample, by treatment two or three times with solution of potassium ferrocyanide, when the oil became pale yellow in colour. One portion of this oil was then exposed to sunlight for some days and a second to the heat of a water-bath in an open porcelain dish for twelve hours without any change whatever in colour taking place. A third portion of the oil was treated on a water-bath for a few minutes in presence of a very small piece of copper foil, when the oil rapidly assumed its original green colour, thus showing conclusively that the green coloration of the oil is due to the presence of a trace of copper, and that its removal causes the oil to assume its natural colour, namely, yellow.

The green coloration of the oil was destroyed on heating to 50° C., and at a higher temperature an acid distillate was obtained which was proved after neutralization to consist principally of acetic acid. It seems possible, therefore, that the metal exists in combination with this acid, the change in colour on exposure to light either depending on oxidation of an aldehyde present to acetic acid, or on the partial decomposition of an ester of acetic acid contained in the oil. Varying statements exist as to the specific gravity of pure citronella oil, for whilst Messrs. Schimmel state that it should not fall below ·895 at 15° C. (*Pharm. Journ.* [3], xx., 264), Dodge (*Pharm. Journ.* [3], xx., 855) assigns to it a gravity of ·877 at 16° C. It will be noticed that sample H, which contained no copper, was of lower specific gravity than the others, and fell considerably below the limit proposed by Messrs. Schimmel. This sample proved, on examination of its solubility in 80 per cent. spirit, to be adulterated with petroleum, as was readily proved by fractionation, and the absence of copper is probably due to its distillation in the earthen or iron stills, now only used by the poorer native distillers. The quantity of copper present, without doubt derived from distillation in stills of that metal, is, of course, very minute, but it seems desirable to call attention to it, as pointing out that pale yellow, and not green, is the natural colour of citronella oil.

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* After this paper was read I received from Sir C. Cameron one of the seeds sent him by Surgeon Parke. This proves on examination to be the seed of *Erythrophlœum Guineense*, and is probably the one used in the poison, as it is the produce of a large tree, not a shrub.—E. M. H.

† Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, April 8.

* 'Proceedings American Pharmaceutical Association,' 1887, p. 562.

[*The discussion on this paper is printed on p.* 928.]

REPORT OF THE GOVERNMENT VISITOR UPON THE EXAMINATIONS IN LONDON.

The following copy of a report made by Dr. Stevenson to the Privy Council on the examinations held in London during the year ending March 31, 1891, has been forwarded by order of the Lord President to be laid before the Pharmaceutical Society:—

"Privy Council Office,
"*April* 6, 1891.

"Sir,—I am directed by the Lord President of the Council to transmit to you, to be laid before the Pharmaceutical Society, the enclosed copy of Dr. Stevenson's report on the examinations held by the Society in London, during the year ending the 31st ultimo.

"I am Sir,
"Your obedient servant,
"C. L. Peel."

"The President of the Pharmaceutical Society of
"Great Britain, 17, Bloomsbury Square, W.C."

"*Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society of Great Britain, during the year ending March* 31, 1891.

"To the Lords of the Council,

"My Lords,—I have to report that during the year ending March 31, 1891, I attended twelve of the examinations of the London Board of Examiners of the Pharmaceutical Society of Great Britain, and that I have read the papers of several of the candidates examined at the Preliminary Examination, both those approved and those rejected at this examination.

Preliminary Examination.

Number of candidates examined	1355
" " who passed	594
" " " failed	761
Percentage of failures	56·2

"The number of candidates examined was nearly the same as during each of the two previous years; but the percentage of rejections was 5·5 per cent. in excess of those in the year 1889-90. The inferior and defective education of many rejected candidates is sufficiently evidenced by an examination of their answers, and by the fact that no less than 655, or 40·3 per cent. of the candidates failed in elementary arithmetic; in other words, six out of seven of the rejected candidates failed in arithmetic, and about two-thirds of these failed in other subjects also.

"Notwithstanding the large proportion of rejections the examination is by no means a severe one; nor is the standard of the examiners high. Elementary arithmetic, a knowledge of the mother tongue such as may be acquired in a Board School, and quite rudimentary Latin, are indispensable attainments for those who aspire to qualify as chemists and druggists.

Minor Examination.

Number of candidates examined	919
" " who passed	381
" " " failed	538
Percentage of failures	58·5

"The number of candidates examined in this the qualifying examination, was largely in excess of those examined during the preceding year, whilst there was some falling off (3 per cent.) in the rejections.

"Of the rejected candidates 69 failed in chemistry, 20 in botany, 67 in materia medica, 93 in pharmacy, 67 in the reading and writing of prescriptions, and 196 in dispensing; 372 failed in one subject only; whilst 96 were rejected in no particular subject, but in consequence of their general want of knowledge in all the subjects of the examination.

"The large number of failures in prescriptions and in dispensing is significant, these being the two branches of examination which are most practical and most important in the interests of the public. The ability to read and properly interpret prescriptions, and accuracy and care in the dispensing of medicines, are rightly deemed all important. I have observed that a considerable number of failures are brought about by mistakes as to quantities of potent drugs and poisons. Such errors are inexcusable, and rightly lead to rejection.

"In chemistry the lack of systematic training and manipulative experience are patent. Indeed, too often, it is manifest that the candidates have had neither proper teaching in the theory of the science, nor laboratory instruction.

"So long as no course of instruction is obligatory, this state of things may be expected to continue. I trust, however, that at no distant date pharmacists will recognise that the interests of their business will not be in conflict with public opinion, that the accurate study of the sciences bearing on pharmacy is indispensable.

"I desire to express my sense of the thorough and careful manner in which the examiners carry out the responsible duties entrusted to them. If my criticisms seem severe, they are directed rather to the defects in the training of candidates than to the examinations themselves.

"It is gratifying to note that the remarks made in my last annual report as to the desirability of insisting upon a knowledge of the law relating to the sale of poisons has borne fruit. The proposed new bye-laws of the Society contemplate making such examination obligatory on candidates for the Minor or Qualifying examination.

Major Examination.

No. of candidates examined	92
" " who passed	59
" " " failed	33
Percentage of failures	35·9

"Here there was a considerable falling off in the number of candidates, but the rejections were comparatively few. Half the candidates failed in practical work. Generally the quality of the candidates appears to have improved.

"I have the honour to be,
"My Lords,
"Your obedient servant,
(Signed) "Thos. Stevenson"

The Pharmaceutical Journal.

SATURDAY, APRIL 11, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

REPORT OF THE GOVERNMENT VISITOR ON THE EXAMINATIONS.

IF anything were needed to confirm the opinions that have been for some time expressed in regard to the defective education of a very large proportion of the aspirants to a pharmaceutical career, the report of the Privy Council Visitor of the examinations, which will be found at page 923 of this week's Journal, furnishes most conclusive and authoritative evidence that those opinions are but too well founded. Dr. STEVENSON states in the report that during the year ending last March he attended twelve of the examinations held by the London Board of Examiners, and that he has read the papers of several of the candidates presenting themselves for the Preliminary examination, both of those who passed and those who were rejected. It may therefore be inferred that he has given more than ordinary attention to this examination to enable him to express an opinion. In regard to the general character of this examination he states that it is by no means a severe one and that the standard of the examiners is not high. The subjects of elementary arithmetic, a knowledge of the mother tongue, such as may be acquired at a Board School, and quite elementary Latin are, he thinks, attainments indispensable for those who aspire to qualify as chemists and druggists. Those subjects constitute the entire scope of the examination, and with such extremely moderate requirements it might reasonably be expected that the majority, if not all the candidates who presented themselves, would pass. But the records of the examination given by Dr. STEVENSON reveal a sadly different state of affairs. Notwithstanding the simple character of this examination, the proportion of those who are unable to pass it has amounted during the past year to no less than fifty-six per cent. of the total number of candidates. And so far from there being any signs of improvement in this respect, the statistics of the past year show a worse result than in the previous year, inasmuch as the percentage of rejections in the Preliminary examination was 5·5 per cent. in excess of those in the year 1889-90. The examination of the papers of rejected candidates showed that as many as eighty-seven per cent. of them failed in elementary arithmetic, or, in other words, six out of seven of the rejected candidates failed in arithmetic, while about two-thirds of these failed also in other subjects. These facts are unquestionably very weighty evidence of the inferior and defective education of many of the youths who have been engaged as apprentices to chemists and druggists, but there is another aspect of these facts that is of serious importance, though Dr. STEVENSON does not refer to it in his report. This large number of candidates rejected in the Preliminary examination does not represent those who by their failure are turned aside from entering upon the business of a chemist and druggist as being unfitted for it. If that were the case there might be less reason to lament the number of rejections. But on the contrary the candidates for the Preliminary are for the most part not lads about to enter upon apprenticeship. They are to a very large extent persons of mature age, who have already been engaged in the business, either as apprentices or even assistants, and who have devoted so much time to it that they are likely to become, whether qualified or not, the competitors of those who are duly qualified for the duties of the position. This is a serious prospect for the future of pharmacy, and the report of Dr. STEVENSON comes opportunely in support of the views put forward last week by Mr. SAUL as to the necessity of enlarging and raising the standard of the Preliminary examination, which are endorsed by several correspondents this week.

We heartily sympathize with the demand that is being made for such an improvement of the Preliminary examination as would render it an efficient test of fitness for entering upon the business of a chemist and druggist, and for being received as an apprentice. It is to be hoped that eventually such an improvement of this examination will be effectually established. But it is evident that there is an immediate evil to be dealt with, viz., that of practically introducing into the business a great number of persons who are unfit for it, and who can scarcely hope ever to become properly qualified. That evil might be, to a great extent, provided against by means of the Preliminary examination, even on its present footing, if it were made compulsory to pass that examination before being admissible as an apprentice. If that were done, the fifty-six per cent. of rejected candidates above mentioned would not be, as they probably now are, expecting to earn their living as chemists and druggists, but they would have acquired a timely knowledge of their unfitness for that calling, and have had an opportunity of leaving the field open to more eligible aspirants. It is in this respect that the establishment of a definite curriculum, with fixed intervals between the several portions of the qualifying examination, would operate beneficially, and that it might be expected to have the effect of making the passing of the Preliminary examination a condition essentially antecedent to apprenticeship. Desirable as the raising of the standard of the examination undoubtedly is, that might be left in abeyance for a time if the other condition were secured. Such a mode of dealing with the matter would recommend itself in the light of Mr. LABOUCHERE's late definition of a compromise as the accepting of half what is desired under the anticipation that at a future time the rest will be obtained.

The statistics of the Minor examination given in Dr. STEVENSON's report are no less discouraging than those relating to the Preliminary, and it might naturally be expected that such should be the case when the test for fitness to be received into the business is in itself so defective, and is not applied at the time when it would be appropriately serviceable. Although evidence is required of each candidate having been engaged for three years in the business, he may have only just scrambled through the Preliminary, and no guarantee is furnished of his having been properly taught or trained. Under such conditions it is not surprising that in this examination the failures of persons who are seeking to obtain qualification to carry on business on their own account should amount to the large proportion of more than fifty-eight per cent. of the candidates. Though this percentage of failures is slightly less than it was in the previous year, it constitutes an alarming evidence of the fact that a vast number of persons are seeking to take up the calling of a chemist and druggist who are not competent to engage in it. And yet all of those who thus fail in the examination will have produced proof of having been occupied in it for at least three years, and they are at an age when recourse to some other pursuit will not be so easy. The thorough unfitness of the rejected candidates may be judged of by the particulars given in Dr. STEVENSON's report. More than thirty-six per cent. of the rejected candidates failed in dispensing, eighteen per cent. failed in consequence of their general deficiency of knowledge in all the subjects of the examination, seventeen per cent. failed in pharmacy, to say nothing of the failures in chemistry, botany and materia medica. On these data Dr. STEVENSON remarks that the number of failures in prescriptions and dispensing is significant, since these two branches of the examination are most practical and most important in the interests of the public, and he also adds that he has observed a considerable number of failures were brought about by mistakes as to quantities of potent drugs and poisons. He justly says such errors are inexcusable and rightly lead to rejection. What a light these facts throw upon the training and education of apprentices, and how thoroughly they demonstrate the necessity of a systematic curriculum such as the Council has long been endeavouring to establish. The experience of the last twenty years has proved that adequate facilities for the instruction of apprentices cannot be maintained under existing conditions, because there is no obligation to take advantage of them. It is equally evident that there cannot be any suitable provision for the teaching of apprentices in the provinces until attendance at properly organized classes is made compulsory. In regard to chemistry, which is now more than ever essential in a pharmacist, Dr. STEVENSON's remarks have a similar tendency, when he says that it is manifest the candidates have had neither proper teaching in the science nor laboratory instruction. His conclusion that such a state of things may be expected to continue so long as there is no obligatory course of instruction is a natural one, and it is fraught with serious significance to all those for whom the future of pharmacy is of practical importance. Surely it requires little perception to recognize in the facts above mentioned a most emphatic endorsement of the opinion that the apprentices engaged in pharmacy require to be drawn from a much better educated class than is generally the case at present. In conclusion Dr. STEVENSON expresses his appreciation of the thorough and careful manner in which the examiners carry out the responsible duties entrusted to them, and he states that if his criticisms seem severe, they are directed rather to the defects in the training of candidates than to the examinations themselves.

We are requested on behalf of the sub-Committee entrusted with the arrangements for the celebration of the Society's jubilee, to state that with the view of providing for a possible exhibition on that occasion of objects of historical interest in connection with the formation and past work of the Society, the Committee will be glad to be informed as to the existence of such objects, and also to know whether the owners would be willing to lend them for the purpose stated. At the recent jubilee of the Chemical Society the collection of documents and other objects associated with the founders of that Society and its past history proved to be a source of very great interest to the majority of the visitors. It is thought that something of the same kind might possibly be got together for the celebration of the Pharmaceutical Society's jubilee next month. Communications on this subject should be addressed to Mr. Richard Bremridge, for the consideration of the Committee.

* * *

Our contemporary, the *Chemical News*, draws attention to the circumstance that steps are being taken by the Council of that Society in conjunction with the Royal Society and other learned societies for the introduction of a Bill into Parliament which shall make the improper use of the letters F.C.S. a punishable offence. The opinion is expressed that there is need for preventing persons who are not Fellows of the Society from using the letters F.C.S. after their names, since there is good reason for supposing that the public believe these letters to be an indication of professional qualification as a chemist. However mistaken such a belief may be, its existence is a sufficient reason for adopting some effective means of putting a stop to the deceptive practice, which is not only a serious fraud upon the public but also injurious to the chemical profession. There is, however, another and perhaps still more serious injury caused by the exhibition of the letters F.C.S. by persons who as Fellows of the Society are entitled to make use of them and, though they have no kind of pretentions to be regarded as chemists, exhibit those letters for business purposes as an indication that they are qualified chemists. The malpractice in both cases is serious, and it shows that there is occasion for making some public and authoritative declaration as to the true significance of the Fellowship of the Chemical Society.

* * *

A correspondent in Newark-upon-Trent sends an interesting account of the discovery of a quantity of mercury in the trunk of a large walnut tree, measuring about four feet in diameter, when being cut in a timber yard. The mercury was in a hole in the centre of the trunk, which had been bored out and then plugged up after inserting the mercury with a deal plug, round which some eighteen inches of walnut wood had since grown. Considering the very slow growth of the walnut a tree of the size mentioned would be several hundred years old, and it is conjectured that the hole containing the mercury must have been made at least two centuries ago. It is difficult to surmise what could have been the object of storing up the mercury in this extraordinary way.

* * *

In connection with the fifty-ninth annual meeting of the British Medical Association, which is to be held at Bournemouth on the 28th to the 31st of July, there will be a "Museum" arranged in five sections: (A) Food and Drugs, (B) Pathology, (C) Anatomy and Physiology, (D) Surgical Appliances and Books, and (E) Sanitary Appliances. The Honorary Secretary to Section (A), which is to include exhibits of prepared foods, pharmaceutical and chemical preparations, antiseptic preparations, etc., is Mr. MacGillicuddy, Pendennis, Bournemouth, with whom persons desirous of exhibiting in the section should communicate. The Honorary Secretary to Section (E) is Mr. W. H. L. Manner, Westbourne Tower, Bournemouth.

* * *

The thirty-ninth annual meeting of the American Pharmaceutical Association, which is to be held in the city of New Orleans, is announced to commence on the 27th of the present month, this unusually early date having been fixed to avoid the disadvantages attending a meeting in that city during the hotter months. The proceedings are to commence with a reception on the Monday evening and to conclude on Friday evening with a banquet.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, April 8, 1891.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An evening meeting of the Pharmaceutical Society was held on Wednesday evening, the 8th inst., the chair being taken by the President, Mr. Michael Carteighe, at 8 o'clock.

The **President**, in opening the proceedings, said he regretted to have to apologize for the absence of Surgeon Parke, the joint author with Mr. Holmes of the paper about to be read. That very day the Life Guards, to which regiment Surgeon Parke was attached, had been ordered to march to Windsor, and by the rules of the service he was therefore precluded from being present. He had written expressing his personal regret and disappointment at not being able to be present.

Mr. **Holmes** then read a paper on—

THE ARROW POISON OF THE PIGMIES.

BY SURGEON PARKE, ARMY MEDICAL SERVICE, AND E. M. HOLMES, F.L.S.

The paper is printed at p. 917, and gave rise to the following:—

Mr. **Gerrard** said he had brought to the meeting an arrow with poison upon it, and also a bowl in which the poison was prepared, which were brought home some eight or nine years ago by Dr. Felkin, who travelled with Livingstone. These arrows were used by two tribes, the Wanaki and the Wakamba, who lived on the east coast between Zanzibar and the Sooraliland. The account given of this poison by Dr. Felkin was that it was manufactured, like that described in the paper, from five herbs; the method was kept a secret, being handed down from father to son, and the son had to undergo some kind of ordeal before being initiated; in fact, there was a good deal of superstition connected with the matter. The plants yielding the poison were made into an extract, which was rolled into a sausage form and wrapped in a leaf, the whole being bound together by means of two ligatures in a very ingenious manner. As in the case just described, so in this, there was a native antidote, which was made from eight or nine plants, which were carbonized, pulverized, and made up with honey. The arrow, which had been kindly lent by Dr. Ringer, had a barb which could be separated from the stem easily, the object being to cause additional difficulty in withdrawing it from the wound. Dr. Felkin stated that when any one was wounded, he whistled in a peculiar manner, and then the medicine man, who was in hiding somewhere in the bush, not taking part in the fight, ran out, cut out the arrow, and applied the antidote. He understood from the paper that it took a considerable time for a wound from an arrow bearing the pigmy poison to prove fatal, but in the other case Dr. Felkin stated that the poison acted very rapidly, death often taking place in ten minutes, which would lead to the conclusion that a different poison was employed. He had examined that poison, and found it contained a glucoside, which had characteristics strongly allied to strophanthin, showing that it belonged to the digitalis group of poisons. Dr. Ringer, who had experimented with it, came to the same conclusion, and thought it was probably strophanthin, as it produced exactly similar effects to those described by Dr. Fraser. It was stated that one of the poisons described by Surgeon Parke had a tetanizing action, and it was said that this effect was probably due to strychnine, yet the effect l not show itself for some hours, whereas strychnine s very rapid in its action, showing itself in three or ır minutes when given in a poisonous dose. It med open to some question therefore whether the anizing effect of the arrow poison of the pigmies was lly due to strychnine; at any rate further investiga- n was necessary before coming to a positive con- sion as to the active agent in the poison.

Mr. **Blunt** asked if Mr. Gerrard had seen the paper Mr. Stanley in the *Century Magazine* on the dwarfs d their arrow poison? Strophanthus was there ntioned as a probable ingredient.

Mr. **Moss** said he had not caught how the poison s actually prepared. Were the substances pounded ether in a mass, or was a decoction prepared and porated down to an extract? The paper was one of at interest, especially to those who had paid any ention to the composition of arrow poison.

The **President** said the ingredients were pounded ether into a paste.

Mr. **Moss** said that was very different from the rari, the great arrow poison which had attracted st attention, and about which probably most was own; though he held its composition was still some- at mysterious. He paid some attention to it about elve years ago, and came to the conclusion that it s made from various drugs. It was said by Water- n, who first investigated the subject, to be a decoc- n of various barks and roots evaporated to an ex- ct and then pounded up with serpents' fangs, ants, d other abominations, two kinds of peppers, and so . Other observers had come to the conclusion that was an extract only, and Gustav Planchon, after vestigating various kinds of plants used in making row poisons, came to the conclusion that a species *Strychnos* was the chief ingredient. Nevertheless, it d not produce tetanizing symptoms, and might appa- ntly be taken internally with impunity. He did not ow whether that meant to an unlimited extent, but at was one of the conclusions to which a commission Berlin came some years ago, after Schomburgk had ven a description of how the poison was prepared. In nnection with this point it was interesting to note hat Mr. Holmes said of the arrow poison of the aboon, which was undoubtedly prepared from a ecies of *Strychnos*. He thought it was *S. toxifera*, ıt Mr. Holmes mentioned another species. Messrs. eckel and Schlagdenhauffen said that strychnine was e only alkaloid in that poison, and further that a tanizing effect was produced by a small dose, and e stupefying, tranquillizing effect, which was also aracteristic of curari poison, was due to a large dose. different parts of the world very different sub- ances were used to produce similar results; strophan- in in Africa, oubain in Somali, m'boundi wood on the aboon. These mixtures of strychnos and other barks ere all valued by the natives for their lethal power, and r the destruction they could work with them, but hen civilized Europeans got hold of them, and the ysician was enlightened by such men as Mr. Holmes d Surgeon Parke, after sufficient experiment he con- rted these instruments of death and destruction to remedies and means of healing.

Mr. **Blunt** asked if it were known how the antidote as applied; was it taken internally or applied to the ound?

Mr. **Holmes** said he did not know, but he gathered at Surgeon Parke did not consider the antidote of uch value.

Mr. **Blunt** thought that the charring of the roots d barks used for the antidote, as mentioned by Mr. errard, must destroy any active principle, and it emed to him, as a chemist, that the only action uld be that of the wood ashes, as an alkali.

Mr. **Bottle** said there was no information in the aper as to whether the poison was of an acid, neutral, or alkaline character. If the antidote had any value at all it probably lay in some alkaline residuum in the ashes which might neutralize the acid in the poison. He could not conceive of there being any active principle in an ash.

Mr. **Bowen** remarked that perhaps the use of the wood ash was to develop the action of an alkaloid.

The **President** said it might be a question whether an alkali such as wood ashes might not correct certain morbid acid secretions produced by the poison. As far as he could follow the paper, and others on the same subject, it seemed to him that the natives of these countries, at all events those who went in for the destruction of human beings, were very much like the natives of more northern climes when they went in for big guns. Even those who were supposed to be scientific, sometimes combined toxic agents of very different physiological action, and it was well known to pharmacists that in one if not more than one well known patent medicine of a proprietary character, certain physiological actions which ought to follow from the presence of certain poisons presumably in the medicine did not occur, in fact, a physiologist would be entirely at sea if he examined a person who had taken a lethal dose of such a preparation. Probably, these Africans had found out that a very useful way of destroying life, a very quick way, was to associate two toxic agents which they had found by experiment produced certain results that might be described as being to some extent antagonistic to one another. They would not be anxious to have their victims hanging about and giving trouble; they wanted them out of the way. On no other hypothesis that he knew of, could one account for the curious fact that in every arrow poison of which he had read there seemed the strongest possible evidence that there was more than one toxic agent.

Mr. **Martindale** said this paper added considerable information to that already in existence on the subject of arrow poisons. There were the Upas poison, the Curari, the Kombé and others; and this was one more. As the President had pointed out, there was very likely a paralysing and a tetanizing substance, one being probably from the Sassy bark and the other from a species of *Strychnos*. It was probable that strychnine was a principal agent in Curari, but there was a good deal of doubt about the other ingredients. This might prove hereafter to be a valuable medicine.

Mr. **Holmes**, in reply, said there were two plants known to be used in Somaliland for arrow poison, one was *Adenium somalense* and the other was *Acokanthera Ouabaio*. The latter yielded ouabain, which had been shown to be very similar to strophanthin, both in action and chemical composition. There was very little doubt that strychnine was present in the bark of *S. Icaja*. Mr. Moss had referred to the variety of poisons used, and Surgeon Parke informed him that different tribes modified the method of preparing the poison, or used slightly different materials, so that the poison of one tribe might differ somewhat from that of another. *Strychnos toxifera* was a native of British Guiana, and it had been stated that the South American species had an action like curare, while those of Asia and Africa had an action like strychnine. The *S. M'Boundou* of the Gaboon was identical with the *S. Icaja* of the Congo. Charcoal was valuable as an antidote to poison, very largely on account of its absorbent property. In India and Ceylon a lump of animal charcoal was used as an antidote to snake bite, being placed in the wound until it had absorbed sufficient blood to drop out; so that it acted something in the same way as sucking the wound. Mr. Bottle had spoken of the alkali neutralizing the acid, but there might be also a different action. A moderately caustic alkali like carbonate of sodium would alter the chemical composition of some alkaloids; carbonate of potassium would destroy the action of belladonna, and in this way the alkali might affect the poison. The President had suggested that when there were two alkaloids present one might modify the action of the other. He did not know whether erythrophlœine and strychnine acted in this manner. It might be that the action of the strychnine would be delayed; but at all events that was a suggestion worth following out. He had hoped that Dr. Lauder Brunton would have been present, as he had paid considerable attention to the subject of casca bark and its active principles, but he had written saying he could not attend though he felt much interest in the paper. He had been lately working on the bark, and he had expressed a doubt if erythrophlœine was a pure substance, as a secondary physiological action had been observed by him.

The **President** in proposing a vote of thanks to the authors, remarked that though there was occasionally some little friction between the medical or surgical department of the army and the combatant side, in regard to such expeditions as that in which Mr. Parke had been engaged, there could be no doubt that officers like him were entitled to the credit of fighting hard against disease. Mr. Parke was a man whose pluck was undoubted, and as to whom, whatever might be said about other members of the expedition, not a word of a doubtful character could be uttered.

The next paper was a—

NOTE ON COMMERCIAL CITRONELLA OIL.

BY JOHN C. UMNEY.

The paper is printed at p. 922, and gave rise to the following discussion:—

Mr. C. **Umney** said it was very desirable that pharmacists should be aware of the changes which took place naturally in drugs and other matters with which they had to deal. Essential oils they all knew were prone to oxidation and change, as was seen in the case of essential oil of almonds, which one day might be quite limpid and the next almost a solid mass from crystallization due to oxidation, or in essential oil of camomile, which would be one morning quite white, and the next a beautiful blue colour. Oil of cajuput, again, was sometimes rejected because it was white and had not the green copper colour they were accustomed to. It was very important to know when these changes were due to natural causes and when to sophistication or defects in manufacture. Citronella oil was a very large article of commerce, being imported enormously from Ceylon, where the grass from which the oil was distilled grew in such luxuriance that they had nothing to do but gather it and put it into the still, and the oil came to this country almost for nothing, the price being only about one-tenth what it was some few years ago. It was quite clear that there was often a defect in manufacture which could be remedied by having the head of the still well tinned, and by having the worm of tin or earthenware. That, however, would not prevent sophistication. Petroleum was very cheap in most places, and the citronella oil which came to London was often adulterated with it, sometimes only to so small an extent as to arouse suspicion, but sometimes to such a large extent that those who understood such matters simply marked "petroleum" against it in their catalogues and paid no further attention to it. This paper would put people on their guard, and would enlighten those who like himself had been under the impression that this change of colour was due to a similar cause as that which took place in camomile oil and not to defects in manufacturing or sophistication.

Mr. **Holmes** said the specimens of citronella oil in the Museum had never been green; and it seemed therefore that the method of distillation must been altered of late years. The question of adul tion with petroleum was of great importance, as tial oils were more frequently adulterated than drugs, and the fraud was often difficult of American essential oils were much worse than in this country, which might account for the fact the specific gravity mentioned in American text- was not always correct. The same thing had noticed in the case of sandal-wood oil.

The **President** said it would appear that the called sophisticated oil was in fact pure, the colour being only due to distillation in copper. did not know whether anyone could throw any on the reason for adding petroleum. Apart from question of gravity it would probably be useful in serving the flavour of the original oil.

Mr. **Charles Umney** thought possibly the leum was put into the still with the grass. this oil and also oil of verbena came to this bottles which had been sent out with wine or but these essential oils now came over either or sometimes in huge cisterns, weighing half It was in these large packages that adulteration petroleum had chiefly been found.

Mr. **Moss** remarked that it did not necessarily that the mode of manufacture was altered, becaus the present time both green and colourless oil came into the market, the difference being the different nature of the apparatus in which produced. If this apparatus were a very primitive a tub, a clay head, and a bamboo stem, there no trace of copper, but with a more modern still, copper were not well tinned inside, there might green colour.

The **President** said he was rather suggesting the petroleum might be put into the still primarily prevent oxidation or change during the process distillation.

Mr. C. **Umney** said his belief was that the was added because it was cheap.

Mr. **Bottle** said he had been rather struck statement in the paper that citronella oil with traces of petroleum did not show the copper and he might state the result of an experiment dentally made—which he witnessed at Dover previous day. A child was coming out of an oilshop wine bottle containing about a pint of petroleum when, owing probably to the neck not having wiped, the bottle slipped from the child's fingers was smashed on the pavement. At that was about twenty yards off, and by the time he the spot, he found to his surprise that the oil was rapidly turning a greenish blue where came into contact with the cement with which the ment—blocks of patent Victoria stone, about two square—was laid; it was evidently the cement the stone which was giving the colour. He clined to think at first that this was an indication the petroleum had been distilled in copper, and rather surprised to hear Mr. Umney's remarks. he returned home he should take steps to the composition of the cement in question.

Mr. J. C. **Umney**, in reply, said Mr. Moss remarked that some commercial oil of citronella yellow, rather implying that it contained no and would not turn green; but he might say that procured eight samples from different sources, out of which seven went green, though five of them were yellow at starting. He thought the reason that light oil did not change colour was that it had distilled by poor people and that petroleum had added, being cheaper, to increase the yield. people using more modern appliances got a full and had no need to adulterate. The sp. gr. of the in America was stated in a recent paper by a Mr.

·877, which was rather a peculiar statement, and it account for some of the analyses.

e PRESIDENT then proposed a vote of thanks to Umney for the paper, referring to the fact that he been a pupil in the School of Pharmacy and was working in the Research Laboratory. The vote passed unanimously.

harmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

e monthly meeting of the Council was held on nesday the 1st instant at No. 11, Harcourt Street, lin.

e President, Mr. Charles Evans, in the chair.

e other members of the Council present were the -President, Mr. Wells, Mr. Hodgson (Treasurer), srs. T. W. Robinson, Shaw, Dr. Burnes, Hayes, kin, Boyd and Professor Tichborne.

he President said it was his intention to place his gnation of the office of President in the hands of Council in the following month.

he first business on the agenda paper was the tion of a member of the Council in the room of M. M. J. D'Arcy.

he Vice-President said he had much pleasure in posing that Mr. Joseph Stewart of Limerick be pted a member of the Council. They had only members of Council from the South, one from k and the other from Tipperary; and it was essary that the vacancy in the representation uld be filled.

r. Robinson said he had great pleasure in second- the motion. He was personally acquainted with Stewart and knew that he took great interest in rmaceutical matters.

he motion was unanimously agreed to.

report from the Certificates Committee was pted.

report from the Declarations Committee, dealing h inquiries and matters of detail in relation, amongst er things, to the candidatures for the examinations principals) for the licence to act as a registered ggist, to be held in Dublin on the 8th of the present nth, and in the Queen's College, Belfast, on the 14th ant, was also adopted.

report was received from Dr. Whitla, who had d the first quarterly examination in Belfast of can- ates for the licence to act as registered druggists ler section 8 of the Pharmacy Act, 1875, Amend- nt Act, 1890. It stated that the candidates were the whole good, and that the failures had chiefly n from very bad spelling and want of knowledge weights and measures.

donation was received from the Pharmaceutical iety of Great Britain of a copy of the Register 1891.

n the motion of Dr. Burnes, seconded by Mr. Boyd, nks were voted to the donors.

letter was received from the Privy Council enclos- a copy of a letter from Dr. George Duffey, the itor, in relation to the alteration lately made by the ncil in the Preliminary examination and other tters connected therewith.

he letter of Dr. Duffey was referred to the Schools mmittee.

letter was received from the Registrar of the neral Medical Council, stating that the decision of question which the Council of the Society had erred to the General Medical Council, as to the eptance of the Society's Preliminary examination, entirely in the hands of the Irish Branch of that ly.

letter was received from Mr. H. G. Eaton, a mber of the Society, dated from 23, Johnston Street, Clonmel, in which the writer notified his change of address, and also said, "I have noticed with great satisfaction that the Society is raising the standard of examination."

On the motion of Mr. Boyd, seconded by Mr. Robinson, Mr. Gerald L. Stack, of Listowel, was elected a member of the Society.

Messrs. Gibson and Lyons were appointed visitors of the examination for druggists to be held in Belfast, and Messrs. Hayes and Boyd were appointed visitors for the Dublin examination.

A form of certificate to be given to persons who pass the examination for registered druggists was submitted. It was in the following terms: "Examination for registered druggists. I hereby certify that Mr.—— has passed the examination for registered druggists conducted by me on the——day of——, and is hereby qualified to sell the scheduled poisons. ——Examiner. ——Registrar, Pharm. Soc. Ireland."

Mr. Rankin said he thought the certificate should be headed "Pharmaceutical Society of Ireland."

The Vice-President: We are not bound to give the certificate at all. It is the examiner who gives it.

Mr. Shaw: But is not the examiner appointed by the Society and their paid servant?

The Vice-President: He is the paid servant of the Lord Lieutenant. If we were to put the words "Pharmaceutical Society" on these certificates it would be very misleading. I think the certificate should say "qualified to sell poisons but not to dispense medical prescriptions."

Some accounts were ordered to be paid and the Council adjourned.

EXAMINATIONS.

Messrs. L. Murray, S. Adamson, J. S. Wilson and W. White have passed the examination for the licence to act as a pharmaceutical chemist. Two candidates were rejected.

Provincial Transactions.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

At a meeting of the Liverpool Pharmaceutical Students' Society, held on Thursday, the 2nd instant, the following note was read by the President of the Society:—

NOTE ON ICHTHYOL.

BY H. WYATT, JUN., PH.C.

Ichthyol, as the ammonium compound of ichthyolsulphonic acid is usually termed, though largely prescribed for external use, has only recently begun to find favour as an internal remedy, at least in England.

It is usually ordered enclosed in capsules containing 5 or 10 minims, or in pills of 2½ grains in each, many prescribers ordering the sodium or potassium ichthyolsulphonates, as they are of a firmer consistence, and consequently can be formed into less bulky pills, requiring, as they do, less absorbent powder to mass them.

By evaporating the ammonium ichthyol carefully over a water-bath a dark brown easily powdered residue is left, which, however, soon becomes a pasty, somewhat deliquescent mass, readily cutting into pills, which should be coated with gelatine or varnished. I found that 120 grains of ammonium ichthyol yielded 54 grains of residue, a loss equivalent to 45 per cent.

I was asked a short time since by a medical man if there was such a salt procurable as a magnesium ichthyolsulphonate, as he wished to try it internally in a case he was attending, and moreover wished to have it with as little delay as possible. The only salts I could see mentioned in any book of reference were the ammonium, sodium, potassium, and lithium for internal use and the zinc for external, so my only course was to try and evolve some way of working up the material I had to hand, viz., ammonium ichthyol, into the required salt. After one or two failures it struck me the easiest and quickest way would be to evaporate the ammonium ichthyol down to dryness after the addition of milk of magnesia. Accordingly to 120 grains of ammonium ichthyol I added 15 grains of freshly burnt magnesium oxide made into a thin milk with ʒiss. of water, and evaporated the mixture with constant stirring over a water-bath to dryness, during which process ammonia was given off, a light chocolate brown powdery mass resulting. On weighing this I obtained 83 grains, that is to say (120 grains ichthyol and 15 grains magnesium oxide) 135 grains lost 52 grains in drying, or, roughly speaking, 8 grains of the magnesium ichthyol = 12 grains of ammonium ichthyol.

This magnesium compound formed very good pills on the addition of a little water, and was moreover readily soluble, the therapeutic effect according to the doctor being also satisfactory, so that the evaporation of the mass had not (as I feared it might do) impaired its medicinal activity. Latterly ichthyol as a topical application has been largely used for erysipelas, and it has occurred to me that a dusting powder of magnesium ichthyol and powdered talc or French chalk might be used in some cases with advantage.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual business meeting of the above Association was held in Lockhart's Café Rooms, St. Nicholas Square, on Wednesday evening, April 1, Mr. F. Park, President, in the chair. There was a good attendance.

The minutes of the previous meeting having been read and approved of the Secretary moved a slight alteration in the rules, which was agreed to.

The President then called upon the Secretary and Treasurer to read their reports, which showed that the Association was in a very flourishing condition, the balance of cash in hand being greatly in excess of last session.

The following office bearers were then appointed:—Hon. President, Mr. B. S. Proctor, F.I.C.; President, Mr. J. F. Merson; Vice-President, Mr. B. T. Ord; Secretary, Mr. P. Bell, 11, Grey Street, Newcastle; Assistant Secretary, Mr. T. S. Herd; Treasurer, Mr. H. Pattinson, 124, Northumberland Street; Members of Committee, Messrs. Bell, Cormack, Kellett, Park, Pescod, and Robson; Prize Committee, Messrs. Bell, Merson, and Park.

PHARMACY ACTS AMENDMENT BILL.

Meeting in Glasgow.

A meeting to discuss this Bill was held in the Religious Institution Rooms, 177, Buchanan Street, Glasgow, on Wednesday, the 8th inst., at 11 a.m. In the billet calling the meeting it was described as "a meeting of medical men, chemists, their assistants, and others interested in the Bill," and a strong effort had been made to get a large and representative meeting. When the hour arrived there were only three persons present. It was expected that Mr. Daniel Frazer would occupy the chair, but this intimation had been made without his consent, and a letter was read stating that he could not attend the meeting. After waiting for twenty minutes Mr. Kinninmont moved that Mr. W. L. Currie, Dowanhill, take the chair. At this time there were about thirty present, including several medical men.

The Chairman said he felt rather awkwardly placed in being called to occupy the chair, for it necessarily prevented his taking a share in the discussion. understood this meeting had been called to oppose Bill as at present before Parliament. His views the subject were pretty well known, as he had sta them at Mr. Carteighe's meeting. Although he agr generally with the Bill there were, of course, cert things in it with which he did not quite agree. W regard to a compulsory curriculum, for instan he did not see that it was at all necessary. thought the Society was setting itself above Government even, who did not require a curri lum of candidates for civil service examin He thought it would be rather a waste of time require candidates to spend so much time atten lectures. With regard to the question of unquali assistants of 15 years standing being recognised allowed to go on under a registered chemist and dru gist he did not see how that could be tolerated It would have the effect in some cases of act placing registered junior assistants under the dir of unregistered seniors, and that would be a anomalous thing. And it would have the other of leading to an unlimited number of branch shop ing carried on by unqualified men. If this Bill opposed it would certainly stop all pharmaceu legislation and prevent anything at all being secure greater advantages for the trade. If it successfully passed it would make a very materi provement in the status of the trade, and especially assistants, and would give the public a much idea of education and qualification of regis chemists and druggists. He would now invite the express their opinions on the Bill.

After a considerable pause Mr. Kinninmont said he would move the following resolution, which hoped would be passed by the meeting:—

> "In the opinion of this meeting the Amen Pharmacy Act should contain an interpreta clause to the effect that wherever the words or keep open shop' occur (with the exceptio executors in clause 16) they shall be held to 'carrying on business on his own account' restoring the word 'seller' in the Act of to its legal, commercial, and common meaning."

Mr. Kinninmont was proceeding to discuss the ing of the 1868 Act and the intention of the when—

Dr. Lees rose to a point of order, and main that Mr. Kinninmont was not discussing the which the meeting had been called to consider. motion did not refer to anything in the Bill, did not think he was in order in discussing it. should consider the Bill as it stood first, and after would be the time for Mr. Kinninmont to propo clause as an addition to the Bill.

The Chairman sustained the point of order ruled that Mr. Kinninmont's motion was ou order.

Mr. Kinninmont then said he would take up c 6 of the Bill, which was the principal one requ attention. He was proceeding to argue that sec 6 interfered with and curtailed the exemptions garding doctors' shops provided for by section 1 the 1868 Act, when——

Mr. Rutherford Hill asked to be allowed to p out that section 6 distinctly and specifically re-affirmed the exemptions contained in section 16, and on the Chairman reading the words of section 6 this was distinctly seen to be so that it was evident Mr. Kinnin mont's statement could not proceed.

A general discussion then took place as to the pr per procedure.

Mr. George Macdonald, Mount Florida, asked the Chairman what motion was before the meeting.

The Chairman said that Mr. Kinninmont's motio had been ruled out of order, and here was no motion before the meeting.

Mr. George Macdonald then moved, without remark:—

"That in the opinion of this meeting the Pharmacy Bill now before Parliament is worthy the support of all pharmacists, and we resolve to extend to the Pharmaceutical Society our support in getting it passed."

This was seconded without remark by Mr. James Findlay.

Mr. Thomas Davison, St. Vincent Street, moved without remark:—

"That this meeting oppose the Pharmacy Bill as at present before Parliament."

This was seconded by Dr. Lees without remark and put to the meeting without discussion, when six voted for the motion and fourteen for the amendment.

The meeting then closed, after having lasted about an hour.

As the members were leaving a suggestion was made that a petition against the Bill should be got up for signature, but no arrangement was come to regarding it. A large proportion of those present expressed great dissatisfaction with the result of the meeting, as there were many points in the Bill of which they approved, and they would have preferred to suggest amendments rather than direct opposition to the Bill. As the amendment against the Bill had been put to the meeting they had felt bound to vote for it, but would much have preferred a discussion of the various clauses.

Proceedings of Societies in London.

SOCIETY OF CHEMICAL INDUSTRY.

London Section.

A meeting of the section was held on April 6th, Mr. Tyrer in the chair. After the transaction of some business relating to the election of the Sectional Committee, Professor Vivian B. Lewes read a paper on the "Analysis of Illuminating Gases." He said that until recently conventional methods of gas analysis had been considered adequately accurate, whereas many of the results thus obtained were misleading, and, indeed, erroneous. He preferred the process recommended by Winkler to most of those that had been proposed, considering the use of palladium to remove the hydrogen a valuable innovation. A large error arose from the custom of determining paraffins by explosion and reckoning them as methane. Homologues of methane were present in ordinary coal gas in sufficient quantity to condemn this practice. In consequence of this the figures representing carbon and hydrogen densities, upon which so much stress had been laid by previous observers, were valueless, and no relation between them and the illuminating power of the gas was to be expected. As regards reagents for gas analysis other than those generally agreed upon as fitted for their purpose, he preferred a solution of bromine in potassium bromide to bromine water for absorbing olefines. The conclusions arrived at were based on many experiments on the action of various absorbents upon known mixtures containing the pure gases whose behaviour was to be examined. Thus methane had been prepared by the action of a copper-zinc couple upon a mixture of methyl iodide and alcohol, ethane by a similar method, and ethylene in the ordinary manner, by heating alcohol with sulphuric acid. After numerous trials it had been found that paraffin oil freed from its more volatile constituents by long heating on the water-bath was a fair absorbent for gases of the C_nH_{2n+2} series, absorbing ethane and a good deal of methane. By taking the volume thus removed, plus that calculated from the explosion of the residual methane, the true percentage of paraffins could be determined.

The apparatus that had been found best in this work was Stead's, a form too well known to need description. Two such apparatus were taken and one used with water as a sealing liquid, the other with mercury. The calibration of each apparatus must be rigorously checked before taking it into use. Absorption of the carbon dioxide, oxygen and unsaturated hydrocarbons was effected in the ordinary way, save that a solution of bromine in potassium bromide was employed for the olefines as mentioned above. The carbon monoxide was absorbed with cuprous chloride, the higher paraffins by paraffin oil, and the hydrogen and methane determined by explosion in the usual way. But the nitrogen, having to bear the brunt of all the errors of many previous operations, was not taken as equal to the residual gas left by the last absorption. It was determined by exploding a fresh portion of the gas over mercury, absorbing the carbon dioxide, and taking the residual gas as nitrogen.

Such constituents as acetylene and sulphuretted hydrogen were present in very small amount, and were best determined by passing a known volume of the gas through an ammoniacal silver solution. The mixed precipitate of silver sulphide and acetylide was collected on a filter, washed, and dilute hydrochloric acid poured over it, whereby the latter salt was converted into the chloride. The chloride was then dissolved in ammonia reprecipitated with nitric acid, and thus determined.

Compounds of the nature of carbon disulphide were best estimated by passing the gas over heated platinized furnace, by which treatment the sulphur appeared as sulphuretted hydrogen.

By such means as had been described two analyses could be performed in one day, and though this did not seem very quick work the author wished that those who considered it needlessly slow would check their own methods, the rapidity of which was such that it was sometimes boasted that an analysis of an illuminating gas could be made in one hour, by analysing known mixtures.

A discussion followed in which nothing of importance was said save that Mr. Lacey pointed out that the method of executing various operations in the analysis of gases, such as the explosion of hydrogen and methane with oxygen, under constant conditions, might give concordant results, yet variation of these conditions might reveal discrepancies, a proposition endorsed by Professor Lewes in his reply.

A second paper by the same author was then read on "The Products of Checked Combustion," in which the work of Mr. Thomson in the same direction was extended and the methods improved. The last named experimenter had been content to determine merely the carbon and hydrogen of the hydrocarbons present in the products of combustion, but Professor Lewes had been able to further differentiate them. The apparatus he used consisted of a copper vessel provided with a false bottom fitting on outside the true bottom, and having a circular hole about 2½ inches in diameter in the centre; the tip of the flame used to heat water in the vessel played into this hole, and the products of combustion were drawn off from the space enclosed between the true and the false bottom by means of a tubulus fastened to the latter. The gases were led away through a series of absorption tubes, the hydrogen eliminated without the methane being attacked by passing it over asbestos coated with palladium contained in a tube kept at 210°-220° C. by means of a paraffin bath, and the hydrocarbons burnt by passing over platinized asbestos more strongly heated. There was seldom enough oxygen in the gases analysed to burn them thoroughly, so oxygen, the quantity of impurity in which was known, was added in known amount before entering the combustion tube; a train of absorption tubes for the products of the last process completed the apparatus. By such means the author had proved that much less perfect combustion than was usually supposed took place when either a bunsen or a luminous flame was allowed to impinge on a comparatively cold surface, such as that of a vessel in which water was being heated.

Similar experiments with bunsen flames burning freely in air had shown that the outer non-luminous flame owed its appearance to the cooling influence of diluent gases rather than to perfection of oxidation. Where the dilution was less and the temperature higher, as in regenerative burners, the combustion became more nearly complete.

Dr. Thorne congratulated the author on his paper, which he considered was an important contribution to a subject that had hitherto received scant attention, and said that the causes that had been indicated were at work in gas stoves, rendering combustion in them often incomplete, and their use in consequence sometimes disagreeable and unhealthy.

Mr. Bertram Blount endorsed Dr. Thorne's criticism on gas stoves in general, but said that the experiments brought forward by the author applied to those cases where the surface treated was comparatively cold, and had no direct relevance to the conditions obtaining in a gas stove where the burning gases impinged upon some refractory material already in a state of incandescence. He also expressed a doubt as to whether the combustion of a flame, confined to some extent, as it inevitably must be, by the device of a false bottom, which the author had described, was as perfect as it would be under more natural conditions.

Mr. Lacey emphasized the remarks of the previous speaker on the difficulty created by the use of some confining arrangement in order to collect the products of combustion.

Mr. Foster instanced the exhaust gases of a gas engine as a striking example of incomplete combustion, and ridiculed the vulgar notion that a gas stove provided with some condensing arrangement could be safely used without a flue.

Mr. Alder Wright stated, with reference to what had been said as to the greater approximation to complete combustion obtaining in a gas stove where the flames of the burners were in contact with incandescent material, that he believed those in which iron was used as the material heated were most efficient in this respect, the magnetic oxide formed acting in what used to be called a "catalytic" way.

Professor Lewes, in reply, said that even when burning in contact with incandescent material, ordinary gas gave partially burnt products. With regard to the question that had been raised as to the false bottom checking combustion, he said that he did not think it acted in that manner.

A note by Professor Lunge, of a controversial character, referring to the long-standing dispute between himself and Messrs. Cross and Bevan, as to the point of neutrality in titrating aluminate of soda, having been read and replied to by Mr. Bevan, the meeting adjourned.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting held on March 24, Mr. W. Bedford being in the chair, the minutes of the previous meeting having been read and confirmed, the Assistant Secretary read a letter from Mr. G. Houghton accompanying two works entitled 'Excursions Daguérriennes,' containing a large number of plates drawn from daguerreotypes taken prior to 1841, and an advertisement from *Fraser's Advertiser* dated 1840 relating to them. The subject for discussion was Hand Cameras, and a large number of cameras were exhibited and described.

Mr. Leon Warnerke then described some experiments he had been making upon colours produced by interference, and showed that the colours obtained when a negative, prepared by the powder process mentioned in his collotype lecture, was collodionized, was due to interference produced by the reflection of light from the graphite. He also showed some coloured images on albumenized paper obtained by printing through a negative composed of strips of coloured glass on albumenized paper, the sensitized surface of which was in contact with mercury. The colours were strong and distinct, and were visible both by reflected and transmitted light, but the colours disappeared on fixing.

At the technical meeting on March 31, Mr. Chapman Jones being in the chair, Mr. T. E. Freshwater showed his miniature lantern, and a lantern display took place, slides being contributed by various members.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PRELIMINARY EXAMINATION.

Sir,—Mr. J. E. Saul, being an examiner and actively engaged in pharmacy, has the right to speak on a subject which he is in a position to understand.

In a straightforward and sensible manner he shows us the Preliminary examination as now arranged does not meet the requirements of the situation, and being signally ineffective, owing to its restricted scope, is an injustice to a youth about to enter on a pharmaceutical career.

That something is fatal to the examination and future prospects of aspiring pharmacists needs no discussion. What that something is we all know, but it seems a foolish to make a solemn statement that a liberal education is the best preparation for a career half technical and half scientific—one on the borderland of medicine—that we refrain from dilating on a truism. The world outside must think pharmacists a curious set, and pharmacy a vocation specially adapted to the sect of the Peculiar People.

Mr. Saul is to be praised both for his courage and for his lucid explanation.

I also have been a working pharmacist and an examiner and am now a teacher, so I shall not be charged with sentimentalism or inexperience when I make my statement.

The difficulty under which our students labour is that they do not know how to learn. They have never had the awakening influence which general knowledge and cultivation can alone create; the area of their thoughts has been so contracted that the power of acquisition has become seriously impaired; and the sad truth is revealed but too soon to themselves when they begin their technical studies and to an examiner when by law he is compelled to pass judgment on their imperfections.

Every session there are certain students who are conspicuous exceptions to the above. They may possibly not be well versed in pharmacy; but let them start fair with such an education as may be had at our great public schools and they will speedily assert their superiority in the new study which they are called upon to undertake.

Should they, besides efficient schooling, have had good business training, they then stand alone amongst their companions, and for them the laboratory and lecture-room offer supreme advantages.

The word schooling is used advisedly as distinct from that higher scholastic training which would fit a man for the university, and to indicate a standard not higher than the fifth form nor lower than the third.

We are in full hope and anticipation of a compulsory curriculum arranged in such manner as that a student may welcome its introduction.

Let us begin at the right end, and not force our young men to make bricks according to the Egyptian method of not providing straw.

It is my deliberate opinion, being a practical educationalist, free from theories of all description and of sound mind, that unless we materially alter our Preliminary examination, this wise and beneficent provision will prove only a new source of dread.

Under existing circumstances we allow our youth to crowd into our schools of pharmacy less instructed than the average tradesman and mechanic, while we are about to tempt them to failure and disappointment, by offering a higher system of technical training than that officially recognized already.

Mr. Saul puts the matter in so temperate a form that opposition is disarmed; he is an improver, not an iconoclast; he suggests no sweeping alteration, but that the Preliminary examination should be adapted to the requirements of the times—that it should be of positive service and not simply a pass qualification.

To promote this end he would not reconstruct but amplify and amend its regulations. Cæsar, with his dreary Commentary, to be suppressed; Virgil to remain; Euclid, first book, and algebra up to simple equations, to be considered as indispensable as arithmetic; a general knowledge of history and geography and one modern language to be an essential part of the education of a pharmacist. The reasonableness of the scheme commends it for acceptance, more particularly as it avoids the pet blunder of a theorist, who would drag into a strictly scholastic examination a diluted portion of a science subject.

By all means let an elementary knowledge of physics, chemistry and botany be gained at school, but it is not evidence of progress in that direction which we want.

The amendment of our Preliminary examination has a two-fold object: to save a youth from embarking on a career for which he finds himself intellectually unfitted; and to protect his future teachers from the mortification of futile endeavour. JOSEPH INCE.

THE PRELIMINARY EXAMINATION.

Sir,—The perennial difficulty of the Preliminary examination has again come to the surface, troubling the waters. Sometimes it rises in a wail of woe from unsuccessful examinees, shipwrecked on the rugged Scylla of untranslatable Cæsar or an insoluble vulgar fraction. Now it is the pathetic protest of a despairing examiner, bewailing the hopeless struggles of those who have been lured into Charybdis by a too lenient ordeal. The two grievances are somewhat contradictory, but let that pass. Let us also get rid, if we can, of some fallacies.

Mr. Saul asserts that, "In all the professions where theoretical science has to be acquired, a good scholastic training, tested by examination, is insisted upon." Is this so? My experience is the very reverse. I believe that the Preliminary examinations for all the professions are very inefficient tests of "good scholastic training." And what is universal is likely to be founded upon practical experience, if it does not square with *a priori* theory. The object of a Preliminary examination is not, as Mr. Saul appears to suggest, to sift out all the possible future failures (which no one can foresee), nor yet to fix an average standard of educational qualification. I am not sure that such a "preliminary" would not have barred the pursuit of science to Sir Humphrey Davy and Michael Faraday. A Preliminary examination, I submit, is intended to fix the minimum qualification and to exclude the hopelessly incapable. In the latter purpose it appears, from Mr. Saul's competent testimony, frequently to fail; but perhaps there are other reasons than this, to be adverted to presently. Nor is this minimum arrived at without an effective automatic check: it must not be pitched so high as to prevent the ranks from being recruited. Totally different influences regulate the maximum qualification, which cannot, of course, be demanded from all, and between these a respectable average is, or ought to be, struck.

It will not be unprofitable to give a passing glance at these latter influences. The maximum qualification is governed by the power of the profession, whichever it may be, to attract to itself the higher intellects and the more liberally educated classes; and this attractive power depends partly upon the emoluments each profession offers and partly upon the estimation in which it is held. Now, it is unfortunately the case that the profession of pharmacy, in consequence, no doubt, of its trading associations, does not attract the higher intellects and the educated classes to the extent to which its more intrinsic but less visible attributes may fairly lay claim. These conditions act and react in a vicious circle, and while they last have to be endured. For such reasons the examination standard in pharmacy is not, as in other professions, the minimum, but it becomes the maximum qualification, with some brilliant exceptions.

If we look at recent statistics of the Preliminary examination it will not appear practicable to raise this standard in a direct manner, unsatisfactory as it may be. It is shown that 56·2 of every hundred candidates fail to pass the present ordeal, and of these 40·8 failed in arithmetic! *Proh Pudor*! and this, too, while the considerate examiners are appeased by the attainment of 40 per cent. of the total possible marks! Only 44 per cent., therefore, satisfied the examiners, and, according to Mr. Saul, half, if not more, of these "are seriously deficient, not only in general education, but also in intellectual capacity." It, therefore, comes to this, that only 20 per cent. or thereabout of pharmaceutical aspirants in this its year of jubilee are fitted by previous education and natural endowment for their proposed vocation. Truly this is a melancholy picture; but it does not convince me that a remedy will be found by increasing the stringency of the Preliminary examination.

I have hinted that reasons other than the low pitch of the Preliminary examination may, perhaps, account for some of the incapacity that filters through. There is always a certain element of luck in examinations, which may favour the undeserving or baffle the meritorious; but this cannot explain Mr. Saul's grave statement. I find, however, that the classical examination, which, if elementary, should at least be real, consists, as to translation, of a construe from the first book of Cæsar (to which, unlike Mr. Saul, I make no objection, except that if I were under examination I should greatly prefer Virgil). I also learn, with consternation, that this first book of Cæsar has been the text for the pharmaceutical Preliminary without change for thirty years! Why, this is monstrous! It is cramming made easy! The whole thing may be learnt by heart, and is known to have been learnt by heart by a candidate, with the remarkable result that he gave an excellent translation of a passage which, unfortunately for him, the examiners did not happen to have set! And now we know why 40 per cent. out of 56 per cent. failed in arithmetic. There was nothing else for them to fail in. Before condemning the present scheme of the Preliminary examination, let me suggest that it should have a fair trial, which it does not now get. Let fair and easy papers be set, eschewing such tricky questions as relate to "she foxes" and the plural of "die," and demand a higher—I should say a much higher—proficiency from the candidates. When that proves a failure it will be time enough to consider further changes.

The direction of such further changes as may in a not too near future be desirable and practicable is clear enough to my thinking. A silent and almost unheeded revolution has been taking place under our very eyes; which is destined, I believe, to accomplish great things for the extension and improvement of education, and amongst these to furnish not only the Pharmaceutical Society, but every technical, scientific or professional body with a suitable "certificate of scholastic examination by a scholastic body," which Mr. Saul has most sagaciously recognized as the ideal of a Preliminary examination. If his communication had not contained another word besides the suggestive sentence from which that phrase is quoted, it would have deserved the careful consideration of every one interested in the subject of Preliminary examinations. Our Universities, after generations of torpid existence, have during the present era awakened to a sense of their responsibilities to the nation at large, and have initiated a noble work, which has already made great progress towards bringing the hitherto disjointed and irresponsible schools throughout the kingdom under some central influence. The work began with the Oxford local and Cambridge local examinations, which both tested the work of the schools and certified the proficiency of the scholars. This has now been further organized and developed by a joint board of both Universities, as set forth in the "Regulations of the Oxford and Cambridge Schools Examination Board," who grant certificates of different degrees of merit; the lower certificate being at the present time accepted by the Pharmaceutical Society in lieu of the Preliminary examination. Here is all the machinery that is wanted, filling up the vacant place between the Universities and the great public schools on the one side, and the Board Schools (who also grant certificates of various standards of educational proficiency) on the other, so that the whole ground of English education is now covered by the supervision of competent examining and certificating bodies. All that is wanted is a fuller recognition of these inestimable advantages, which must inevitably follow their wider publicity; and herein I believe will be found the complete and only satisfactory solution of the "Preliminary examination" crux.

RICHARD W. GILES.

THE PRELIMINARY EXAMINATION.

Sir,—I write to say that I have read with satisfaction Mr. Saul's paper in last week's Journal calling the attention of the Society to the necessity of "broadening the Preliminary examination with the view of bringing it more into accord with the present condition of middle-class education."

I trust the Council will see its way to adopt his recommendations and include them in the proposed alterations of the bye-laws.

The lamentable high proportion of failures in passing the Minor examination is, I am convinced, due in a large degree to the imperfect elementary education of many of the candidates, and I am inclined to think that the Society would do well if it abolished the Preliminary, together with its fee, and that the Board of Examiners should accept only the certificates of the various scholastic bodies which contain, in addition to the present schedule, those subjects recommended by Mr. Saul.

Knightsbridge. J. B. BARNES.

Sir,—I have read with the greatest pleasure and interest the able article by Mr. J. E. Saul on the state of the Preliminary examination, published in your last issue. It was a matter of surprise and regret to many, that when the revised syllabus of the Major and Minor examinations was published, the Preliminary examination remained unaltered.

The aim of the President and Council, I take it, has always been to win for the pharmacist the respect and confidence of the public by raising his educational level, to make him a more competent man, and secure for him a professional status, and consequently professional remuneration. It is on the fulfilment of these objects that many of us believe the future existence of the pharmacist depends.

The public will not respect, or believe in the professional ability of a man whose educational level may be about that of a board school boy; the only kind of education it understands is the general education of which all possess some degree, and if this is defective, the highest technical acquirements possible will not be appreciated.

But apart from this consideration, the recently published syllabus of the Major and Minor examinations has made additions to that of the Preliminary examination an imperative necessity. It is utterly impossible for a student who is ignorant of elementary mathematics to properly understand such subjects as the conservation of energy, gravitation, or elementary light and heat; yet all these subjects are now included in the Minor or Major examination. It is a great hardship on the teacher, and a greater one on the student, that the latter should have to learn the most elementary notions of Euclid and algebra at a period when his time should be occupied with the application of them.

I would advocate, therefore, that the schedule of Preliminary examination be amended by the introduction of algebra as far as simple equations, and of the first book of Euclid, together with a modern language or mechanics as an optional subject. This would not be a great increase in the severity of the examination, although the difference in the mental development of the students who pass it, compared with those who scrape through the present examination would be enormous. Moreover, a pharmacist wishing to enter the medical profession would be able to do so without undergoing further scholastic examination; whilst the increased respect he would gain in the eyes of medical men, by having the same general education as the bulk of themselves, would be very considerable.

In conclusion, I am inclined to think Mr. Saul lays too much stress on what he terms "deficiency of intellect." I believe that much of what looks like lack of brains is rather need of training and development. It is the duty of the Society to insure that each of its candidates has had sufficient training, and is sufficiently developed to warrant, at all events, a prospect of success in the calling he has entered. It can only do this in one way; by insisting on an adequate proof of the candidate's mental development, before he enters the business at all. That is by increasing the severity of the Preliminary examination and rendering it compulsory before apprenticeship.

If it is not passed before apprenticeship, a large number of apprentices, as they do now, will not pass it at all, but will help to swell the large number of hopelessly unqualified men who are both a disgrace and an incumbrance to our ranks.

I am convinced that the majority of pharmacists are in favour of the reform of the Preliminary examination, and it is to be hoped that the Council will not allow the prejudices of the few to prevail, to the injury of pharmacy at large and of the welfare of the bulk of its followers.

A. CAMPBELL STA

Sir,—Mr. Saul in your last issue does a service in drawing the attention of members of the Pharmaceutical body to the state of education existing among the candidates for examination. It is high time that the matter received the attention of all who really take a sincere interest in the welfare of our calling. The chemist is supposed to be in education a step in advance of his brother tradesmen, and no doubt when the present subjects and scope for the Preliminary examination were fixed, they were sufficient to ensure that result, as the general education of the middle classes was not carried to the present pitch; indeed, it was less in many instances than that now given in the National and Board Schools.

It does not reflect great credit on our body, that while the general education of the country has been making immense strides, that required for our calling has been allowed to remain stationary. If the opportunity now afforded by the proposed alteration of the Bye-laws be let slip, this state of affairs, I am convinced, is likely to continue for an indefinite period.

Without an alteration in the scope of the examination it is scarcely likely that much improvement will take place in those examined, as it is not usual for students to learn much more than they are actually obliged to; in fact it can scarcely be expected. Many now go in for the Preliminary because it is more easy to pass than the local examinations of the various scholastic bodies, and even these may be and are passed without much difficulty, by any lad of average ability, before leaving school.

Uckfield. E. H. FA

Sir,—It was with much pleasure and intense interest that I read Mr. J. E. Saul's article in your last issue on the "Preliminary Examination."

It is always a pleasure to peruse anything emanating from his pen, and with the subject of education he is especially competent tō deal.

My time is very fully occupied at the present moment, therefore I should not presume to trespass upon your space, did I not feel so convinced that the efficient early training of a would-be pharmacist is of the most vital importance, not only to the young aspirants themselves, but to the whole body pharmaceutical. Moreover, it has always been my hobby to see the Preliminary examination increased in stringency and the passing of it enforced previous to the three years' pupilage.

I cannot deal with the matter so ably or so fully as Mr. Saul has done, but after generally acquiescing with the whole of his arguments, I will, with your permission, add a few words of my own.

A compulsory curriculum would doubtless do much to ensure the better training of pharmacists, but unless the lent had been previously put through a sufficiently re course of mental exercises and intellectual scales, would find his fingers tumbling, so to speak, one over ther, and ending in a series of jerks and jumps to the of both rhythm and smoothness. The processes of a th's mind should be conducted in a methodical way, by jerks and jumps and guesses, but by the harmonious rcise of the intellectual powers, and for this reason I thoroughly at one with Mr. Saul in advocating the ition of such subjects as algebra and Euclid to the liminary examination papers. This would prove, as he s, splendid mental gymnastics, or in other words they ld compel a boy to think. Why is it necessary for our ng men to take bodily exercise? The boy who goes or gymnastics is not very likely in after life to find it essary to hang by his toes, or deport himself on a allel bar; nor he who goes in for cricket and boating rcise to get his living by these means. They are satis- that these exertions will strengthen the muscles, ex- d the chest and brace the nerves. Why then should we be equally anxious that no pains are spared to en- rage the athletics of the mind. Do not let parents be tent to ask whether their sons have acquired an accu- lation of available, saleable knowledge, but let them uire whether they have capable, vigorous minds; in er words, have they "learnt to learn." I can fancy a called practical business man saying, of what use is all s to my son? He can indite a fairly grammatical letter, te a good business hand, and knows sufficient Latin to ble him to decipher any ordinary physician's prescrip- n, and if to this you throw in a smattering of history and graphy, so that he can understand something of what reads in the daily papers, surely this is all that the son a business man requires, who is himself destined to be usiness man. Well, I must state that in my opinion s is not all that a practical business man requires, more ecially a practical pharmacist. Having a good supply knowledge will not ensure him being an intellectual lividual when he grows up. One may have accumu- ed a goodly store of such knowledge, and still not be rly so intelligent as another, who has not stored half as much. It is not prudent to use the mind rely as a storehouse, but also as a tool which has been ll polished and whose edge has been kept thoroughly rpened. The mind is by far the most useful tool that y business man possesses, and if it has been well trained early life, it will enable its owner to overcome almost y difficulty and to successfully grapple with the various otty problems which will crop up and require solution.

This is a subject upon which one might dilate at an un- ited length, and from which one might quote an limited number of examples and base an equally un- ited number of arguments, but I have said enough to ow you how much I have at heart, and how much I lue any system of education that will stimulate, harden, oaden and train the mind, and how convinced I am that mere accumulation of useful and saleable knowledge will t adequately fit a boy for a pharmaceutical career.

It is difficult to ascertain the condition of a young man's nd by the simple means of a written examination, but e best method of producing trained and thinking phar- cists that it is now practicable to adopt, is by adding me of the severer subjects to the Preliminary examina- n, and those suggested by Mr. Saul leave little to be sired. This being a "seasonable" time to consider this ange, I hope influential pharmacists will bring their fluence to bear upon a matter that will, I believe, meet th the approbation of all thoughtful members of our lling, and prove, as Mr. Saul says, of at least as much nefit to us as the much debated curriculum.

54, *Piccadilly*. H. H. MILLHOUSE.

Sir,—It was with a considerable amount of interest I d the article on the above subject in last week's urnal. Feeling, as I do, the very great importance of a orough inquiry into the best form of education adapted become a first step in the ladder of a pharmacist's ture, is my reason for writing you. The alteration in e syllabus for the Minor and Major examination is an provement to be thankful for; but without reflecting on the good intentions of the examiners in suggesting, d the Council in adopting them, I must ask, What is e use of attempting a renovation and improvement of the superstructure when the foundation is at fault? The result of building upon the sand is well known. It needs not a very keen observer to discover the utter absurdity of the pharmaceutical Preliminary as being the open door with a business that requires subsequent mental training as well as mere mechanical and commercial enterprise. I do not wish to imply that the examiners are at fault; indeed, they are to be pitied, for how can they ascertain the width of knowledge possessed by a candidate when they are bound down to so few subjects, only one of which —arithmetic—admits of the application of the true reasoning faculties? Certainly a thorough knowledge of a few subjects is preferable to a superficial knowledge of many, but the Preliminary examination requires neither.

Mr. Saul makes a sweeping statement, that ought to bring forth some criticism from gentlemen who think the tendency is to over-educate. He says of the younger fraternity, "a very great number, almost the majority—are seriously deficient—in intellectual capacity." With this statement I can fully agree, and upwards of five years' experience in training candidates for the higher examinations has compelled me to observe it. The low standard required in the Preliminary, and the narrow limits prescribed, render it an examination peculiarly adapted to the cramming system. Everything is so elementary. A vague knowledge of Latin, with one month's cram, and the first book of Cæsar is learnt, and can be recited if only a keynote is given. I have several times at meetings of the Chemists' Assistants' Association expressed the great desirability of extending the requirements for Preliminary. Mr. Saul has suggested the scope of extension, and I would support it, with the alteration, for "English history or geography at choice," of English history and geography. Without the latter, how can a student understand the geographical source of drugs? For what is more perplexing to them now than requiring the position of certain places on a map?

Algebra! Yes, what a boon it is to have a slight knowledge only, when studying almost any physical science. For example, given rules for conversion of temperatures F. and C., required the temperature when each registers the same figure? Simple as is such a calculation not 10 per cent. of Minor students are able to solve it.

Now examiners are feeling the necessity of extending the scope of the Preliminary, perhaps something may be done in that direction by the Council, thus elevating the pharmacist's position and conferring a boon upon all those young men upon whom they intend to force extra work before granting a trade licence. Students themselves deplore most the scantiness of their early education, casting the blame, not upon friends and relatives, but upon the meagreness of what is demanded of them ere they can be registered as students of the Pharmaceutical Society.

I trust that more weighty members than myself will take up the subject and that something will speedily be done in this direction by the Council.

T. A. ELLWOOD.

Sir,—The admirable article by Mr. J. E. Saul on the subject of the Preliminary examination, published in last week's Journal, serves as the fuse to a train of thought which has been hanging fire in my own mind for a considerable period.

It is impossible that any observant person can have been in recent years other than painfully impressed by the steady accession to our ranks of men who have not the capacity to receive and assimilate the scientific training and knowledge that Parliament imposes and custom demands; and the records of the lecture theatre, laboratory and examination room serve but to endorse and reflect a fact as palpable as it is unpleasant.

But how can it be expected that the average of intellectual ability shall be high when we put a premium upon what may be regarded as the "leavings" of other callings?

It has always seemed to me the acme of inconsistency that a society desirous of elevating the status of its members should tolerate for a day the microscopic minimum of knowledge which the Council of the Pharmaceutical Society regards as a sufficiency to admit the bearer to his first degree.

To me it was humiliating to read, as I did in these very pages no long time ago, that pupils in one of our elementary schools solved without difficulty an arithmetical problem that had baffled the brains of an unusually large percentage of our own candidates.

The advancement of general education has been so pronounced during the last ten or fifteen years that it is more than ever matter for wonder that the Council should cling with such affection to standards which if not ancient enough to be obsolete are at least poor enough to be pensioned.

The present moment seems most opportune for raising this important question. We are on the eve of introducing certain changes in the conduct of our qualifying examination. Why delay further the inauguration of an even more pressing necessity—to increase the stringency of our Preliminary examination?

The conservation of the present system is as unkind to the individual as it is unjust to the body pharmaceutic, and its revision could not but be hailed with satisfaction by each right-minded member of the craft.

I most unreservedly endorse the proposals put forward by Mr. Saul, and respectfully suggest that any amended regulations may also provide for a paper on general knowledge. W. Lloyd Williams.

Urine Analysis.

Sir,—In the Journal of March 28 I see Mr. R. A. Cripps suggests that the subject of "Urine Analysis" be added to the practical examination in chemistry for Major candidates.

I go further than Mr. Cripps, and would suggest that Minor men should be examined in that necessary subject.

On the Continent all assistants are expected to be able to make urinary examinations. Frank R. Squire.

San Remo, Italy.

Estimation of Coniine.

Sir,—Mr. Cripps' letter, contained in the issue of the Journal for March 28, seems to call for a word from us by way of reply.

In the process recommended by Mr. Cripps, for the estimation of the alkaloids in conium fruits, and which is detailed in the *Pharm. Journals* for July 2, 1887, and December 17, 1887, both chloroformic and ethereal solutions of dry HCl are directed to be employed, the former in the extraction of the alkaloids, and the latter for their final conversion into hydrochlorates.

In applying this process to the estimation of tinctures of conium, we have used by preference the chloroformic solution, judging that this would be more likely to remain stable than the corresponding solution in ether. In the latter case it appeared to me not at all improbable that decomposition might take place with production of ethyl chloride.

Mr. Cripps objects to the employment of "hydrochloric" chloroform for the conversion of the alkaloids of conium into hydrochlorates, and recommends the use of "hydrochloric" ether on two grounds. (1) That the evaporation of the final solution proceeds more rapidly. (2) That a chloroformic solution of HCl decomposes when kept, with liberation of chlorine, and thereby endangers the vitiation of the final result by the production of substitution compounds.

With regard to the first point, it is worthy of note that the alkaloids are shaken out with the 30 c.c. of chloroform, and as only 10 c.c. of the hydrochloric solution is required to effect their conversion, the saving of time, even if ethereal HCl be used, is, relatively speaking, small. As to the decomposition of a chloroformic solution of HCl, we are bound to assume that Mr. Cripps has verified this assertion by experimental evidence. But that pure chloroform induces such decomposition is *primâ facie* improbable; and that such, in fact, is not the case, we have proved at least to our own satisfaction. A small portion of the hydrochloric chloroform used in our experiments, and which had been kept for several weeks, was carefully tested for free chlorine, but not a trace was present. We may say, however, that in order to obviate any possibility of decomposition taking place, we were careful to employ only a freshly prepared solution, and for this reason the "hydrochloric" chloroform was frequently made in small quantities at a time.

As to the process itself, it has proved in our hands thoroughly reliable, so far as the estimation of the total alkaloids in the tinctures of conium are concerned.
solutions of pure coniine it is obvious that it mig
modified with advantage, and a considerable econ
effected both of time and money. E. H. F
R. W

The Mercuric Test for Mydriatic Bases.

In your last issue Mr. Gerrard claims to have de
in 1884 a group test for the mydriatic alkaloids,
has since been confirmed by Professor Flückiger
Schweissinger.

Mr. Gerrard's test is given (*Pharm. Journ.*,
719):—"To a small portion of atropine in a test-t
about 2 c.c. of a 5 per cent. solution of mercuric
in 50 p. c. alcohol and warm gently, the pre
will at once appear and become brick-red in
"Hyoscyamine, daturine, duboisine and homatrop
the same result."

Flückiger and Schweissinger confirmed these
with regard to atropine, which is not now in q
but so far from confirming his results with hyosc
Schweissinger stated, 'Year-Book of Pharmacy,'
"Hyoscyamine gives no precipitate if the reagent
according to Gerrard's direction." Flückiger
Pharm. Journ., [3], xvi., 602, "whereas hyoscya
not yield a precipitate in the solution of mercuric ch

The official test differs from that of Mr. Ge
using a 2 per cent. (instead of 5 p. c.) solution
curic chloride; and, which is much more importa
fines the quantity of alkaloidal salt to be used, "ab
tenth grain," instead of "a small portion."

Mr. Gerrard having called my attention to the
the statement in the 'Supplement' was modified
reprint of March 14, by the insertion under hom
hydrobromas of the following footnote:—"In the
issue of our 'Supplement' it was stated that hyo
gave a yellow colour, which did not become red
however, is true only when the proportion of hyo
to mercuric chloride is greater than that indicated
Pharmocopœia test." If more than 1 grain of al
used in place of one-tenth grain, the other con
the official test remaining the same, the result wi
in the case of atropine and yellow with hyoscyam

The official proportions are one of alkaloid to
mercuric chloride. Now if twenty of atropine be
four of mercuric chloride the result will still be r
when hyoscyamine (Merck) is used, the red colour
obtained only until the proportions reach ten of al
four of mercuric chloride; if the quantity be still fu
creased to twelve of alkaloid, or above this propor
result will be yellow. It is curious to note that th
tallized product obtained as total alkaloids in th
tion of belladonna root, when submitted to the ab
gave a yellow colour when the proportion was six of
to four of mercuric chloride, or just half the propo
quired by hyoscyamine (Merck). The same re
obtained with two different samples of belladonna

Some further experiments are in progress with
of explaining the different behaviour of the alk
this group towards mercuric chloride, which I hope
to publish. P. W. Sq

NOTICES OF MEETINGS.

Photographic Society.—Tuesday, April 14.—P
'Platinotype,' by Mr. W. Willis. A specimen
Lippmann's colour photographs will be shown.

Chemists' Assistants' Association.—Thursday, April
Discussion on the Preliminary examination.

Royal Institution.—Thursday, April 16, at 3 p.m. 'R
Spectroscopic Investigations,' by Professor Dewar.
day, April 17, at 9 p.m.—Discourse on 'Magnetic Re
by Professor A. W. Rucker. Saturday, April 18.—'
Dynamo,' by Professor S. P. Thompson.

"*Dormar.*"—Ten grains in 100 grain measures
'Additions' to B.P., p. 19). The minim is not the
measure corresponding to the grain.

Communications, Letters, etc., have been received
Messrs. Wright, Smith, Gould, Seccombe, Evans, Wil

OIL OF ROSEMARY.

BY R. A. CRIPPS, F.I.C.

Description of Samples.—The oil, the examination of which is described in this communication, was distilled in 1889 by Mr. Sawer of Brighton, nd is a portion of the same oil which formed the ubject of a note by Mr. E. M. Holmes that appeared in the *Pharmaceutical Journal* for January 15, 1889, in which various particulars as to cultivaion and mode of distillation are to be found.* Mr. Sawer has guaranteed this to be an absolutely pure oil, distilled from English plants, consequently I have thought it worth while to record the results of the various tests applied.

By way of comparing some of the more important tests, I applied to Mr. Sawer, who kindly sent me a small sample of the present season's oil, 1890; this I have called No. 2.

In addition to these I am indebted to Mr. E. M. Holmes for a third sample of oil, season 1890, which he had received from Mitcham as "English oil." This is called No. 3.

Finally, I have also applied the same tests to a sample of very fine foreign oil, 1889 season, for which I am indebted to my principals, Messrs. Southall Bros. and Barclay. No. 4.

Preparation of Samples.—Before subjecting the oils to chemical tests they were thoroughly dried by prolonged contact with chloride of calcium, and finally filtered.

PHYSICAL CHARACTERS.—1. *Colour.*—The oils obtained from Mr. Sawer are both nearly colourless, having a faint yellowish tint; sample No. 3 is of a more pronounced yellow, while No. 4 (foreign) is even more coloured.

2. *Odour.*—It is almost impossible to describe the odour of essential oils with any degree of precision; all the English samples possess an odour distinct from that of the foreign, a difference which is readily noticed by the most casual observer; the foreign oil is "softer," but also of far less "power" and less suggestive of lavender. The sample No. 3 differs somewhat from Nos. 1 and 2, having more the character of No. 4.

3. *Specific Gravity.*—For the purpose of comparison I have added the figures of other observers.

	English.	Foreign	French.	Italian.	Spanish.	Source not std.
†Symes	·881	·952	—	—	—	—
‡Hager	—	—	·894	·904	—	—
§Schimmel ..	—	—	·881 and ·898	·901-·907 (7 spls.)	·892	—
Squire	—	—	—	—	—	·882 to ·916
‖ Williams..	—	—	—	—	—	·894 and ·912
U.S.P.	—	—	—	—	—	about ·900
Cripps No. 1	·911	—	—	—	—	—
Cripps No. 2	.924	—	—	—	—	—
Cripps No. 3	·901	—	—	—	—	—
Cripps No. 4	—	·8835	—	—	—	—
Do. other spls.	—	·8816 and ·882	—	—	—	—

From these figures it will be seen that the sp. gr. of foreign oil of rosemary, as described by various observers, varies from ·881 to ·907, the Italian oil always being higher than the other varieties, excepting only Dr. Syme's samples, the sp. gr. of which is remarkable.

4. *Rotation.*—Only samples one and four were examined, the quantity at disposal being insufficient in the other cases—

No. 1	—	9° 35′
No. 4	—	33°
Symes gives, English	—	16° 47′
" " Foreign	+	4° 47′

5. *Solubility in Spirit.*—The method I have adopted is that of Häger,* which is applied to essential oils as follows:—"One volume of the oil is dissolved in *two* volumes of absolute alcohol (sp. gr. ·799). Dilute alcohol of sp. gr. ·889 is gradually added from a burette, until the liquid remains opalescent for one minute after agitation. In many instances the addition of another drop of the dilute alcohol is sufficient to render the opalescent mixture milky white. If the liquid be turbid but still translucent, a further addition of the diluted alcohol should be made, until the liquid is barely translucent, and this point is taken as the end of the reaction. It is very necessary to adhere rigidly to a certain temperature for carrying out this test, a difference of 2° C. making a perceptible difference in the number of c.c. of dilute alcohol required. I work at 16°-17° C. The following results were obtained, using 1 c.c. of oil and 2 c.c. absolute alcohol—

Number of spl.	*C.c. diluted alcohol required.*
1.	Infinite.
2.	Infinite, slightly opalescent with 8·5 c.c.
3.	2·65 c.c.
4.	0·8 c.c.
No. 1, 3 parts + No. 4, 1 part . . .	4·2 c.c.
No. 1, 2 parts + No. 4, 2 parts. . .	2·2 c.c.
No. 1, 1 part + No. 4, 3 parts . . .	1·1 c.c.

Hager gives—

French.	2·5 to 2·8 c.c.
Italian	4·0 to 5·0 c.c.

Sample No. 1 was examined when about six months old, and again about nine months after with the same result.

CHEMICAL CHARACTERS. 1. *Freedom from Petroleum, Resin and other non-volatile Substances.*—1 c.c. of each sample was evaporated in a platinum basin on a water-bath. Neither sample left any weighable residue, only just sufficient to render the dish slightly sticky.

2. *Freedom from Alcohol.*—To each sample a fragment of magenta was added (before the addition of chloride of calcium), samples 1 and 4 remained free from pink coloration. Nos. 2 and 3 were very faintly coloured, but not more so than would be due to the trace of moisture present.

3. *Reaction with Nitric Acid.*—Two drops of the oil are added to 6 drops of nitric acid (sp. gr. 1·5). With each sample the following reaction occurred:—A bright orange brown colour, then brisk effervescence, becoming at the same time paler in tint; No. 4 reacted much more violently than Nos. 1 and 2 and hissed slightly, No. 3 being intermediate. Dragendorff says: Red, then brown, no hissing.

4. *Reaction with Sulphuric Acid.*—Two drops of

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* *Pharm. Journ.*, [3], xx., p. 581.

† 'Year-Book of Pharmacy,' 1879, p. 467.

‡ 'Year-Book of Pharmacy,' 1882, p. 239.

§ *Pharm. Journ.*, [3], xx., p. 856.

‖ *C. N.*, Oct. 11, 1889, p. 175.

* 'Year-Book of Pharmacy,' 1882, p. 239, and Allen's Commercial Organic Analysis,' vol. ii., p. 433.

the oil with 4 drops of sulphuric acid (1·843) in each case assumed a pale orange-brown colour, becoming darker and redder by standing. Dragendorff says: Yellow-brown, then red-brown.

5. *Reaction with Hydrochloric Acid.* — This and the two following tests are taken from a paper by M. Charles Noël which appeared in 'L'Union Pharmaceutique,' 1886–1887. They are modifications of tests originally proposed by Dragendorff.*

Five drops of oil are mixed with 1 c.c. of hydrochloric acid (1·16) and heated to ebullition; 4 c.c. of chloroform are added, the whole agitated, and then allowed to stand, the colour of the two layers of liquid being observed. With each of these oils the liquids remained almost colourless, the acid layer being faintly yellowish.

6. *Reaction with Brominated Chloroform*:—To 2 drops of the oil contained in a dry test-tube, a solution of bromine in chloroform (about 5 per cent.) is gradually added, until a faint yellow coloration is produced; the mixture is then set aside for several hours. No distinct coloration is produced at once, but after standing some hours each sample assumed a more or less greenish-blue hue. This was most marked in No. 3 and least in No. 2; No. 1 rather more deeply tinted than No. 4.

7. *Reaction with Ferric Chloride.*—Four drops of the oil are added to four drops of solution of ferric chloride (Fr. Codex: 26 per cent. Fe_2Cl_6, free from nitric acid) and ten drops of sulphuric acid (1·843) added. After thirty seconds 5 c.c. of carbon disulphide are added, agitated, and the disulphide poured off into a white dish. In each case the liquid was deeply coloured, of a purplish rose-tint, which changed to dull violet after several hours.

8. *Reaction with Powdered Iodine.*—Applied in the usual way, scarcely any action took place with any of the samples.

9. *Phellandrene Test.*—This was applied only to Nos. 1 and 4, which gave negative results.

10. *Action of Bromine.*—If bromine be added drop by drop to cineol, it is at first decolorized, but afterwards a red crystalline compound is produced. This, when kept in closed vessels, gradually runs to a liquid and finally deposits white crystals, which melt at 125·5° C. These consist of cinene tetrabromide.† Wallach states that cineol is present in oil of rosemary amongst other oils; which statement I can confirm, as I obtained abundance of cinene tetrabromide by treating English oil (No. 1) in the manner described.

11. *Iodine Absorption.*—This test is too well known to need description. It has been much lauded as a test of adulteration; it has not proved satisfactory in my hands, however, and I am of opinion that except in a few special cases the test is of no value for *essential* oils, although very valuable for *fixed* oils and fats. In the case of oil of rosemary I have applied it only to sample No. 1, with which it did not give concordant results, consequently I did not follow it up with the other samples. I append my results, with those already published by others:—

Barenthin .	185 p.c.	
‡ Davies . .	325 p.c.	
* Williams .	161·7 p.c. (sp. gr. 894)	(probably foreign, judging from sp. gr.)
„	142·4 p.c. (sp. gr. 912)	(probably English, judging from sp. gr.)
Sample No. 1		
2 hours .	93·8 p.c. (mean)	
18 hours .	117·3 p.c. (mean)	

12. *Bromine Absorption.*—I greatly prefer this to the last test for oil of rosemary; in my hands it has given more concordant results, and the short time of digestion, fifteen minutes, is a decided advantage. In carrying it out, I follow Allen,† as employed for shale and petroleum oils. "An approximately decinormal solution of bromine is made by dissolving 2 c.c. of bromine in 750 c.c. of recently distilled carbon disulphide. This solution is rendered perfectly anhydrous by the addition of some lumps of dry calcium chloride. An accurately weighed quantity of the dry oil, weighing between ·2 and ·4 gram, or a measure of a solution in carbon disulphide containing a known weight of the oil, is placed in a perfectly dry-stoppered flask; the solution diluted to about 25 c.c. (I use 10 c.c.) with dry carbon disulphide, and then 25 c.c. of the bromine solution added. The flask is then closed and the contents agitated. If the liquid is distinctly red sufficient bromine has been added, but should it be nearly or quite decolorised, a further addition of bromine solution should be made without delay. The flask is then at once placed in the dark and kept there for exactly fifteen minutes, when an excess of an aqueous solution of iodide of potassium is poured in, the whole agitated, the flask removed to a light place, and the solution titrated with decinormal solution of sodium thiosulphate." Violent agitation is necessary towards the end of the titration, as the iodine remains dissolved in the carbon disulphide. Twenty-five c.c. of the bromine solution is treated exactly similarly in another dry flask; when the difference between the volume of standard thiosulphate required in the two titrations indicates the amount of thiosulphate corresponding to the bromine absorbed by the oil. One c.c. of decinormal thiosulphate is equivalent to 0·008 grm. of bromine.

It is absolutely necessary not to expose the mixed bromine solution and essential oil to the action of daylight, but gaslight has no sensible effect. The time, too (15 min.), must be adhered to or secondary reactions occur, vitiating the result. Finally the temperature should be as near to 15·5° C. as possible, and should on no account be above 17·5° C. or below 15·5° C.

Working in this way my results are as follows:—

No. 1	70·9 per cent.
„ about 9 months later .	65·8 per cent.
No. 2	70·5 per cent.
No. 3	88·2 per cent.
No. 4	108·0 per cent.

Finally I may state that I feel it would be premature to offer any definite conclusions from the results of the examination of so few samples, still I would draw attention to the following points.

1. Sample No. 3 does not *appear* to be wholly English oil.

2. Generally speaking the sp. gr. of English oil is higher than that of the foreign.

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* "Studies upon Essential Oils," *Pharm. Journ.*, [3], vi., p. 681.

† Wallach, *Pharm. Journ.*, [3], xviii., p. 481.

‡ *Pharm. Journ.* [3], xix., p. 823.

* *C. N.*, Oct. 11, 1887, p. 175.

† 'Commercial Organic Analysis,' p. 331.

3. English oil is more soluble in spirit than foreign.

4. The colour reactions of the oils are similar, although scarcely identical, but of little value for distinguishing the oils.

5. The bromine absorption of English oil is much lower than that of the foreign.

I desire also to express my thanks to Messrs. Southall, Bros. and Barclay for permitting these experiments to be conducted in their laboratories, and to Messrs. Sawer and Holmes for the samples.

NOTE ON SOLUTION OF ALBUMEN, B.P.

BY R. A. CRIPPS.

The proneness of this solution to decomposition is a source of annoyance to the chemist, and practically entails the preparation of some fresh solution every time it is required as a test. I have found that the presence of acetic acid effectually prevents this decomposition for several months, some which I made about six months ago showing no signs of change up to the present; 10 per cent. of the B.P. acid is sufficient.

Not having seen this simple method of preservation recommended in any books, is my excuse for publishing this short note.

NOTES ON ESSENTIAL OILS, ETC.

The following notes are taken from the April "Bericht" of Messrs. Schimmel and Co., of Leipzig:—

Alanta Oil and Helenin.—A considerable quantity of alanta oil is stated to be now used in the preparation of "helenin," under which name Messrs. Schimmel understand the crystalline product so designated by Gerhardt (*Annalen*, xxxiv., 192), obtained in the distillation with steam of the root of *Inula Helenium*. It consists of a mixture of much alantic acid anhydride with a little alantic acid. On the other hand Kallen (*Berichte*, ix., 154) has applied the name to a substance having the composition represented by the formula C_6H_8O.

Angelica Root and Seed Oils.—The pronounced phellandrene odour given off by the oil freshly distilled from angelica root suggested the presence of that hydrocarbon. The constituent boiling at 170° C. was therefore separated by fractionation and gave readily with sodium nitrite and glacial acetic acid a large quantity of a solid nitrite, the identity of which with phellandrene nitrite was established by the melting-point of the repeatedly recrystallized substance. A solution of the nitrite in chloroform rotated polarized light to the left, which is evidence of the presence of dextro-phellandrene in angelica root oil, as it is known that this hydrocarbon rotates polarized light in a direction opposite to that effected by the nitrite derived from it. The presence of phellandrene in the oil from angelica seeds was also demonstrated by the preparation of the nitrite.

Anise Oil and Anethol.—It is stated that there has been a large over production of anise seeds during a series of years, the demand being far below the supply. It is also mentioned that under the name "anethol" a number of products are sent into commerce, the best of which consist only of fractionated anise oil. True anethol, according to Messrs. Schimmel, is characterized by its exquisitely fine and pure anise odour, absolute absence of colour, a specific gravity of 0·985 at 25° C., a boiling-point at 234° C., and a melting-point between 21° and 22° C.

Bergamot Oil.—The high price of this oil is said to have led to so much adulteration that a genuine sample of bergamot oil is a rarity in commerce, the prevailing adulterant being a machine-pressed oil of lemons. The specific gravity, rotatory power and solubility in spirit are, however, considered to afford satisfactory criteria as to the purity of a sample. As the result of the examination of a number of authentic specimens Messrs. Schimmel give the following data:—

Bergamot Oil: Sp. gr. 0·881 to 0·885 (in one sample examined immediately after expression from over-ripe fruit, 0·892). Rotatory power (100 mm.) + 8° 30′ to + 19° 30′.

Bitter Orange Peel Oil: Sp. gr. 0·849 to 0·855. Rotatory power (100 mm.) + 97° 4′ to + 97° 32′.

Lemon Oil: Sp. gr. 0·857 to 0·863. Rotatory Power (100 mm.) + 40° 10′ to + 62°.

It will be seen from these data that an admixture of the oil of bitter orange peel with oil of bergamot would lower the specific gravity and increase the rotatory power. At the same time the oil of bergamot would lose its property of forming a clear solution with a small quantity (one-half part) of 90 per cent. by volume alcohol. The physical properties of oil of bergamot are less strikingly affected by an addition of oil of lemons; but in this case also the lowering of the specific gravity and the increase of the rotatory power would be recognizable, whilst the solubility in 90 per cent. alcohol would also be affected. Sophistications with turpentine oil occur more seldom and usually they can be detected by the odour. They lower the specific gravity and increase the proportion of the low boiling fraction (pinene). An addition of fatty oil can be recognized by the higher specific gravity and the residue left by the oil when evaporated. If about 2 grams of oil of bergamot be heated on a watch glass to 100° C. until the odour has completely disappeared, there will be left a green homogeneous residue, of unctuous consistence, which in the case of a good oil will amount to about 6 per cent. A fresh oil, which has not had time to settle, will sometimes give a larger residue. If a fatty oil be present the residue is augmented and a green thick smeary layer is covered by a yellow oily liquid. In the opinion of Messrs. Schimmel a genuine oil of bergamot should answer to the following requirements: Specific gravity not below 0·880. Rotatory power (100 mm.) not exceeding +20°. The oil should dissolve clear in one-half of 90 per cent. by volume alcohol, and the solution should not become turbid upon the addition of more alcohol of the same strength. The residue from evaporation should not exceed 6 per cent. and should form a green homogeneous mass. The oil should contain no pinene. Probably these requirements may prove eventually to be insufficiently stringent.

Betel-leaf Oil.—A consignment of betel-leaf oil has been received from Manila, with information to the effect that in its production 790 kilos of fresh leaves were required for each kilo of oil. It was observed in the distillation that at first a small quantity of light oil passed over, which floated upon the water contained in the flask used as a receiver. On shaking the flask, however, this fraction also sunk to the bottom.

Birch-tar Oil.—Attention is called to a new variety of this oil, said to possess the "Russia leather" odour to a far greater degree than that hitherto in use. It is stated to come from the government of Minsk, and is supplied in two forms, crude and rectified. For the leather manufacture and for soaps, and when the intense colour would be of no disadvantage, the crude oil is used, the rectified oil being weaker in odour.

Boldo-leaf Oil.—The oil distilled from the leaves of *Boldoa fragrans* has not yet created much interest, but according to advices from Chili if it came into demand it could be supplied at a relatively low price.

Buchu-leaf Oil.—Reference is made to the fact that different kinds of buchu leaves occur in commerce, varying in respect to the amounts of essential oil they contain, and its composition. The results obtained from two parcels of leaves recently distilled by Messrs. Schimmel are given.

(1) Long buchu leaves, consisting exclusively of leaves of *Barosma serratifolia*, Willd., yielded 1 per cent. of essential oil of sp. gr. 0·944, from which only a very little crystalline diosphenol (buchu camphor) separated during intense winter cold, and only a little could be removed by treatment of the oil with ley.

(2) Round buchu leaves, consisting almost entirely of leaves of *Barosma betulina*, Bartl., yielded 2 per cent. of essential oil, which even at ordinary temperature was quite permeated with crystals of diosphenol.

CEDAR-WOOD OIL.—The accumulation of cedar wood waste in the German lead pencil factories is said to have become so large, that it can be bought at almost any price, and in some cases will have to be burnt.

CHENOPODIUM OIL.—A distillate from the leaves of *Chenopodium ambrosioides*, L. The oil is considered to be of no practical value. The odour is described as strong, penetrating, disagreeable, camphoraceous and narcotic. The specific gravity at 15° C. is 0·901.

CORIANDER OIL.—Coriandrol is the name given by Semmler to the principal constituent of coriander oil, of which it constitutes about 90 per cent. (*Berichte*, xxiv., 206). It is described as being dextrogyre, specific gravity 0·8679 at 15° C., boiling between 194° and 198° C., and having the composition represented by the formula $C_{10}H_{18}O$.

EUCALYPTUS OIL.—Mention is made of a consignment from Australia of a large quantity of oil, said to be from *Eucalyptus Oleosa*. It is stated to be extraordinarily rich in eucalyptol, so that upon being cooled it solidifies to a pasty mass. It is also said to be free from the light irritating constituents present in some eucalyptus oils that give rise to coughing, and to be therefore suitable for spraying in the sick chamber. Cumic aldehyde is present in considerable quantity, being distinctly preceptible by its odour. In some particulars supplied by the manufacturer the specific gravity of this oil is given as 0·923 at 15·5° C. In the distillation 1 per cent. passes over below 170° C.; 72 per cent. between 170° and 180° C.; 18 per cent. between 180° and 190° C., and 8 per cent. between 190° and 225° C. The oil is feebly lævorotatory, in 100 mm. tube – 30° 55′.

Messrs. Schimmel state that the distillation of the oil of *Eucalyptus amygdalina*, a product which has lately varied much in quality, has now been given up by the Australian house from whom it has hitherto been received.

Another eucalyptus oil that is mentioned specially in this report is the distillate from *Eucalyptus citriodora*, which is sent out of two qualities, a "commercial" quality from ordinary leaves and stalks and a finer quantity from selected leaves, the latter being very much higher in price than the former. The oil is alleged to possess disinfecting properties, and to be of value when used externally and internally in fevers, colds, rheumatism and affections of the throat, the dose for internal administration being one to five drops. It is pointed out, however, that as the oil of *E. citriodora* contains no eucalyptol, any antiseptic action it may exercise must be referable to some other constituent.

GARLIC OIL.—A considerable demand for this new distillate is said to have sprung up, it finding use in pickles, piquant sauces, etc. Ten grams of the essential oil is said to be equal to 16 kilos of garlic.

GERANIUM OIL.—The competition of Réunion with Algeria in the production of geranium oil is said to have brought down the price 20 per cent., the production in the former colony during the year 1890 being estimated at 18,000 kilos. It is pointed out that an adulteration of geranium oil with a fat oil is easily detected, since it is one of the few essential oils that dissolve clear in dilute alcohol. As the result of numerous experiments it is recommended that geranium oil should be required to dissolve in 2 to 3 parts by volume of 70 per cent. by volume alcohol at a temperature of 20° C. If much fat be present the mixture appears milky, but with a small quantity it is only turbid, and after standing some time a smeary coating is deposited upon the side of the vessel. Geraniol has been further investigated by Semmler (*Berichte*, xxiii., 3556 and xxiv., 201), who reports its conversion into citral through oxidation with chromic acid mixture, corresponding in this behaviour to one of the constituents observed by Poleck in rose oil.

LAVENDER OIL.—Commenting upon a statement made by Mr. Sawer in an article published recently in a contemporary, to the effect that German lavender oil is worse than French, Messrs. Schimmel say that lavender oil is not prepared in Germany.

LIGN-ALOE OIL.—In some information received from a correspondent in Mexico, as to the production in that country, it is stated that lign-aloe oil is distilled exclusively in the province of Guerrero, about one hundred leagues from the capital, by the Indians, and is only brought irregularly into the market in small quantities (up to 1 arroba, equal to about 12½ litres). On account of the depressed price in recent years the Indians have given up the distillation, but in presence of an improved market they are again taking it up. According to Semmler (*Berichte*, xxiv., 207), the principal constituent of the oil is linalool ($C_{10}H_{18}O$), sp. gr. 0·8821 at 20° C., boiling between 190° and 195° and lævorotatory.

OPOPANAX OIL.—Referring to the statement made by Mr. Holmes at a recent evening meeting (see before, p. 838) that true opopanax resin has nearly disappeared from commerce, and that the resin so-called from which essential oil is now distilled is a product from *Balsamodendron Kafal*, usually found in collections of Chinese drugs under the name "myrrh," Messrs. Schimmel thankfully accept the explanation, but they add that the "opopanax" received from the east differs widely from the myrrh of commerce, which becomes specially evident upon a comparison of the essential oils distilled from the two resins. As to the suggestion by Mr. Holmes that where the name used might leave any doubt as to the identity of an essential oil the botanical name should be added, Messrs. S. promise to give practical effect to it in the future, but think time will be required before it can be thoroughly carried out in all cases.

ORIGANUM OIL.—A distillate from *Origanum vulgaris*, L. This oil possesses a powerful aromatic odour and a spice-like bitter taste. The yield of oil amounts to only 0·24 per cent. The specific gravity is 0·893.

POLEY OIL.—Under this name the distillates from *Mentha Pulegium*, *Pulegium micranthum*, and *Hedeoma pulegroides* occur in commerce in Germany, the oil being usually distinguished according to its geographical origin. The Spanish poley oil (*Mentha Pulegium*) has recently been examined by Beckmann and Pleissner (*Annalen*, cclxii., 1). who report that it contains a considerable quantity of pulegon ($C_{10}H_{16}O$), a ketone compound which, by reduction in ethereal solution by means of sodium, can be converted into menthol.

ROSEMARY OIL.—Doubts as to the genuineness of some commercial samples of oil of rosemary induced Messrs. Schimmel to prepare normal distillates from leaves and flowers obtained direct from France and Italy, and to compare them with samples obtained from various sources. It was found that while a number of the commercial samples corresponded in their properties to the special distillates, others of French origin differed widely, and further examination led to the conclusion that they were adulterated with considerable quantities of turpentine oil. The results are shown in the following table:—

No.	Origin of Oil.	Sp. gr. at 15°	Rotation, 100 m.m.	Solubility in ½-1½ part 90 p.c. alcohol.
1	Schimmel's dist. from French flowers, 1890.	0·920	+1°38′	soluble
2	Schimmel's dist. from French leaves, 1890 .	0·914	+14°35′	„
3	Schimmel's dist. from Italian leaves, 1890. .	0 912	+4°54′	„
4	Italian oil, 1888 . . .	0·907	—	—
5	„ „ 1888 . . .	0·905	—	—
6	„ „ 1889 . . .	0·902	—	—
7	„ „ 1889 . . .	0·907	—	soluble
8	„ „ 1890 . . .	0·901	+0°46′	„
9	French oil, dep. Gard, 1889	0·904	+5°10′	„
10	French oil, dep. Drôme, 1889.	0·905	+5°45′	„
11	French oil, dep. Drôme, 1890.	0·893	+5°15′	„
12	French oil, dep. Alpes Maritimes, 1888. . .	0·881	−8°44′	not sol.
13	French oil, dep. Alpes Maritimes, 1889. . .	0·883	−5°18′	„
14	French oil, dep. Alpes Maritimes, 1890. . .	0·881	−7°16′	„
15	. . . .	0·888	−11°30′	„

Upon the foregoing Messrs. Schimmel remark as follows:—"Nos. 1 to 3 are the oils prepared by ourselves from the dried plants. Had we, as might be the case with a commercial oil, been able to obtain fresh material for use, the specific gravity of the oils would probably have fallen somewhat lower. Oils Nos. 4 to 10 must be considered as pure and free from suspicion. In No. 11 it may be doubted whether we have to do with a genuine oil. Without doubt Nos. 12, 13 and 14 are to be considered as sophisticated with turpentine oil, and indeed the quantity of the addition might amount to not less than 50 per cent. We convinced ourselves, at any rate, that by the addition of 50 per cent. of turpentine oil to a genuine oil a mixture similar in properties to Nos. 12, 13 and 14 can be obtained. No. 15 in the table was composed of equal parts of French turpentine oil, and No. 9, corresponding to their contents in turpentine oil. Nos. 12 and 13, contained a considerable quantity of constituents boiling below 170°." From their experience, Messrs. Schimmel are of opinion that a rosemary oil of either French or Italian origin should answer to the following characters:—

(1) The specific gravity of rosemary oil is not below 0·900 (certainly not lower than 0·890).

(2) Rosemary oil dissolves at a temperature of 20° C. in one-half to one and a half parts of 90 volume per cent. alcohol to form a clear solution, which upon a further addition of alcohol of the same strength remains clear.

(3) Rosemary oil rotates polarized light to the right.

It is further pointed out that in case of an addition of American turpentine oil the sophisticated oil would be still dextro-rotatory, but that this adulteration would be easily recognizable in the alteration of the specific gravity and the diminished solubility in 90 per cent. alcohol.

Sandal Wood Oil.—The following characters are given as a means of distinguishing between the four kinds of commercial sandal wood oil:—

East Indian:—Sp. gr. 0·978. Rotatory power −17° 20′.

Macassar:—Sp. gr. 0·976. Rotatory power −18° 40′.

West Australian:—Sp. gr. 0·953. Rotatory power +5° 20′.

West Indian:—Sp. gr. 0·965. Rotatory power—+26° 10′.

Sandal Wood Oil (African).—Distillate from a so-called "sandal wood," the botanical origin of which is unknown. It was received viâ Hamburg, having been brought from Tamatave, Madagascar, the importation amounting to about 17,000 kilos. The wood is of a brown red colour, uncommonly hard and tough. It yielded upon distillation with water 3 per cent. of a ruby red oil of the consistence of East Indian sandalwood oil, sp. gr. at 15° C. 0·969. The oil resembles in odour that of the West Indian sandal wood, and therefore is of no practical importance.

Sandal Wood Oil (South Australian).—Distillate from the wood of *Santalum Preissii*, a tree growing in the interior of South Australia. The wood is dark brown, and unusually dense, tough, hard and heavy. It differs entirely from that of *Santalum cygnorum*, coming from Swan River, in West Australia. According to the discoverer the wood is very much sought after in China, where the oil distilled from it is used for medicinal purposes and for medicated soaps used only by women. Messrs. Schimmel distilled 3 kilos 800 grams of oil from 75 kilos of wood, or at least 5 per cent., so that the wood is one of the richest in oil of the Sandal woods. The oil is a thick liquid of a cherry red colour and heavier than water (sp. gr. at 15° C. 1·022). It solidifies at a moderate temperature, acicular crystals separating, so that care has to be taken in the distillation, or the cooling worm may become blocked. This tendency to solidify is strongest in the middle fraction of the oil. The wood in the rasped condition has a peculiar balsamic odour suggestive of roses, which is not present in the normal oil; but upon fractionating the oil it becomes perceptible in the middle fraction. Further experience is required to determine the value of this oil for perfumery.

Serpyllum Oil.—A distillate from the dried leaves of *Thymus Serpyllum*, Pers. The oil has an agreeable melissa-like odour, with a slight suggestion of thyme. But only 0·3 per cent. of oil is yielded by the dried leaves, so that it would be too expensive for practical purposes. Specific gravity at 15° C. 0·917.

Star-Anise Oil.—Referring to the property possessed by this oil of sometimes remaining liquid below the temperature of its normal congealing point, Messrs. Schimmel point out that this can be guarded against by adding to the oil to be examined a small quantity of ready-formed crystals. The method for testing recommended is to cool the oil to be examined to 12° to 14° C. by placing it in cold water, and then add, by means of a rod, a trace of crystallized oil, when the whole should solidify to a crystalline paste that does not liquefy again below 15° C.

Valerian Oil.—The importation of the so-called Japanese valerian roots, which are rich in oil, is said to have affected the value of valerian oil. This is intensified by the occurrence in the market of oil obtained as a bye-product in the manufacture of the acid and extract.

Wintergreen Oil.—A mixture of equal parts of wintergreen oil and olive oil is referred to as an approved remedy against rheumatism, especially in its chronic form. The affected limb is rubbed with this liniment and then bound up with wadding. The pain is said to disappear in from four to six hours, this effect being supposed to be due to absorption of the methyl ether of salicylic acid in the neighbourhood of the painful part. The specific gravity of pure wintergreen oil should not fall below 1·180.

INTRODUCTION ON THE GENERAL CHARACTERS OF MOSSES.*

BY PROF. LEO LESQUEREUX.

1. *Mode of Propagation of Mosses.*—Mosses are reproduced by the germination of spores or by propagules. The seminal granule, or spore, is a small, round body, formed of two membranes; the outer, *perispore*, more solid, often granulose on the surface, generally of a peculiar colour; the inner, soft, hyaline, and containing the elements necessary for germination. When perfect spores are ripe and exposed to humidity, the inner membrane becomes swollen, the perispore is ruptured, and allows the protrusion of the primordial cell—the first growth of the moss, named *proembryo*. This proembryonal utricle is first divided into two cells, which by subsequent sub-divisions, constitute more or less elongated filaments, which, by anastomosing at various angles, compose a confervoidal tissue, *prothallium*, upon which buds of new plants are developed. Another mode of reproduction of the mosses still more frequent, is from the development of buds, tubercles or filaments, derived from different parts of mature plants. Effete leaves, branchlets, lenticular granules, *pseudopodes*, attached to the leaves or the stems,—all have the property of sprouting into radicles and producing new plants.

2. *The Root.*—This organ, essential for fixing the plants to their place of growth, is found in all mosses. As rootlets, or radicles, they are not only attached to the base of the stems, but often distributed in fascicles along the stems and the branches, which they sometimes cover as with a matting or *tomentum*. They may even appear at the top of the branchlets, or upon the surface of the leaves. They are composed of a single series of oblique cells with contiguous walls (*parietes*). They are either simple, or at length forked, or in fascicles. So-called "creeping roots" are merely subterranean branches, *stolons*, analogous to rhizomes—a continuation of, or shoot from, the base of the plant.

3. *The Stem.*—Though sometimes very short, the stem is present in all the mosses. In the annual *Acrocarpi* it is generally simple; but it becomes compound by repeated simple, double or multiple innovations when perennial. It is truly ramified only in the *Pleurocarpi*, whose lateral fructification does not impede the growth. For in the *Acrocarpi*, the fructifications being terminal and late, the annual development is continued only by lateral gemmules from under the flowers for the vegetation of a second year. As these annual innovations are not always simple, but in twos, threes, or more, the old plants are sometimes simple, sometimes double, or many times dichotomous, or fastigiately branched. In the *Pleurocarpi* the ramification is very varied—diffuse, pinnate, bipinnate, ramulose, fasciculate, etc.

4. *The Leaves.*—The leaves are present in all mosses, in their natural state of development. They are generally horizontally attached to the stems, sometimes obliquely, rarely vertically. Their relative position varies in different species—sometimes even in different parts of the same plant. The characters of the leaves, their mode of attachment, their forms, the divisions of the borders,—which are never lobate, but entire, or dentate, or ciliate, etc.,—the appearance of the surface,—opaque, glossy, papillose, etc.,—are expressed by common botanical terms. They are generally formed of a simple stratum of cellules of various forms, or, in rare cases, of superposed, double or triple layers of cellules.

5. *The Organs of Generation.*—The flowers of the mosses, like those of the phænogamous plants, are unisexual or bisexual; they are polygamous or syncecious whem male and female organs are mixed in the same involucre; monœcious or autœcious when in separate buds on distant or separate branches; parœcious when the antheridia are free in the axils of the perichœdial leaves; androgynous or hypogynous when the male and female flowers are close to each other or separated by a single leaf. In the *Acrocarpi*, the flowers, either female or bisexual, are produced at the top of the stem or of the innovations. The male flowers are sometimes similarly placed, but more generally on the sides of the branches, especially at the base of the female flowers, which throw them aside in their growth. In the *Pleurocarpi*, the flowers—always lateral—are upon stems or branches. Polygamous as well as female flowers are enclosed into a kind of involucre of imbricated leaves, of which the inner ones—originally the smallest—gradually increase in size during the evolution of the fruit, forming a peculiar envelope, *perichætium*, which surrounds the inflated oval support of the pedicle, the *vaginule*. The involucre of the male flowers, *perigonium*, is not subject to a modification of the same kind, though the inner leaves generally differ from the outer in some characters. The female organs of the mosses, *archegonia* or *pistillidia*, show the greatest analogy to the pistils of the phænogamons plants. They are flask-shaped bodies, each with a cellular covering, narrowed upwards into a cylindrical tube, *stylidium* or *collum*, which, variable in length in different species, remains closed until the anthesis, when it opens by an enlarging funnel-like mouth, to receive and give passage to the fecundating matter. The archegones are more or less numerous in the different species,—two to thirty or even more;—but generally only one is fructified, rarely two or three, the fruits in this case being clustered in the same perichœtium. The male organs of the mosses, *antheridia*, enclosed with *paraphyses* in the *perigonium*, are generally composed of two parts,—an utricle of an oval elongated form, rarely globose, containing the spermatozoid matter; and a pedicle, either short or somewhat elongated. When replete, the antheridia are swollen, greenish white or hyaline at the apex; when empty they become flaccid, rugose, reddish or dirty yellow, and deformed by compression. At the time of fecundation the subclavate bacillate spermatozoids convolute in spiral, being freed from the spermatozoid mass wherein they are mixed, have a spiral motion of their own,—like small living animals,—and penetrate the archegones through the cylindrical tube. The number of the antheridia is, like that of the archegones, variable according to genera and species. Filamentose organs, *paraphyses*, are mixed with the antheridia and archegones; they vary in their form and their number. They are generally as long or even longer than the antheridia; filiform and slender in gemmaceous flowers, subclavate, spathulate, etc., in discoid or anthoid ones.

6. *The Fruit.*—In ripening, the base of the fertilized archegone gradually enlarges into a capsule, then composed of two walls; the inner, *sporogone*, or *sporange*, soft, thin, which at maturity contains the spores and which either adheres to the outer walls, or, free—except at its base—is like a small cylindrical bag attached to the outer walls by filaments. In the process of its growth, the cellular part covering the sporange becoming dry and membranaceous is transversely ruptured at its base, and forms the *calyptra*—a cover which, pushed upwards, is either split on one side and thrown up obliquely (*cuculliform*), or is gradually expanded, and sits upright upon the capsule like a conical hat (*mitriform*), either entire or lacerate at its base. In rare cases it remains attached to the base of the capsule, which then passes through by a longitudinal slit of its side. It is also sometimes *dimidiate*, or split on one side in its whole length. The capsule itself, formed of a somewhat hard, solid membrane, composed of two or more series of cells, is

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* From *Popular Science News*, March.

ariable in size, shape and colour in the different pecies of mosses. It is generally more or less perorated by stomates towards its base. In most species he capsule is gradually narrowed downward to a neck, *ollum*, or an *apophysis*. The collum is merely the ubconical upper part of the pedicle; while the apophyses is a more or less long prolongation of the inflated base of the capsule, from which it generally differs by onsistence and colour. In some species it is as long as the sporange, or even longer, being an intermediate part between it and the pedicle. The *pedicle*, or basiar support of the capsule, is sometimes short or carcely discernible, though present in all mosses. It s generally filiform, cylindrical, of equal thickness in ts whole length, except under the base of the capsule. It is more or less rigid, elastic, generally smooth on ts surface, sometimes rough, scabrous or verrucose. The lid, or *operculum*, also in all mosses except the *Cleistocarpi*, the *Holocarpi*, and the *Schistocarpi*, is he apex of the capsule, which becomes circumscissile, and is at length detached as a kind of cover. It is variable in shape, length, colour, and affords very valuable characters for the diagnosis. The *annulus* is a narrow fringe composed of one, two, or three series of hyaline cellules at the orifice of the capsule. The cellules, contracted by dryness when the capsule is ipe, and abruptly dilated by humidity, force the disruption of the lid. These cellules are detached from the orifice in fragments, or else they remain adherent o the lid, or fall altogether from the mouth of the capsule as a spirally-twisted narrow fringe. The *spores* or *sporidia* enclosed in the capsules, deformed by compression when young, become globose in ripenng; they are sometimes angular, but generally smooth or rugulose. They are greatly variable in size—from 1-6 to 1-100 m.m. in diameter. They also vary in number; species of *Archidium* have no more than fifteen or twenty spores in each capsule: in the *Hypnaceæ* the spores are very small, and, indeed, innumerable.

The Peristome.—When the lid is removed the orifice of the capsule, in most of the genera of mosses, is seen to be adorned by a simple or double—very rarely triple or quadruple—row of small teeth and cilia, called the *peristome*. When simple the peristome is composed of eight, sixteen, thirty-two or sixty-four teeth, attached to the orifice of the capsule or a little lower inside of it; sometimes tubulose, or prolonged above the orifice into a cylindrical tube. The teeth are simple or compound—that is, in this last case they are formed of two or four similar parts adhering or united by the borders, and thus geminate or bigeminate. These parts often separate with age, doubling or quadrupling the number of the teeth. A coloured line marks the union of the teeth or the line of division. The teeth are very variable in size, form, and colour, affording important characters for the diagnosis. When the peristome is double, the inner is generally composed of a pellucid, yellowish membrane, *processus*, of various engths; it is rarely entire, sometimes irregularly acerate, generally cut into segments and cilia. The segments are usually plicate-carinate lengthwise, more distantly and less distinctly articulate than the teeth. The cilia are generally narrow, filiform, distantly articulate; sometimes barred (appendiculate) at the articuations. They are also derived from the inner membrane, and are alternate with the segments.

The *columella* is a cellular cylinder, or axis, which occupies the centre of the capsule, from its base to the top of the lid. It is generally fugacious, and soon breaks up or decays. In a few mosses, however, it persists and remains attached to the lid, supporting it above the mouth of the capsule when this becomes dry and effete.

Mosses live everywhere and on various kinds of material. On criks or on coarse sandstone, to which they are attached by short radicles penetrating the porous matter, are species of *Desmatodon* and *Barbula*; on coarse gravel along roads, *Trichostomeum*; on the sand and naked earth of the plains, the *Cleistocarpi*, the *Pottoideæ*, and the *Weisieæ*; on clay banks, *Fissidens* and *Dicranella*; on the wood of living trees, the *Orthotricheæ* especially; on that of decayed trunks or branches, the *Dicraneæ*, the *Hypneæ*; on the dung of animals, the *Splachneæ*, etc. Their especial province in nature is to absorb and concentrate atmospheric humidity, and to retain it in their texture, either to hasten the decay of the dead woody matter to which they are attached, or to retard it when life still remains in the plants. They cover and protect the roots of trees and their base against atmospheric influences, cold or heat; they overspread waste fields, swamps and bogs, and by their gradual decay produce peat or humus. They are thus modestly pursuing everywhere a constant work of usefulness, always bearing a pleasant aspect, giving the appearance of life, and hiding the hand of death wherever its decomposition is at work.

Mosses are found in every station, under every kind of climate, and bear an uninterrupted life. They have their seasons for fructification, but even when dry and discoloured under the influence of heat, they take life again and continue to vegetate as soon and as often as they receive a sufficient amount of humidity. Hence the botanist is never disappointed in his search for mosses. At every season some species bear their fructification, and are therefore determinable. They need no care for their preservation; heaped in bundles or dried they may be left aside for years, and when needed for comparison and determination, immersion in water revives them, and at once they open their leaves and become as fresh and green as if they had just been gathered.

VEGETABLE TALLOW.

In a report on the trade of Wênchow, China, for the year 1890, Mr. Acting-Consul Hosie writes:—

There is one item in the export list which deserves a brief notice. I refer to vegetable tallow, which occasionally appears as an import, but more frequently as an export. The tallow tree (*Stillingia sebifera*, Roxb.) is largely cultivated near Wênchow, and still more widely within the Ch'u-chou prefecture to the west. It is not, I think, generally known that the fruit of this tree produces oil as well as tallow. The berries, which resemble coffee beans in appearance and size, are first steamed, and then pounded in an ordinary rice trough. By pounding, the soft mealy mesocarp is partially separated from the kernels. The whole is then placed in a bamboo sieve, the meshes of which are just large enough to allow the mealy matter to be scrubbed through, and small enough to keep back the kernels, which are hard, black, and about the size of peas. From the mealy matter the tallow is expressed in primitive wooden presses, into the details of which I need not enter in this place. The oil is derived from the kernels in the following manner. They are dried and passed between two mill-stones held at such a distance apart by means of a bamboo pivot as to crush the hard shells of the kernels without injuring the white interiors. The whole is then passed through a winnower, which separates the broken shells from the solid matter. The latter is thereafter placed in a deep iron pan, and roasted till it begins to assume a brownish colour, the process being accompanied by continual stirring to prevent burning. The crushed shells make an excellent fuel for the purpose. It is then ground by a huge stone roller in a circular stone well, steamed, made into circular cakes with bamboo and straw casings, and passed through the wooden press. A good lighting oil, called "ch'ing yu," of a brownish-yellow colour is thus obtained. The tallow is called "p'i yu," that is, skin, or external oil.

The Pharmaceutical Journal.

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SATURDAY, APRIL 18, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE FIFTIETH ANNIVERSARY OF THE FORMATION OF THE PHARMACEUTICAL SOCIETY.

THOUGH our readers will probably be aware that last Wednesday, the 15th inst., was actually the fiftieth anniversary of the formation of the Pharmaceutical Society, it seems proper to make a formal mention of the fact in these pages. It was in the course of the deliberations of the committee of chemists and druggists appointed to watch the progress in Parliament of a Bill which would have operated prejudicially against those engaged in that occupation, that the propriety of establishing a Society was first suggested. The necessity for incorporation and for recognition upon the basis of educational qualification had become evident, and when the danger threatened by the Bill of Mr. HAWES had been averted opportunity was taken to discuss the principles upon which a corporate body should be established. At the meeting held on the 15th April, 1841, at the Crown and Anchor Tavern, to report the successful result of the opposition to the Bill of Mr. HAWES, it was stated at the conclusion of the report that the Committee was of opinion that the chemists and druggists were capable of self-government, and upon that ground it was suggested that they should form themselves into a permanent Association, to be denominated the "Pharmaceutical Society of Great Britain." The objects of this Association were to be the union of all the members of the trade, the protection of their general interests, and the advancement of scientific knowledge. Education, examination, registration, and representation were recommended as constituting a suitable basis for such union, inasmuch as those conditions would secure benefits to chemists and druggists as well as to the general public, and would furnish a guarantee that chemists and druggists, while anxious to retain their privileges, were disposed to afford every public evidence of their fitness to exercise them. In pursuance of this suggestion it was resolved, on the motion of Mr. WILLIAM ALLEN, F.R.S., seconded by Mr. JOHN BELL, that the Pharmaceutical Society should be formed for the purpose of increasing the respectability of chemists and druggists, and protecting their permanent interests. The subsequent proceedings of drawing up and agreeing to the Bye-laws of the Society occupied some time, and in the month of July, 1841, the Council issued an address to the chemists and druggists of Great Britain in which their attention was directed to the immediate necessity of uniting their strength and influence. It was also suggested that the prospect of substantial improvement which might thus be effected ought to stimulate all of them to assist in the important work which had been undertaken. In this address it was further pointed out that chemists and druggists had long had reason to regret the want of union for mutual benefit and protection, of uniform education, and of internal self-government as the means of substantiating their claim to public confidence, and of resisting obnoxious imputations, as well as the imposition of extraneous restrictions and supervision.

Half a century has now elapsed since the proceedings above referred to took place, and though some progress has been made towards the attainment of the objects set forth in the above-mentioned address, so much yet remains unachieved that to a great extent the terms of the address are still applicable to existing conditions. The uniform system of education and the incorporation of all the chemists and druggists of the kingdom within the ranks of the Pharmaceutical Society still remain to be realized in the future. In some degree the qualified members of the trade have been incorporated into a legally recognized body, but the attainment of even that result was not effected until after the lapse of more than half of the period that the Society has been in existence. As a consequence of that failure of the trade to secure recognizable consolidation, one of the most urgent complaints of the present time may be mentioned, the want of exemption from jury service which chemists and druggists suffer under. That was attributable solely to the fact that at the time when pharmaceutical chemists obtained this exemption on the ground of being members of a corporate body, the great majority of chemists and druggists could not be identified or distinguished from other traders who had no claim to exemption from the duty of serving on juries.

In regard to education of such a nature as is requisite for ensuring competent ability to conduct the business of a chemist and druggist, there is still a total absence of any established or adequate system. Youths drift into the occupation by hundreds without any idea of its nature or any conception of the requirements they will have to satisfy eventually; without the timely application of any test of their fitness for entering it or of their capacity to acquire the knowledge of which they must give proof before they can obtain legal qualification. This is, perhaps, less a source of danger to the public than of detriment to those engaged in the business as duly qualified persons. But in this latter respect it is a most startling and ominous fact that more than one-half of the persons who have actually been engaged in the business for a number of years as apprentices and assistants are found, on presenting themselves for examination, to be unfit to receive qualification. This circumstance alone constitutes a most serious obstacle to that improvement of the general status of chemists and druggists which was one of the main objects with which the Pharmaceutical Society was founded. It points also to the imperative necessity of establishing properly organized methods of educational training for apprentices and an effectual system of restricting the admission of youths as apprentices, who have not received a thoroughly sound scholastic education. That in this respect the position of affairs should be so far behind what is requisite, is a matter of serious importance for all engaged in the business. And when it is considered that this defective condition prevails, notwithstanding the efforts that have been made by the Society to promote pharmaceutical education during the past half century, it will be evident that with whatever satisfaction past progress may be viewed, the occurrence of the Society's Jubilee will require to be made the starting point of further exertions in the same direction, if the trade of the chemist and druggist is ever to be placed upon a professional footing in this country.

THE CHEMISTS' ASSISTANTS' ASSOCIATION AND THE PRELIMINARY EXAMINATION.

The Chemists' Assistants' Association devoted the last meeting of the present session, which was held on Thursday evening, just as we were going to press, to a discussion on the question of the proper standard of the Preliminary examination, so ably raised in these columns by Mr. J. E. Saul. The discussion was initiated by the President, Mr. A. Campbell Stark, who after some introductory remarks moved a resolution to the effect that the meeting was of opinion that the quality of the Preliminary examination should be extended so as to constitute a better test of a youth's general education and ability than it now does, and that it should be made compulsory for a youth to pass it before entering apprenticeship to a pharmacist. The motion having been seconded by Mr. Stead, was supported by Messrs. Seccombe, Millhouse, J. C. Umney, Sherlock, Harrison, and Helbing, and passed unanimously. Indeed, there was no difference of opinion as to the advantage, social and pecuniary, that would result from raising the standard of the Preliminary examination, though, as might be expected, all the speakers were not quite in agreement as to the precise direction and limit of the extension. We purpose publishing a fuller report of the discussion next week.

AWARD OF THE HANBURY MEDAL.

We understand that the adjudicators appointed under the Deed of Settlement of the Daniel Hanbury Memorial Fund have awarded the sixth Hanbury Gold Medal to Dr. Julius Oswald Hesse, of Feuerbach, near Stuttgart, for his distinguished services in the prosecution of researches in the chemistry and natural history of drugs. Dr. Hesse, as our readers will be aware, has long been a frequent contributor to the pages of this Journal, and his papers on a great variety of subjects have been of the highest value and utility. We may mention that the adjudicators of the medal are Dr. A. Crum-Brown, the President of the Chemical Society; Professor C. Stewart, President of the Linnean Society; Mr. M. Carteighe, President of the Pharmaceutical Society; Mr. W. Martindale, President of the British Pharmaceutical Conference, and Mr. T. Greenish, Pharmaceutical Chemist, nominated by the Presidents of the Pharmaceutical Society and the British Pharmaceutical Conference.

* * *

In one of the Exeter papers the defendant in the case reported at p. 953 is described as a "chemist's assistant." This is a mistake, as he was carrying on the business of a chemist and druggist on his own account though unregistered. It may be added that in reply to the plea in defence that he had tried to pass the examination and failed three or four times the judge remarked that it was a case affecting the safety of the public and that attempts to pass would not do to qualify men. He had himself made attempts to pass and succeeded, or he would not have been there in the capacity of judge. As the defendant had transgressed the law the judge said he had no discretion as to inflicting the penalties, though he was very sorry for him. In a previous prosecution the defendant paid the penalty before going into Court.

* * *

In reply to a question put in the House of Commons on the 10th inst., by Mr. Kimber, as to whether opium, the manufacture of the Indian Government, imported into the United Kingdom for smoking or other purposes, would be allowed to be sold, as in India, without being labelled "poison," the Home Secretary said that in accordance with the provisions of section 17 of the Pharmacy Act, opium and all preparations of opium or of poppies cannot be sold in Great Britain unless labelled with the name of the article, the word "poison," and the name and address of the seller.

* * *

Mr. A. W. Gerrard writes to inform us that in a letter he has received from Mr. W. T. Thiselton Dyer, the Director of the Royal Gardens, Kew, an explanation is given of the occurrence of mercury in a walnut tree described in last week's Journal. According to Mr. Thiselton Dyer, there is an old belief prevailing in country districts that when a tree is infested with insect plagues of any sort it may be cured by boring a hole obliquely in the trunk and filling it with mercury. This he suggests is no doubt what was done in the case cited, and he adds that he has seen the experiment tried on a cherry tree, though, of course, without effect. The Chinese have a similar notion. They profess to be able to restore *Cycas revoluta* to health by driving an iron nail into the stem.

Transactions of the Pharmaceutical Society.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, April 15, at 1 p.m.

Present: Messrs. Gilmour, Mackenzie, and Gibson, Edinburgh; Nesbit, Portobello; Kerr and Hardie, Dundee; Fisher, Dunfermline; Strachan, Aberdeen; Kermath, St. Andrew's; Lawrence, Oban; Storrar, Kirkcaldy, and Watt, Haddington. Apologies for absence were intimated from Messrs. Maben, Hawick; Kinninmont and McAdam, Glasgow; Paterson, Aberdeen; and Stephenson and Boa, Edinburgh.

The minutes of last meeting were read and approved.

The report of the General Purposes Committee was read and adopted.

The Assistant Secretary reported that, as directed, he had forwarded to the Council the recommendation of the Executive that a superintendent of the Preliminary examination should be appointed in Kirkwall and Lerwick in the same way as in Guernsey and Jersey. The following reply had been received from the Secretary:—"I am instructed to say in reply that the subject will be taken into consideration when the superintendents and the centres of examination are being determined next year."

Mr. Fisher remarked that the Council had not decided to refuse.

Mr. Watt, Haddington: The Council will consent, if it is at all practicable. Take Shetland, for instance; there is communication in the winter only twice a week.

Mr. Strachan: Four times a week in summer.

Mr. Watt: That was the only reason why it was delayed; in order that proper arrangements might be made.

Mr. Strachan: Well, the mails are to be increased now.

Mr. Fisher: I think it will be very important to have one centre in Kirkwall. It is only a matter of some eight or ten hours' sailing from Lerwick to Kirkwall.

Mr. Strachan: But there is no reason why the examinations should not be held in both towns.

Mr. Kermath: Who could be proposed for appointment in Kirkwall?

Mr. Fisher: There is Mr. Stewart, a very good man, and pharmaceutical chemist.

Mr. Kermath: Then I think we should request the Council to make arrangements as quickly as possible.

Mr. Watt: But you have to consider the whole arrangements in connection with such an appointment. For instance, Wick was talked about. There is regular communication with Wick; but the matter is just in the meantime delayed.

Mr. Mackenzie: Oh, Scotch geography is not very well understood in London.

The Chairman: I think we can safely leave this matter in the hands of our Scotch members of Council.

Mr. Watt: I may mention that there is a great desire on the part of the President and Council to carry out this suggestion.

The following resolution was unanimously agreed to:—

> "That the next election of Executive take place on Wednesday, June 17, and that the Chairman and Vice-Chairman be appointed scrutineers of the voting papers, with power to add to their number."

The Executive then sat in Committee. On resuming the annual report to the Council was adopted and ordered to be forwarded to London. It was intimated that prior to publication it must in courtesy be sent to the Council.

Mr. Kerr said he had a communication from Mr. J. Walker, Glasgow, in reference to some matters that the assistants of the city were considering under the Pharmacy Acts Amendment Bill. They desired that unqualified assistants who had been ten or twelve years at the trade should be registered without examination to remain as assistants. They were getting up a protest againt the omission of such a clause from the present Bill now before Parliament, and they had printed a circular to be sent to members of Parliament to induce them to have an amendment introduced so as to obtain the privilege they desired.

The Chairman thought they should not take up the matter for discussion. It was not for them to take it up as an Executive.

Mr. Storrar said they could only take it up as a mere matter of information.

Mr. Watt asked why as an executive they could not take up the question? They need not put themselves in the position of parties antagonistic to the Bill, but they might express their opinion upon it.

Mr. Storrar: The question is, can we take up as an Executive a proposal to petition for or against this Bill?

Mr. Kerr: It is only information I am going to give you as to what is being done outside.

Mr. Mackenzie: I see Mr. Gilmour's difficulty. Finish the business and the Chairman can leave the chair. We can then discuss the question competently.

Mr. Watt: This is a question which is likely to seriously affect the position of the Bill before Parliament, and are we going to ignore it, and deny ourselves the privilege of discussing it? I rather think is my opinion that it is a matter which the Executive should take up. I presume the Executive to be either in favour of or against this Bill, and here is a serious matter which the assistants propose to raise in connection with it. Now I think it is a very serious subject for us to discuss.

Mr. Storrar: I would not like to be misunderstood. If it is simply to discuss what is being done I think it is a very proper subject to be brought before the Executive, but I understood Mr. Kerr desires to get this Executive to approve or disapprove of this circular and take part in the assistants' action.

Mr. Kerr: Oh! not at all. I only bring the matter before you for your information as to what is being done. I got a letter, asking me to send the circular to the members of Parliament for Dundee, which I have done, and received replies.

The Chairman: So far as I am concerned I have not the slightest objection to the document being read, but as an Executive, to have a discussion on a circular which we have never seen, I think it out of order.

Mr. Mackenzie: This matter is not on the billet.

Mr. Fisher: But any matter may be brought up.

Mr. Nesbit: I do not think it would be proper for us to give an opinion upon this question. Some may agree and some may accept the proposal. We should take neither one side nor the other, for they might send through the country a report that we are in favour of the assistants' proposals.

The Chairman: We are discussing what we know nothing at all about.

Mr. Storrar: I propose that this matter be discussed in committee.

Mr. Watt: I really must oppose it being taken in Committee, as it is an important matter affecting the trade.

Mr. Storrar: I propose that we should be in Committee. We are not discussing a public question. We are discussing whether certain business should be taken up by the Executive or not. In the meantime I do not see why the discussion should be sent all over the country, whether a certain thing should be taken into consideration or not.

Mr. Mackenzie: Will you tell us upon what rule, Mr. Chairman, you decide this discussion is irrelevant.

Mr. Storrar: I beg again to move that we go into Committee.

Mr. Nesbit seconded.

Mr. Watt proposed that the matter be taken into consideration in public.

Mr. Fisher seconded.

On a division, 5 voted for Mr. Storrar's motion and 4 for Mr. Watt's amendment.

On resuming it was intimated that no action would be taken in regard to the Glasgow petition.

Mr. Strachan said he had heard it mentioned in Aberdeen that there was good reason why there should be a celebration of the pharmaceutical jubilee in Edinburgh as well as in London.

The Chairman asked if their representatives at the Council could inform them what was being done.

Mr. Storrar said there was to be a reception in the Society's rooms which would develop into a conversazione and a dinner afterwards.

The Chairman: I do not think it would be right for an expiring Executive to make arrangements for the coming Executive.

Mr. Strachan said he had no motion to propose on that subject, but if there was any expense incurred by such a thing he would never think of burdening the Pharmaceutical Society with the expense. Whatever expense was incurred should, he thought, be defrayed by those present.

Mr. Mackenzie: If the London entertainment is to be paid out of the funds why not this.

Mr. Strachan: They have done that from time immemorial almost.

The Chairman: And there may be a lot of Scotch members going up to London.

On the Chairman's suggestion the matter was left over.

The meeting then closed.

PRELIMINARY EXAMINATION.

April 14, 1891.

The following are the questions that were set for this examination:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin*:—

1. Many things are done by one man.
2. We all ask you for peace.
3. They said nobody would be able to help him.
4. Caesar warned them not to help the enemy.
5. The word being given, our men made an attack upon the Gauls.

II. Translate into English either A. (Caesar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CAESAR.

1. Caesar, quod memoria tenebat, L. Cassium consulem occisum, exercitumque ejus ab Helvetiis pulsum et sub jugum missum, concedendum non putabat: neque homines inimico animo, data facultate per provinciam itineris faciundi, temperaturos ab injuria et maleficio existimabat. Tamen, ut spatium intercedere posset, dum milites, quos imperaverat, convenirent, legatis respondit, diem se ad deliberandum sumpturum.

2. Haec eodem tempore Caesari mandata referebantur, et legati ab Aeduis et a Treviris veniebant; Aedui questum, quod Harudes, qui nuper in Galliam transportati essent, fines eorum popularentur; sese ne obsidibus quidem datis pacem Ariovisti redimere potuisse; Treviri autem, pagos centum Suevorum ad ripam Rheni consedisse, qui Rhenum transire conarentur; his praeesse Nasuam et Cimberium fratres. Quibus rebus Caesar vehementer commotus maturandum sibi existimavit, ne, si nova manus Suevorum cum veteribus copiis Ariovisti sese conjunxisset, minus facile resisti posset.

Grammatical Questions.—For those only who take Caesar.

1. Decline throughout, in the singular, *nova manus*; in the plural, *veteribus copiis* (Par. 2).
2. Give the first person singular of the indicative mood, perfect tense, of all the verbs in Paragraph 1.
3. Write in Latin 7, 36, 479, 4th, 28th, *twice*, *three apiece*.
4. Distinguish between *ne*, *nonne*, and *num* in asking questions.

B. VIRGIL.

1. Olli subridens hominum sator atque deorum,
Vultu, quo coelum tempestatesque serenat,
Oscula libavit natae; dehinc talia fatur:
"Parce metu, Cytherea; manent immota tuorum
Fata tibi; cernes urbem et promissa Lavini
Moenia, sublimemque feres ad sidera coeli
Magnanimum Aeneam; neque me sententia vertit."

2. Namque videbat, uti bellantes Pergama circum
Hac fugerent Graii, premeret Trojana juventus;
Hac Phryges, instaret curru cristatus Achilles.
Nec procul hinc Rhesi niveis tentoria velis
Agnoscit lacrimans, primo quae prodita somno
Tydides multa vastabat caede cruentus,
Ardentesque avertit equos in castra, prius quam
Pabula gustassent Trojae, Xanthumque bibissent.

Grammatical Questions.—For those only who take Virgil.

1. Decline in full and give the genders of *tempestates*, *oscula*, *natae*, *moenia*, *coeli* (Par. 1).
2. Give the first person singular of the indicative mood, perfect tense, of all the verbs in Paragraph 2.
3. Write in Latin 7, 36, 479, 4th, 28th, *twice*, *three apiece*.
4. Distinguish between *ne*, *nonne*, and *num* in asking questions.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. Find the sum of all prime numbers from 100 to 150, and write the result in Roman characters.
2. An iron merchant buys 16,008 tons of iron at £4 13*s.* 4*d.* per ton; he sells half of it at cost price, half the remainder at a profit of ½*d.* a lb., and the rest at a profit of ¼*d.* a lb.; find his gain.
3. Simplify $(12\frac{5}{8} - 8\frac{3}{4} - 1\frac{1}{16} + \frac{5}{18}) \times 4\frac{1}{2} \times (7\frac{5}{12} - 6\frac{1}{2})$.
4. A pile of 33 books is 4 ft. $8{\cdot}8\dot{3}$ in. in height; find the average thickness of each book.
5. By how much is 35 m. 7 centim. less than the average of 34 m. 2 decim., 37 m. 8 decim., 36 m. 9 decim., 35 m. 7 decim., 36 m. 6 decim., and 34 m. 8 decim.?
6. Find the cost of papering a room 25 ft. 8 in. long, 19½ ft. broad, 14½ ft. high, with paper 2 ft. 5 in. wide at 2¼*d.* a yard.
7. If 100·8 lbs. of flour support 20 men for 3 days, how many men will 46·305 cwt. support for 7·35 weeks?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following:—

"Fair ship, that from the Italian shore
Sailest the placid ocean-plains
With my lost Arthur's loved remains,
Spread thy full wings, and waft him o'er."

2. Parse fully:—"In words, like weeds, I'll wrap me o'er."

3. Correct the following sentences, giving your reasons:—

(i.) Saying and doing is a very different thing.

(ii.) If I had drank the mixture, I would have recovered.

(iii.) He referred to the smallest of the two memorandum.

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—pray my young friend said he as they grew familiar together what may i call your name why i am very nimble as you see answered the traveller so if you call me quicksilver the name will fit tolerably well quicksilver quicksilver repeated philemon looking in the traveller's face to see if he were making fun of him it is a very odd name and your companion there has he as strange a one

* 5. Write a short composition on *one* of the following subjects:—

(i.) The Mental and Physical Values of Outdoor Games.

(ii.) The Advantages which Britain derives from her Insular Position.

(iii.) Any historic building you have seen.

(iv.) "Sweet are the uses of Adversity."

Pharmaceutical Society of Ireland.

PRELIMINARY EXAMINATION.

Messrs. J. A. Hogg, J. A. Stewart, S. Hogg, H. Prior, A. H. Jones, W. E. Jolliffe, R. S. Moore, T. S. Taylor, A. E. Welsh, M. F. Fitzpatrick, E. Barnes, R. Leathem, and A. Farrington have passed. Ten were rejected.

REGISTERED DRUGGISTS' EXAMINATION.

Messrs. H. C. Backhouse, R. S. Chapman, T. J. Connery, J. D'Arcy, D. Donohoe, H. Farrell, J. A. Gardiner, T. E. Gordon, W. Gore, B. Haydock, E. M. Hewetson, F. C. Judge, L. Kingsmill, J. R. Middleton, J. Mullen, J. J. O'Donnell, J. H. Parker, R. H. Percy, R. Poole, P. C. Roche, R. E. Scarlett, W. Selkirk, W. Wade, R. T. White and W. Willis have passed an examination for the right to be placed on the Register of "Registered Druggists" for the sale of the scheduled poisons.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting held on Thursday, February 26, Mr. A. Campbell Stark, President, in the chair, the following paper was read:—

THE TELEPHONE AND PHONOGRAPH.

BY J. J. SMITH.

The author quoted from Preece a statement that the earliest document on the subject dates from 1667, when Robert Hooke wrote to the effect that it is not impossible to hear a whisper at a furlong distance, it having already been done, and that "perhaps the nature of the thing would not be more impossible though that furlong should be ten times multiplied." This plan for the transmission of sound, the author said, was on the principle of the string telephone, the best form of which was the "pulsion telephone." In 1821, in the 'Repository of Arts,' a description of a "telephone" invented by Wheatstone was published, together with speculations as to the possibility that by its means musical sounds might be transmitted from one part of the town to another. The date for the electrical reproduction of sound was given as 1837, when it was discovered that an iron bar rapidly magnetized and demagnetized emits a sound known as the "magnetic tick," supposed to be due to molecular rearrangement. In 1852 Reiss conceived the idea of throwing into motion a membrane by means of the voice, and causing the vibrations set up to open and close an electric current with corresponding rapidity, causing pulsations which were changed in the receiver at the other end into audible sounds. From time to time various improvements were made, but it was not until February, 1876, that Graham Bell took out a patent in the United States for the speaking telephone, and on the same day Elisha Gray applied for a patent for an instrument of a similar kind. A great improvement made by Bell was the substitution of a permanent for an electro magnet and the use of an undulatory current. It was pointed out that the great difference between articulate speech and musical notes is the extreme complexity of the waves produced by articulation compared with the sonorous waves produced by musical notes, and that this complexity necessitates the employment of a continuous current of electricity when speech is to be transmitted. The author then proceeded to describe various other forms of telephones, including Edison's loud-speaking or chemical telephone and Gray's friction telephone, and then referred to the practical uses and application of the instrument. The microphone was next referred to as an instrument by means of which sounds otherwise inaudible could be made apparent. It was stated that its mode of construction varies according to the purpose for which it is required, and the following description was quoted of one adapted for making audible the footsteps of a fly. It consists of a box, with a sheet of straw paper stretched on its upper part; two carbons, separated by a morsel of wood, and connected with the two circuit wires are fastened to it, and a carbon pencil, placed crosswise between the two, is kept in this position by a groove made in the latter. A very weak battery is sufficient to set the instrument at work, and when the fly walks over the sheet of paper it produces vibrations strong enough to react energetically on an ordinary telephone. The paper concluded with a description of the phonograph.

After a short discussion a vote of thanks to the author was passed.

At a meeting held at 103, Great Russell Street, on Thursday, March 12, Mr. A. Campbell Stark, President, in the Chair, the following paper was read:—

SOME NOTES ON PHARMACEUTICAL ETYMOLOGY.

BY J. C. HYSLOP.

It occurs to me that the study of language is one of the most refreshing recreations of which man's mind is capable; that it furnishes at once stimulation, strength and order, and that as we wisely cultivate pastimes which tend to develop the thew and sinew of our bodily frame with great advantage, so by turning aside at times from the sterner duties of our avocations to recreate in some such mental field as this, we gain usually that increasing activity and suppleness of spirit which fits us the better for the exacting duties of life's chief work and secures a serener close thereto.

By language, Sir, I do not mean any one particular kind of speech, although our native tongue should claim the priority at all times, but I mean language considered as a whole, as a spontaneous outcome, an ever-living, ever-growing expression of man's eternal mind.

Speak not glibly of "dead languages." Language dies not. The peoples and nations who in the course of their existence form and use the language as a means of communicating their ideas to one another die like leaves of trees, and but for their language would pass away and be all forgotten. The language still lives; its "etymons" remain locked up in security as lives the germ within the seed of fruit, ready to burst forth in response to the demands of fresh surroundings to serve once more a kindly turn in the limitless cycle of existence.

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* This must be attempted by every Candidate.

A short, rambling excursion into the field of philology, gleaning as we go a sample or two of the etymons which underlie the nomenclature of pharmacy, is all that I propose to attempt on the present occasion. *E.g.*, upon opening the B.P. we find thrown together, apparently by the accident of alphabetical arrangement, the names of substances of the greatest diversity; one, however, with respect to the etymon from which those names are alike derived. I refer to the four names acacia, acetum, acidum, aconitum.

The Greek *αχ* equals sharp, piercing, biting, etc. Thus we get acacia, the prickly or thorny leguminous genus of plants; acetum, the sour, the vinaigre of the French, our acid, to indicate a very sour substance; and aconitum, so named by the Greeks themselves as being the sharpest of poisons, that which kills at one sharp thrust.

Then come we to "Alcohol," a word of most interesting origin. The Arabians used to spend an immense amount of attention on the preparation of a pigment for ladies' eyebrows; when finished off in the best manner it used to fetch a very high price, and was termed Al-kohl, the holy black, the sacred black (pigment). From this *tenuissimum* preparation, so highly attenuated and employed for a purpose so sublime, came the word alcohol, to designate the highly rarefied spiritual essence prepared at first by the distillation of the finest wine.

This same Oriental prefix *al* very often occurs, as, for instance, in Al-kali and in Almond. Note that the term Jordan almonds, by-the-bye, has nothing to do with the neighbourhood of "Jordan's crystal fountains," being simply a corruption of Almande Jardine, garden, *i.e.*, cultivated almonds, like Shooter's Hill, a corruption of "Chateau vert," a noted castle covered with ivy having given this name to the locality.

"Amylum" is an interesting word, the exactly opposite of "triticum"—"A," privative *μύλη*, a mill; that (grain) which has not any need of being sent to the mill. "Triticum" from *τρίβω*, that which is ground down fine before being used. Whence also we get the word tribulation, that polishing process that ends so well, but is so very hard to bear.

As to the English word "Starch," why, it is simply native Saxon, and means that which makes "stiff"—"stark."

"Arsenic" is from *ἄρσεν*, masculine—strong—from its well-known potency as a poison.

"Asafœtida," literally the stinking staff. "*Assa*," Pers., a staff.

"*Atropa Belladonna*," Ἄτροπος, one of the Fates, whose duty it was to cut the thread of life. ἀ, privative, and *τροφή*, nourishment.

"Belladonna," of course, has reference to its use by ladies to dilate the pupil of the eye.

"Aurantium" comes to us through several orthographical changes and a simulation of Latin origin which is purely fictitious. The Sanscrit "Nagaranga" became changed by the Arabs into "Narenj." The Italians dropped the "n" and made it into "Arancia," whence in process of time we get "Aurantium," as if from "Aurum," which it certainly is not.

"Bismuth" is from the German "weisse," white, and "muth," lively—"lively white," from its pinkish whiteness as compared with the "dead white" of silver.

"Camphor:" Sans., "Karpura," white; Malay, "Kapura;" Hind., "Kapur;" Latin, "Camphora;" French, "Camphre."

"Clove" reminds us of a word having two distinct meanings, according to its origin, the unexpanded flower buds of *Caryophyllus aromaticus* being named from the Latin "Clovus," French "Clou," a nail, from fancied resemblance. The "clove" of garlic being so named from A. S. "cleofan," to cleave, with reference to the phenomena of the little bulb, the "clove" splitting away from the mother-bulb.

"Cascarilla," the darling bark, a name at first given by the Spanish to all the barks of the cinchona tribe, because of their singular virtues, "cascara" being the Spanish for bark. Now we know the term has been long restricted to another kind of bark altogether, that from the *Croton Eluteria*.

"Catechu," pronounced "cate-shoo," which, from a false analogy, connected with words of Greek origin, such as "catechism," "catechumen," etc., people will persist in calling "kateku," comes from the two Indian words, "Cate," a tree, and "Chu," juice.

"Chirata," a native of Northern India, named from the Kerâtas, a wandering tribe of those parts, who were the first to bring its medicinal virtues into notice. "Kirata-tikta," the bitter herb of the Kerâtas. So likewise, somewhat strange to say, those two other bitters, "Gentian" and "Quassia," are both named from the persons who introduced them, Gentius, a physician, and Quassy, a negro.

"Colchicum," named from "Colchis," the birthplace of Medea, a distinguished daughter of one of its kings, who, after a rapid busy career as sorceress and poisoner—*per orbem terrarum*—was finally deified *post-mortem* by the Colchians as a fitting honour for having played such extraordinary pranks.

"Hemlock" is a truly Anglo-Saxon term, "Healm" = stubble or hay, from the hay-like appearance presented by the dried herb. At first this word seems to have been applied to all the tribe, or nearly so, of the British Umbelliferæ, but later on, as we know, became restricted to the *Conium maculatum*.

"Coriander" seems to present some little difficulty; most likely it is from the Greek *κόρις*, a bug. It seems, however, to have been the fashion to name at different times and places many of the Umbelliferæ in honour of this little insect, either from the odour of the fruits or the real or supposed power of keeping the pest at a distance. My difficulty is that whilst the Greek for bug is *κόρις*, the Greek for a little damsel is *κόριον*, so that coriander may spring from a more refined etymon after all.

"Crocus," Pers. "Kurkum," yellow, so "Curcuma," the yellow root. As to "Turmeric," we need not travel far for its etymon; our easy-going neighbours across the channel came somehow to call it "terre-mérite,"—somewhat for a like reason, I opine, as that which induced the British baker to name a certain double sulphate "stuff," and we in a complimentary mood say "turmeric." Then we must not omit the word "saffron," though for this we have to go back a long, long way. Catch hold of an Arabian word "Asfar," transpose the a and the s, put in another f, and there we are "as-far" as we can go. By-the-bye, in Liddell and Scott's 'Greek Lexicon' there is the amusing announcement that crocus is also the name given to the dried stamens of the plant—*grano salis accipiendum*.

"Digitalis," Lat. digitus, a finger, digitale, a glove, a covering for the fingers. Foxglove has no connection with our friend reynard, being simply made up of "fair-folk's," *i.e.*, "fairies' glove."

"Ergot," old French "Argot," "cocks' spur."

"Fœniculum" and hence "fennel," from "fœnum," "hay," whether from its odour or from its hay-like appearance when dried demands a doubt.

"Galbanum," Pers. "Milk," allied with the Greek *γάλακτος*, whence the Latin "Lac," "lactis;" when it flows from the plant this substance being a rich, white, milk-like juice.

"Glycerine" we all know is from *γλυκύς*, sweet, the sweet principle of fats, so "Glycyrrhiza," the same adjective combined with ῥίζα, a root. The sweet-root plant, by corruption of which we get our English word "Liquorice."

"Dandelion" so also is a corruption of "dens leonis," a reference to the jagged margin of its leaves.

"Taraxacum," Arabic "Tarakhshagūn," akin to the Greek Τραξύνον = "wild lettuce."

"Valerian," simply from the Latin "Valeo," from its benign property of curing the hypochondriacal and hysterical, changing the invalidi into the validi.

"Rhubarb" so named from the river "Rha" = the Volga, and "barbarus," introduced during the Roman ascendancy by inhabitants of the banks of the Volga.

"Ginger," from fancied resemblance of its rhizome to a deer's horn. Sanscrit "çringa-vera" (çringa, horn, and vera, shape); Greek Ζινγιβέρις; Latin, "Zingiber;" old English, "Gingiber."

"Scammony," Greek, Σκάμμα, an excavation, named from its mode of collection; a small cavity being made in the ground close to the incised root, into which a cockle-shell or some such receptacle is placed for the juice to gradually flow into.

"Tamarinds" must now bring our little excursion to a close, from the Arabian "Tamar," a date; "Tamar-Hindi," the "Indian date." The date being so named from fancied resemblance to a finger; Greek, Δάκτυλος; German, "Dattel."

In asking you, sir, to kindly pardon all the imperfections of this tiny brochure, allow me to add that I shall always cherish a satisfaction at being thus invited to a small share in the general life and work of your Association. By sharing our delights with others we lighten much the burden of an arduous career; and when, as in the present case, these are pleasures of the intellect, pleasures that act as "refiner's fire and as fuller's sope" upon the whole business of life, that lubricate the wheels of progress in the right direction, help us in the wholesome task of minimising the bad and magnifying the good, we surely have the best of reasons for mutual congratulations. Allow me to express the hope that your Association may long continue to flourish and attract men of the soundest minds and aim, men who love knowledge because of the power they know themselves to possess of turning that knowledge into wisdom, and who will with fitting enthusiasm make use of both for the advancement of our noble avocation—the art of pharmacy and the public good.

The President said the paper had been to him quite an unexpected treat. There was no subject more interesting and fascinating than the study of comparative philology. There was a great amount of speculation and uncertainty connected with it, however, and even such authorities as Professor Max Müller and the Duke of Argyle could not agree as to the origin of many sets of words. It would probably be more interesting still if one could go back a million years or so and take up the study of language as it actually originated, and probably consisting of roots only. Could Mr. Hyslop give any information as to the origin of the symbol lb. written for pound, also of that used to indicate ounces?

Mr. Stead said he had recently received an order for "kohol." Could Mr. Hyslop tell him what it was composed of? In some parts of the country mezereon was called the mysterious plant. He could not say if this was a vulgarization of the true name or if it had reference to its habit of developing flowers before leaves. Alveva was the name of an Indian drug which had been found to be identical with chiretta.

Mr. J. J. Smith, referring to the language of the pigmies exhibited a few years since at the Crystal Palace, said it was a most extraordinary dialect, consisting merely of a series of clicks like the ticking of a clock. He thought the symbol for pound was simply a modification of *lb.*, an abreviation of *libra*. He proposed a hearty vote of thanks to the author for his valuable paper.

Mr. Seccombe, in seconding the vote of thanks said pharmacists would have to thank Mr. Hyslop for opening up so interesting a subject. He had given them an entertainment novel in its character and useful in the highest degree.

Mr. Hyslop, in reply, agreed with Mr. Smith as to the origin of the symbol for the lb.; probably that for the ounce had been evolved in a similar way. "Kohol" was a very fine preparation of antimony. He thanked the members for the kind manner in which he had been received, and said he should always regard the Chemists' Assistants' Association as a body of whom all pharmacists should be proud.

The President added that "kohol" was largely used in the east for blackening the eyelids and the bases of the finger nails. With reference to the symbol for ounce, one authority had derived it from the Spanish *onza*, and suggested that it originated from the commerce in silver.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, April 9, Mr. J. C. Umney, Vice-President, in the chair.

A discussion on the "British Pharmacopœia Addendum" was opened by Mr. F. Browne, who gave a general review of its contents. Referring to "magnesii sulphas effervescens," he said he was surprised to find that several critics considered the preparation too bitter and thought it would be advisable to introduce less magnesium sulphate into it. In order to see if there was any ground for this condemnation, a specimen was prepared according to the directions, special care being taken to drive off 23 per cent. of water at 54·4° C.; the powders became just sufficiently moist to granulate easily when heated between the stated temperatures. The granulated powder dissolved completely to form a pleasant, sparkling, and effervescing mixture, quite free from any objectionable bitterness, but nevertheless very efficacious. In connection with "mistura olei ricini," he said sufficient fault had been found with this emulsion, and scarcely an ingredient had escaped censure. It had been said that the quantity of oil of lemon would be likely to cause derangement of the stomach; that there was too much flavouring in it, and that the use of the hydrate of potassium was to be condemned as being unpharmaceutical. He, however, thought that the criticism had been much too severe. Two ounces prepared according to the official directions had been taken by a friend, and the only inconvenience sustained from the oil of lemon was a very slight burning taste for a short time after taking. He did not see why the potash should be objected to as being unpharmaceutical. When strictly pharmaceutical means failed to produce as active and as palatable an emulsion as "mistura olei ricini," then let the unpharmaceutical be tried. As far as his own experience went it was the most palatable preparation of castor oil he had yet met with in pharmacy.

The discussion was continued by the Chairman, Messrs. E. White, Harrison, Taylor, Riches, Donington, Whitworth, and the Secretary.

A report on physics was then given by Mr. P. J. Robbins, including the following notes—

REPORT ON PHYSICS.

BY PERCY J. ROBBINS.

ON A NEW METHOD OF DETERMINING THE ABSOLUTE DENSITY OF A GAS.—(*Phil. Mag.* Reprinted from 'Scientific Proceedings from Royal Dublin Soc.,' June 18, 1890). The method still in general use for the accurate determination of the density of a gas is that of Regnault, but this method has the following objections: The gas is weighed in the vessel in which its volume is measured, and as this is necessarily a large vessel, the weight of the gas bears but a very small proportion to the total weight observed. Again from the great bulk and surface of the containing vessel, it is in itself a difficult object to weigh with a high degree of accuracy. If, again, there is an object in economizing the gas, Regnault's method is wasteful, as the washing out of so large a vessel with the gas necessitates a far greater expenditure of gas than is subsequently required for the actual determination. In the new method these errors are either much reduced or eliminated. The essential features of the new method are as follows: The measurements of the volume and of the weight of the gas are effected in separate vessels. That in which the gas is weighed is small, the gas being under high pressure within it. That in which the volume is subsequently measured may, on the other hand, be as large as may be desired; we are not concerned with its weight. The vessel in which the gas is weighed is a thin copper sphere, of a capacity of about 160 c.c., and weighing about 40 grams. It is tested hydraulically to 500 lbs. to the square inch, and thus will easily hold 2 litres of gas. It is provided with a screw-valve, and with the necessary screw connections for attachment to the vessel in which the gas is measured. A counterpoising sphere of approximately the same bulk is of course required. The vessel in which the volume is determined, or volumenometer, is of glass of a capacity of about 2 litres, cylindrical, and closed at each end by tubulated glass stoppers. Its capacity is determined once for all by the usual method. The volumenometer is surrounded by a copper jacket kept at a temperature of 0° C. by broken ice and water. The method of taking a density is as follows:—The copper sphere is first "washed out" with the gas, and a quantity of the gas then forced in by means of a condensing pump. It is then weighed. The volumenometer is filled with mercury, and placed within the copper jacket, and surrounded by the pounded ice. The charged sphere is then screwed on, and the valve slowly opened, when the mercury is displaced and escapes by the opening at the bottom. When the vessel is full of gas the valve is turned off. The copper sphere is now removed and again weighed, when the difference shows the weight of gas which has passed into the volumenometer. Now the volume of this vessel being known, a simple calculation gives the density of the gas. The present method may also, as in the case of Regnault's, be applied to the determination of the variation of density with changes of temperature or pressure, and to the determination of vapour densities. Ratio of weight of gas to weight of vessel in which it is weighed:

Regnault's method = 1 to 1261.
New method . . = 1 to 250.

Fluorescence (*Journ. Chem. Soc.*, June, 1889).—From some recent investigations it appears that the fluorescence of a liquid increases without limit as the dilution increases. In the case of the ammonium salt of fluorescein, the fluorescence of a concentrated solution is zero, or at least too small to be observed. When water was gradually added, the fluorescence first attained a measurable value for a concentration of 1 in 25, and rapidly increased with further dilution until the concentration was reduced to 1 in 3200, after which it remained constant as far as the observations extended, namely, to a concentration of 1 in 6½ millions. Similar results were obtained with an alcoholic solution of Magdala red, except that it was impossible to obtain very concentrated solutions of this substance, so that it was impossible to observe the beginning of the fluorescence. This fact that fluorescent liquids lose the power of fluorescence when they become sufficiently concentrated suggested to another observer that possibly the groups of molecules existing in the solid salt are only partially dissociated in the concentrated solution, but become more and more so with increasing dilution, until when the fluorescence is no longer affected by further dilution, the dissociation is complete. This hypothesis is strengthened by the fact that solutions of fluorescein and eosin in water have their fluorescent power increased by heat, the effect of which would be to increase their solubility, whilst, on the other hand, an alcoholic solution of Magdala red, which is less soluble in hot alcohol than in cold, has its fluorescent power diminished by being heated. This also explains the well-known fact that an aqueous solution of Magdala red, which is more soluble in hot water than in cold, acquires fluorescent properties when it is heated, although it does not possess them when cold. "The diffused *blue* light of fluorescence consists of the chemical rays rendered visible by a change in their refrangibility." In other words, the length of the wave is increased, and its velocity of undulation diminished.

Diamagnetism.—Diamagnetism, the property by which bismuth and certain other substances are repelled by a magnet, was recently the subject of a communication in a scientific journal, in which the author advanced the theory that diamagnetism, as a distinct property of matter, does not exist, and that the phenomena accounted for by it are simply due to the preponderance of the specific magnetism of the air over that of the substance. In Ganot's 'Physics,' although the phenomena are described, no explanation of them is attempted. The theory just published is, however, not new, for in Watts' 'Dictionary of Chemistry,' published 1864, it occurs in the following form:—"Diamagnetism does not . . . . appear to be a distinct property of matter, the true explanation of the phenomenon being that all substances, including the air, are magnetic, and that the so-called diamagnetic substances are those which are less magnetic than the air, and consequently, when brought near a magnetic pole, recede from it, just as a balloon recedes from the earth, because it is less attracted by the earth than an equal bulk of the surrounding air."

On the use of Fluor Spar in Optical Instruments (*Phil. Mag.*, February, 1891).—A few years ago it was announced that a German firm had, by the discovery of a new kind of glass, been able to construct microscope objectives of a resolving power hitherto impossible. The nature of the glass has been up to now carefully concealed, but recently Professor Abbe, of Jena, has announced that the secret consists not in the employment of a new kind of glass, but in the substitution of fluor spar for crown glass in the achromatic combination. Fluor spar has long been known to possess a remarkably low relative dispersion, and it is curious that up to now the only scientific use of it was in certain experiments in radiant heat. Thus by the substitution of fluor spar for crown glass, it is possible to produce an achromatic lens consisting of flint glass and fluor spar, having faces of lesser curvature than would be requisite for a lens made of crown glass with the same sort of flint. This is a great advantage, as both the spherical aberration and the chromatic differences of the spherical aberration are reduced when the curvatures are lessened. Another application of the substance is in the construction of direct vision prisms for pocket spectroscopes. The very same qualities which render fluor spar superior to crown glass for achromatizing lenses, render it, by an inverse use of the material, superior to crown glass for the purpose of procuring along with prisms of dense flint, a wide dispersion. A direct vision prism, made of one wide-angled prism of dense flint glass between two prisms of fluor, gives as long a spectrum as an ordinary five-prism combination of alternate crowns and flints. For lenses the fluor need not be quite colourless, as a thin layer only is used; but for prisms it should be so, or great loss of light will occur. Colourless fluor spar is rather rare, but tinged varieties are common enough, and the colour of these latter may be very much reduced by careful heating. Fused quartz has also been suggested as a substitute for crown glass. It is perfectly transparent, and in its optical properties is intermediate between crown glass and fluor spar.

After a short discussion on the report the meeting adjourned.

Provincial Transactions.

MEETING AT NOTTINGHAM TO CONSIDER THE PHARMACY BILL.

A meeting of the chemists of Nottingham was held at the Masonic Hall on Wednesday, April 8, to consider the Pharmacy Acts Amendment Bill.

After a very animated discussion, in which the Bill was well criticised, and the absence of measures beneficial to the trade strongly commented upon, the following resolutions were unanimously carried:—

> "That this meeting heartily supports the Pharmacy Acts Amendment Bill, but is of opinion that a strong effort should have been made to reserve the title of chemist and druggist to those qualified by examination and registration; and also that the sale of the compound preparations of the Pharmacopœia should be restricted to registered persons."

This to be sent to the Pharmaceutical Society.

> "That the Secretary of the Nottingham and Notts Chemists' Association be instructed to ask local members of Parliament to support the second reading of the Bill."

> "That this meeting requests the Council of the Nottingham and Notts Chemists' Association to take what steps they think best in the interest of the trade during the progress of the Bill."

ABERDEEN CHEMISTS AND DRUGGISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The tenth meeting of the present session was held in the Silver Street Hall, on Friday evening, April 3, Mr. Geo. Cowie, President, in the chair. The minutes of the previous meeting having been read and approved, Mr. Craig read a well-prepared paper on "Things a Druggist Should Know." It was of a highly instructive character, and treated of many points of importance for the successful carrying on of business.

A short discussion having been taken part in, a hearty vote of thanks was awarded to Mr. Craig.

The President then showed under the microscope three specimens of tubercle bacillus, one of pure culture, one from the cavity of a lung, and one prepared from sputum. He gave a full description of the mode of straining and mounting of these by the Ziehl-Neelsen method. The usual vote of thanks having been given the meeting terminated.

On Friday evening, April 10, the annual business meeting was held in the Silver Street Hall under the presidency of Mr. Cowie. There was a large attendance.

The Secretary and Treasurer read their reports, which were most satisfactory, showing that the session had been a most successful one in every respect.

The following office-bearers were then elected for the next session: Hon. President, Mr. Cowie; Presid Mr. Pennie; Vice-President, Mr. A. G. Milne; Secreta Mr. Rennie; Assistant Secretary, Mr. A. Milne; Tre surer, Mr. Forbes; Members of Committee, Mes Bruce, Hay, Leslie, Robertson, Spence and Watt.

A vote of thanks having been given to the Chairm the meeting closed.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual business meeting was held in the Ph maceutical Society's house, 36, York Place, on t evening of Wednesday, April 8, at 9.15, Mr. Dou McEwan, President, in the chair.

The minutes of last meeting having been read a approved, the Secretary read the amended syllabus Association prizes competition, which was una mously adopted.

The Treasurer read the financial statement, showi a balance of £5 18*s*. 8*d*.

The Secretary then read the annual report, fr which it appeared that the membership was st maintained at the same figure as last year, but t Committee expressed a desire to see it largely i creased. It was noted that there was a gratifying i crease in the number of apprentice members.

On the motion of Mr. Hendry, seconded by M Petrie, the financial statement and report were una mously adopted, and a vote of thanks awarded to th retiring office-bearers.

The following scheme of botanical excursions w agreed to:—

Date.	Place.	Meet at	Time.	Retn.
May 18	Botanic Gardens	Garden Gate	6 a.m.	[illegible]
" 27	Easter Duddingston Gardens	Waverley Station.	Not fixed	
June 10	Colinton Dell	Caledonian Stat.	8.35 p.m.	"
" 24	Duddingston Loch	Duddingston Church	8.45 p.m.	"
July 8	Craigcrook	Caledonian Stat.	5.50 a.m.	[illegible]
" 29	Poet's Glen, Currie	" "	6.10 a.m.	[illegible]

The office-bearers for the ensuing session were th elected as follows:—President, John Lothian; Vi President, James Henry Hoseason; Secretary, Wil Beaverley Cowie; Assistant Secretary, Alexander Findlay; Treasurer, Alexander J. Dey; and as me bers of Committee, Messrs. Hendry, Maclaren, Mur Petrie, A. Robertson, R. Robertson, Smith and Wei

The following were also elected members of t Prize Committee:—Messrs. Boa, Duncan and McE

The meeting then closed.

GLASGOW CHEMISTS AND DRUGGISTS' ASSISTANTS' ASSOCIATION.

The concluding meeting of the session was held the evening of Thursday, the 9th inst.

The President presided.

Mr. Alexander Kinninmont delivered the clos address, taking for his subject "Pharmacy Acts, pa and present." After referring to the excited state the public mind previous to 1868 on the subject o poisons he recalled the negotiations which preced and the action of the Parliamentary Committee which moulded the Act of that year. He explained what he was convinced was the intention of the Legislature in giving that Act the form which it at present has, and which he declared to be quite at variance with the interpretations which judicial decisions have lately given to it. After referring to the Act of 1869, he re called the various attempts at legislation up to the present, animadverted strongly on the action of the iety in prosecuting unqualified assistants and on the iquity of most of the judicial decisions under the sent laws. A short criticism of the present Bill cluded the address.

The President said Mr. Kinninmont was well known his strong opinions on this subject and his fearless s in expressing them. They had not met for discus n, and he was sure the evident interest with which y had listened to the address warranted him in ask them to accord Mr. Kinninmont a hearty vote of nks. This was readily acceded to, and

Mr. Kinninmont briefly thanked them for their ience in listening to him, which he appreciated the more that he did not always meet with it when ing vent to his very strong convictions on this ject.

The Secretary and Treasurer afterwards presented ir reports, and office bearers for the ensuing session ing been elected, the meeting separated.

arliamentary and Law Proceedings.

E COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN v. PONSFORD.

Before His Honour Judge Edge, at the Newton Abbot unty Court on the 10th inst., the Council of the armaceutical Society of Great Britain sued Alfred nsford, of 24, Holborough Street, Newton Abbot, to over four penalties of £5 each incurred by the endant under section 15 of the Pharmacy Act, 1868, o of the said penalties being for selling poison, to , "tincture of opium," on the 14th and 17th days February last respectively, one penalty for keeping n shop for the retailing, dispensing, or compounding poison, and one penalty for taking, using, or exhibit the name or title of "chemist," contrary to the visions of the said statute.

Mr. C. H. Langley Flux appeared for the Society.

The defendant appeared in person.

In opening the case, Mr. Flux drew His Honour's ention to the several sections of the Pharmacy Act, d after stating the facts relating to this case, men ned that the defendant had been warned on more than e occasion, and that in July, 1889, proceedings had n taken against him in His Honour's Court for re very of penalties under the same statute, and that fore the action came on for hearing the defendant id the amount of the penalties. The defendant's her, who had carried on business at the premises w occupied by the defendant, died in 1881, and that ctically the defendant had, although unqualified, ried on the business ever since.

Mr. Flux was proceeding to call Mr. Harry Moon to ve the purchase, when

His Honour, interposing, asked the defendant what had to say in the matter.

The Defendant: I do not deny that I have so offended, d admit everything that Mr. Flux has just said.

His Honour commented on the defendant's conduct d gave judgment for the Society for the four alties with costs.

Obituary.

Notice has been received of the death of the follow :—

On the 30th of March, Mr. David Wallworth, Phar ceutical Chemist, High Street, Maldon, Essex. ed 62 years. Mr. Wallworth became a Member of Pharmaceutical Society in 1857 and for upwards twenty years filled the office of Local Secretary

On the 2nd of April, Mr. Henry William Freeland, Chemist and Druggist, Angmering, Sussex. Aged 71 years.

On the 3rd of April, Mr. John Honeywood Filmer, Chemist and Druggist, James Street, Devonport. Aged 70 years.

On the 5th of April, Mr. Thomas Milton, Chemist and Druggist, South Parade, Chew Magna. Aged 69 years. Mr. Milton had been a Member of the Pharmaceutical Society since 1869.

On the 9th of April, Mr. Richard Raimes, senior partner in the firm of Raimes, Clark and Co., of Edinburgh. Aged 40 years. Mr. Raimes connected himself with the Pharmaceutical Society when he passed the Preliminary examination in 1870, and although he did not proceed to the Minor examination, being engaged solely in the wholesale trade, he continued as a "Registered Student of the Society" up to the time of his death.

On the 12th of April, Mr. Charles Gadd, Pharmaceutical Chemist, Harleyford Road, Vauxhall, S.W. Aged 83 years. Mr. Gadd became a Member of the Pharmaceutical Society in 1853.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PRELIMINARY EXAMINATION.

Sir,—The thoughtful and lucid communication of Mr. J. E. Saul in your last issue has doubtless attracted the attention of your readers and secured their sympathy with his object—the reduction of the number of failures in the examinations. But is he logical?

He proposes to attain his object by raising the character of the entering examination. Will this succeed? I think not. Instead of 56 per cent. of failures we shall see 70 or more. It may be argued, plausibly argued, that as only the more intellectually robust will receive admission to the fold, the proportion of failures in the qualifying examination will be smaller than at present, but this result will not certainly follow.

The report of the Privy Council Visitor on p. 923 helps us in considering this. In botany the failures were 2·18 per cent.; in each of the subjects, chemistry, materia medica, and prescription reading, 7·5 per cent. failed; in pharmacy 10·1 per cent., and in dispensing, 21·3 per cent. "The large number of failures in . . dispensing is significant." These are the Visitor's own words, and indeed the figures are very suggestive. Dispensing is the only subject in respect of which anything of the nature of a compulsory curriculum may be said to exist. The candidate before he may present himself for the qualifying examination must produce a certified declaration that he has for three years been practically engaged in the translation and dispensing of prescriptions. It is not curriculum *qua* curriculum, that is at fault, but the system. It is assumed that the certificates represent equal opportunities. Whether the growing candidate be one of an establishment where the weekly prescription is received with the weekly flutter, or one of an establishment where twenty new prescriptions are the daily routine, it is all one. The certificate is obtained and the certificate is accepted. 21·3 out of every 100 who have secured it are rejected. The number is double that in any other subject, ten times as great as in botany, and nearly seven times as great as the other subjects for which a curriculum is proposed. Surely a study of these figures raises a very important question. Is it worth while insisting on a curriculum for subjects in which the failures at worst are only moderate when in the subject for which a curriculum is already in force the failures are disproportionate and excessive? Again I say it is not curriculum, it is system that is at fault.

Can the system be amended? The public (*i.e.*, the Legislature) cares little that a pharmacist shall be a good botanist or an able chemist; it does care and insists that he shall compound prescriptions with accuracy. Hence the compulsory character of the certificate of practice. To a plain man this demand of the Legislature points the goal towards which the executive of pharmacy, the Pharmaceutical Society, should endeavour to progress. Let the Society do for dispensing what it has already done, and done well (the above figures prove it), for chemistry, botany and materia medica. Let it not only establish and encourage schools for dispensing as it has established, and encouraged schools for the other subjects mentioned, but instead of compelling under its powers a certificate that for three years, etc., etc., let it compel a certificate of attendance for a much shorter period at one of the dispensing schools. The principle of a curriculum in dispensing is already conceded, and to modify and amend it in this or some other way that is acceptable to the Legislature is not beyond the powers of constructive statesmanship possessed by our President and Council. In all sincerity I think a proposal of the character I venture to make would disarm much of the opposition to the Pharmacy Bill, that is felt even more than it is expressed.

Reverting to the Preliminary, a gigantic step forward would be made if your own excellent suggestion could be acted upon. I mean that no indentures should be signed until the subject of them produced his Preliminary certificate. It is hopeless, however, to expect this will be acted upon voluntarily so long as the present apathy weighs upon the body pharmaceutic. It is almost equally hopeless to expect a compulsory application of the principle; much more hopeless than the curriculum now being tried for. There is much hope in the gradual and silent working of the awakened educational forces written of by Mr. R. W. Giles in his most excellent letter.

Deptford. JOHN MOSS.

THE PRELIMINARY EXAMINATION.

Sir,—I have read with great interest and appreciation the excellent article on "The Preliminary Examination," which appeared in a recent issue from the pen of Mr. J. E. Saul. As he has very clearly shown, there exists amongst those who offer themselves for examination, many who are by no means possessed of what may be called a liberal education, and this fact, whilst always proving more or less a misfortune to the persons in question, does not tend to the elevation of pharmacists, as a class, in the eyes of the public, who in these days of Board schools and other aids to the acquirement of learning are quick to discriminate between a cultured and an indifferently educated man. A chemist's success in business is generally admitted to depend to a great extent on the personal influence which he can bring to bear on his *clientèle*, and in proportion to the extent to which he gains the confidence of his customers, so will be the measure of the support which they will accord him, and so will he be able to rise superior to the competing efforts of stores and trading companies. On this point rest his greatest chances of progress, and on this principle, I think, should be based all schemes for the amelioration of the pharmaceutical body. As Mr. Saul has pointed out, however excellent the idea of a curriculum may be in itself, it is too much to expect that any solid or lasting educational fabric can be raised on such an insufficient foundation as is provided for by the present Preliminary examination, and it is to be hoped that his remarks will draw the attention of all concerned in the future well-being of pharmacists to the desirability of an amplified schedule. Whilst of almost equal importance to the curriculum scheme, the necessity for change in this direction has certainly not received that amount of consideration which the subject imperatively demands. Moreover it is manifestly unjust to allow a youth to enter on his career without having first proved himself to be equipped with those natural abilities indispensable to his success, and the absence of which will probably compel him in later years to give up the struggle in ignominious defeat. Bitter disappointments and loss of time and money, with their attendant evils, might all be spared such an one if only he be made to realize at the beginning the full extent of what will be required of him later on, either by compelling him to pass the standard of a good general education or in default refusing him admission into the ranks of pharmaceutical recruits. Such a procedure would undoubtedly constitute the greatest kindness that could be shown to such a youth, and this fact in itself forms a strong argument in favour of the desirabi of increasing the scope of the first examination.

Perhaps the most important addition suggested by Saul is that of mathematics; the study of which not only vides a most useful course of "mental gymnastics," to row his expression, but is also of the greatest assistan not absolutely indispensable in the acquirement of a s knowledge of the physical sciences. The practical a cation of electricity and electro-magnetism are becom more and more intimately associated with our every existence, the laws of photo-chemistry, as applied to p graphy, attract an ever increasing circle of students, it has been often shown in these columns that e moderate acquaintance with these sciences is of imm service to the pharmacist, both in giving him a local r tation and status, and in benefiting him from a pecu point of view. Fundamental knowledge of this ki not easily acquired in after life, hence the desirabil ensuring the possession of it at the very commenceme think it might be useful, for the reason above stat include elementary trigonometry as well as algebra; pecially as the former is nearly always taught in middle-class schools, and should therefore presen great difficulty to the candidate. The great valu speaking or writing a modern language, even fr literary standpoint, must be evident to all.

In conclusion, I trust that Mr. Saul's article will h the effect of bringing this matter prominently unde notice of our pharmaceutical legislators at Bloom Square and of the pharmaceutical body generally, an the subject may be thoroughly discussed, and a de opinion arrived at. There is, I consider, no doubt bu it is a question which will exert a great influence upo future of pharmacy. and that the prosperity of the generation of pharmacists will be greatly advanc ensuring to each one a good general and technical ed tion.

F. C. J.

Sir,—It was with considerable pleasure that I read Saul's characteristic article on the Preliminary exam tion, and the subsequent correspondence it elicited. general tone of your correspondents is decidedly in direction—the necessity of giving a wider and more hensive scope to the Preliminary examination. And I agree with them that it is essential to have some guarantee than at present exists that the would-be is likely to make a successful pharmacist, and that has come for the Pharmaceutical Society to move in the matter, I agree with Mr. Giles that the acce of certificates of general education of a definite from specified examining bodies would be the very guarantee of a sound general education that could be sented. Further, the saving of expense to the which the adoption of this suggestion would effect, be worth consideration.

As at present conducted, the Preliminary exami defeats the very ends for which it was instituted, cannot possibly be any criterion of knowledge, and matter of great regret that it has been made use of as a loophole through which so many hangers on crept into the ranks of pharmacy.

There is no study so essential to mental develop so useful to the scientist as the study of mathem yet this is the subject to which least attention in any of our examinations.

We lay claim to better recognition and we call higher social status, yet we have been countenanci evil that is derogatory to both. I hope the Coun take the matter up in earnest, and now that the seems opportune, strike whilst the iron is hot.

C. W. SECCO

Sir,—Mr. Saul may fairly be congratulated upo singularly unanimous expression of opinion, as evi by the letters in the current Journal, which his re article on the Preliminary examination has elicited. scarcely an exception the writers are in agreement Mr. Saul in his wish that this examination should rendered a more reliable test than it assuredly is at sent of the fitness of those desirous of entering up pharmaceutical career.

I am inclined to think, Sir, that this unusual and rently spontaneous unanimity is due to the fact that ome time there has been a growing conviction that the reliminary examination as at present conducted is an nomaly or worse, and we are indebted to Mr. Saul for reaking the ice, so to speak, in his important and ineresting article. Mr. Saul writes with the authority and xperience of an examiner, and yet his sympathy with the harmaceutical neophyte can scarcely be doubted, since it not so very long—if he will forgive me for saying so—ince his own student days. It is not with the hope of dding anything to the subject, which was so exhaustively reated last week that I am induced to write these lines, ut rather to express my hearty concurrence in the views dvocated by Mr. Saul, and I sincerely trust that this iscussion may not be merely academic, but may have a ractical outcome. I understand that the Council of the ociety, with the consent of the Privy Council, has power o make the necessary alterations, and it is to be hoped hat, backed by the support of those whom they represent, he members of the Council may not hesitate to exercise his power.

I should like to emphasize the opinion so forcibly exressed by Mr. Stark as to the necessity of insisting upon he Preliminary examination being passed before the period f pupilage or apprenticeship is entered upon. The imortance of this cannot easily be overstated, and peronal observation has convinced me that much disappointnent and loss in every way would be avoided by this imple regulation.

One word on the question of education generally. I do ot myself share the apprehensions of those who are afraid est the rising generation of pharmacists should know vermuch (it is to be feared there is little ground for such pprehensions), nor can I see why a pharmacist need be ny the less a man of business because he can read Goethe r Victor Hugo in the original, and knows that the Comnander of the Faithful is not one and the same with the Pope of Rome. Every one is aware that the chemist is ften appealed to upon matters quite distinct from his usiness, and surely it is well that he should be a man at east of ordinary culture and information. With all repect my own opinion is that in a calling partly profesional, partly commercial, as is that of the pharmacist, he higher the standard of educational ability the better rom every point of view for the calling and the individuals ngaged in it, and it is for this reason that I cordially upport Mr. Saul in his efforts to procure a change for he better by beginning at the right end and reforming he Preliminary examination.

Birmingham. T. EDWARD BARRASS.

THE PRELIMINARY EXAMINATION.

Sir,—The article by Mr. Saul on the Preliminary exanination, appearing in your issue of April 4, is one which hope will receive that attention from pharmacists geneally which, from its straightforward way of pointing out he failure of the Preliminary as at present conducted, to upply even moderately well-educated youths for the urther examinations, it well deserves. Any addition of the noderate nature of that which Mr. Saul proposes to the resent schedule could be very easily made if members of he Society generally would only interest themselves in his most important matter.

To me it has always appeared an anomaly to make the irst examination so trivial when one considers the large ange of all round knowledge required to pass the other xaminations, the Minor and Major, in anything like a atisfactory and creditable manner.

As the keystone to a university degree is a good matriulation, so ought the Preliminary to be in relation to our xaminations.

Another point in reference to the Preliminary I would irect careful attention to, and that is that it should be nade compulsory on all apprentices that they pass the xamination before being apprenticed or rather bound.

223, *Stanley Road*, *Bootle.* H. WYATT, JUN.

Sir,—I think there was no necessity for Mr. Saul to tate that his observations should be "straightforward," anyone reading them would very quickly see that. For ny own part I think some parts of his article are "too traight," so much so that it becomes insulting. To speak f those who present themselves for the Minor examination, nd who finally pass it, whether it be at the first, second, or third attempt as "deficient in intellectual capacity," and in another place "as young men without brains," is, not to say untrue, very ungentlemanly. Perhaps we may not all be "Sauls," and become examiners, but the fact that we pass our Minor, and thereby pass six examiners (some of whom generally compliment us), should exonerate us from the charge of being "brainless" and "deficient in intellectual capacity." I really do not and cannot think that men who pass Messrs. Tanner, Fletcher, and Saul can be dubbed as "men without brains." If they can, then I am compelled to think that the examiners cannot do their duty, or they would not allow such to pass. And in that case I think Mr. Saul, as an examiner, should be the last to make complaint on that head. Again, Mr. Saul writes as though the drug trade was a "profession," and argues that the scholastic education of the youth entering our ranks should be in accordance with it. I have yet to learn that our trade is a profession. I shall only be too pleased to see it recognized as such, but at present I cannot detect any sign of such a consummation. In conclusion I may say I have no objection to Mr. Saul's suggestions in regard to extending the subjects given for the Preliminary, believing, as I do, that there are very few Minor chemists of to-day who did not go through such a course when at school. "INSULTED."

212, *London Road*, *Sheffield.*

Sir,—I think the thanks of all members, but more especially intending members of the pharmaceutical profession, are due to Mr. Saul for his outspoken and valuable opinion regarding the Preliminary examination and its relation to the future of pharmacists.

I am sure the majority of chemists will agree with him in many of his remarks, especially the advisability of adding such subjects as algebra and mathematics to the list.

The easiness of the present examination is fatally alluring to a large portion of those entering upon a pharmaceutical career.

There is at present no indication to them in the Preliminary of the amount of work and the wide extent of knowledge to be attained before the Minor is passed, and thus many of them go on in blindness until they have completed their apprenticeship and it is almost too late to turn to anything else.

But I think that however strict the Preliminary may be made it will hardly decrease the proportion of unsuccessful candidates at the Minor that Mr. Saul hopes.

Whilst making the Preliminary embrace a better educational knowledge, I think the most sensible plan would be to have one or two intermediate examinations.

The jump from educational knowledge required in the Preliminary to the scientific knowledge required by Minor candidates is too great, and it would be much fairer if the capabilities of candidates were retested, before they have spent the whole of their youth in studying for what eventually turns out to be for them an unattainable position.

Besides, if an intermediate examination were established it would compel masters to give their apprentices some time for study, and not, as is now too frequently the case, keep them working from morning until night as a source of cheap labour.

I believe that ours is the only profession which has no examination between the preliminary and the qualifying one.

Why not establish one in pharmacy?

Then if a man could not pass the intermediate he would have the chance of turning to something else.

Had there been such an examination I might not as now have to sign myself,

A REJECTED MINOR.

APOMORPHINE AND APOCODEINE.

Sir,—My attention has been called to a letter, by Mr. D. B. Dott, in which, speaking of apocodeine, he points out that it would be desirable to know how the particular specimens employed by me in my observation on its use as an expectorant in the treatment of chronic bronchitis were prepared and identified. I have much pleasure in replying to his question and in affording him all the information in my power, although I am bound to confess that it is not so full and complete as I should have wished.

I employed three different specimens of hydrochlorate of apocodeine.

1. The specimen I used in 1881 was obtained from Mr. Martindale. He informed me, if I remember rightly, that it was prepared by a pupil of Matthiessen and Wright, and presumably by the method described by Matthiessen and Burnside in 1870. It was an amorphous substance, soluble in alcohol, ether, and chloroform, and almost insoluble in water. I employed a 1 in 50 solution and 15 minims administered hypodermically failed to induce either nausea or vomiting in healthy individuals.

2. The second specimen with which I commenced work last year was obtained from a wholesale firm in the City, but no information was forthcoming respecting its source or mode of preparation. It answered to the characters and tests usually ascribed to apocodeine. Fifteen minims of a 1 in 50 solution given hypodermically failed to exert any emetic effect, but acted as a powerful expectorant in cases of chronic bronchitis. As the price charged for this particular specimen was £10 an ounce, I experienced some doubts as to its purity and discontinued its use.

3. This specimen was the same as No. 1. The bottle had remained unopened for nearly ten years and the contents had apparently undergone no change. A 1 in 50 solution was prepared and was found to be perfectly neutral. On injecting it hypodermically there was no local irritation, and it acted as a powerful expectorant. It produced neither nausea or vomiting.

4. This specimen was placed at my disposal by Mr. Martindale, and was, I understood, prepared specially for me by the gentleman, whose name I regret I do not know, who made the original apocodeine which I used in 1881 (No. 1 and 3). Twenty-five minims of a 1 in 50 solution, given hypodermically, acted most satisfactorily as an expectorant and produced no emetic effect.

I am afraid the information I am able to give Mr. Dott respecting the source of my specimens is not very complete, but I have done my best to reply to his question. Whether the apocodeine I employed was a simple substance or a mixture of various compounds I am not prepared to say. Mr. Dott is an authority on the chemistry of the opium alkaloids and their derivatives, and it would be an advantage to chemical workers if he would favour us with his views on this subject.

Weymouth St., W. WILLIAM MURRELL, M.D.

THE MERCURIC TEST FOR MYDRIATIC BASES.

Sir,—The criticisms of Mr. P. W. Squire in your issue of April 11, on my test for the mydriatic alkaloids, are so misleading as to call for further notice from me.

In the first place I most emphatically maintain my previous statements, viz., that a small portion of either atropine, hyoscyamine, daturine, duboisine, or homatropine, when warmed with about 2 c.c. of a 5 per cent. solution of mercuric chloride in 50 per cent. alcohol, gives a red precipitate. Also that hyoscyamine, when treated after the manner of the official test for homatropine, also gives a red precipitate. Mr. Squire, by using a large excess of hyoscyamine, ten times more than the B.P. indicates of homatropine, gets with the official test a yellow precipitate. Now any fairly practical chemist knows that very wide differences may result from the use of reagents in excess or in deficiency, hence it is unfair, under the conditions of Mr. Squire's testing, to argue as he has done.

It is not fair hitting when your critic but partly quotes an authority, and thus perverts the meaning a sentence is intended to convey. Mr. Squire makes Dr. Schweissinger say, "Hyoscyamine gives no precipitate if the reagent is added according to Gerrard's directions," to which should have been added, "but if only 1 or 2 drops of the reagent instead of 2 c.c. be added, to one milligram of the alkaline, a red precipitate appears on gently warming." Again in quoting Flückiger (*Pharm. Journ.*, [3], xvi., 602) Mr. Squire has not correctly represented that author's broad conclusions, for though Flückiger appears to have had some difficulty in getting the red precipitate, he yet remarks, "as to my own experience I likewise found Mr. Gerrard's results to be correct." Again, "in conclusion we have found, Mr. Gerrard, Dr. Schweissinger and myself, that atropine (and hyoscyamine, Dr. Schweissinger) has an alkaline power like the hydrates of sodium and potassium."

The fact that hyoscyamine when in excess acts tow mercuric chloride somewhat differently from atropi certainly interesting, but was not the point at issue.

A. W. GERRAR

COMMERCIAL OIL OF CITRONELLA.

Sir,—I have perused with much interest the pape "Commercial Oil of Citronella," read before the Evening Meeting by Mr. J. C. Umney. Some years a I had occasion to conduct some experiments on citro oil with the same object in view, and as my results p in some respects to slightly different conclusions those arrived at by Mr. J. C. Umney, it may be usef record them now that the subject is under notice.

Two samples of oil were operated upon: one a ne from an original bottle, the other an old one. former was pale yellow, whilst the latter was green. bottles filled with the first sample and hermetically were placed, one in sunlight the other in darkness. other bottles were half filled and the stoppers re daily after well shaking; one of these was exposed to light whilst the other was kept in darkness.

The two samples which were in the full bottles unchanged in colour for the month whilst under o tion, but of those in the partly filled bottles the posed to light had become green, and the one in da also, though not to quite the same extent. An el of temperature was afterwards found to accelera change.

The other sample was next operated upon. A p was distilled from a fractionating flask and the di was set aside in successive portions and exposed in full bottles. The first three portions of distillate change in colour, but the last one slowly acquire green tint of the original. The small portion of in the flask and the last distillate were both found tain copper.

The foregoing seem to indicate that the develop the green colour in those samples containing caused not by the action of light, as assumed by M Umney, but by oxidation. E. H.

Uckfield.

UNG. HYDRARGYRI NITRATIS.

Sir,—I am surprised to find it stated by Mr. Lothian (*Pharm. Journ.*, p. 872), that the presen formula for the above ointment does not give satisfaction. I am constantly using it and never get a good result. I enclose a sample of a batc (according to the official formula) more than si since, which I consider to be "absolutely perfe every respect.

Dawlish. GEO. JNO. CURL

NOTICES OF MEETINGS.

Society of Chemical Industry (London Section.)— April 20, at 8 p.m. "Stoneware and its Appli to Chemical Apparatus," by Mr. W. A. Rix.

Midland Counties Chemists' Association (Mason Co Tuesday, April 21, at 8.30 p.m.—"Methods for Specific Gravities," by Mr. J. F. Liversege, A.I.C.

Royal Institution.—Thursday, April 23, at 3 p.m.— cent Spectroscopic Investigations," by Profess war.——Friday, April 24, at 8 p.m.—"Euphuis and Present," by Canon Ainger.——Saturday, A at 3 p.m.—"The Dynamo," by Professor S. P. son.

Liverpool Pharmaceutical Students' Society.—Th April 23.—Social.

A. Banks.—We think the columns of a medical j would be better fitted for the purpose.

A. Westley Gedge.—We do not think that it is int to make the examinations "much more difficult" t present, and in any case an ample allowance of time be made for those who have already commenced studies.

COMMUNICATIONS, LETTERS, etc., have been received Messrs. Barclay, Brown, Streeter, Assistant, A. P. S.

THE SOLVENT ACTION OF ALCOHOL OF DIFFERENT DEGREES OF STRENGTH ON SOME OF THE DRUGS USED IN MAKING PHARMACOPŒIAL TINCTURES.

BY E. H. FARR AND R. WRIGHT.

(*Continued from page* 860.)

NOTE II. ON TINCTURE OF COLCHICUM.

Before commencing the preparation and estimation of samples of this tincture all available literature bearing on the subject was carefully studied.

It was found that considerable difference of opinion existed not only as to the nature and constitution of the active principle of colchicum seeds, but also as to the percentage yield of this principle by the seeds and the tincture.

The chief constituents of the drug are said to be colchicine, fatty oil, sugar, and traces of gallic acid. According to Garrod ('Materia Medica,' 13th edition, p. 398) they also contain traces of veratrine. Flückiger and Hanbury ('Pharmacographia,' p. 339) state that they obtained 6·6 per cent. of fatty oil, solidifying at − 8° C., while Rosenwasser is reported to have found as much as 8·4 per cent. of oil in a specimen of the seeds. With regard to the solidifying point of the fatty oil our experiments show that it varies considerably. Some of the tinctures deposited fatty matter in a semi-crystalline form when exposed to a temperature a few degrees above zero, and the greater the proportion of this body present in the fat the higher would be the melting point. In some samples of extractive the fatty matter congealed at about 8° C. As regards the active principle, it would appear to be open to question whether or not it is of an alkaloidal nature. In some text-books the active principle is said to be a basic nitrogenous body, whilst others state that it is a substance containing nitrogen but having no basic properties.

We find that when separated by either of the processes given below an aqueous solution is readily precipitated by Thresh's reagent, phospho-molybdic acid, tannic acid, and also by solution of iodine in potassium iodide. On the other hand, it is not precipitated by mercuric chloride, nor by Mayer's reagent, until a mineral acid is added to the solution, when the latter throws down a copious lemon-yellow precipitate.

The addition of a dilute mineral acid to a solution of the substance causes the production of a yellow coloration, and this is also noticed when a few drops of acid are added to a strong tincture or infusion of the drug.

The proportion of active principle present in the seeds is given in 'Pharmacographia' as about 05 per cent. In Squire's 'Companion to the British Pharmacopœia' (p. 157), it is stated that four samples of seeds examined by the authors yielded ·608, ·660, ·872 and 1·09 per cent. of total alkaloids respectively. In a series of articles on tinctures published in the *Chemist and Druggist* Journal (Jan. 1889), Mr. F. W. Fletcher gave ·012 per cent. as the amount of alkaloid yielded by B.P. tincture of colchicum; and in papers read at the last meeting of the Pharmaceutical Conference we reported having obtained about ·010 per cent. from samples of tincture examined by us.

The process then employed consisted in evaporating a given volume of the acidified tincture until all the spirit was driven off; removing the colouring matter and fat from the residual liquor by agitation with chloroform; adding a slight excess of liquid ammonia, and shaking out the alkaloid with chloroform.

At the commencement of our work for the present paper, we were led to suspect that the process previously followed was faulty and involved the loss of a portion of the active principle. On examination it was found that the chloroform used in washing the acid solution, not only removed fat and colouring matter, but also took out some of the active principle. It was therefore necessary to adopt some other process for the estimation of the tinctures. The following were tried among others, and gave results closely approximating to each other.

1. Fifty c.c. of the tincture were evaporated until all the alcohol was driven off, a little water being added towards the close, the residual liquor acidified with dilute sulphuric acid, filtered, the dish and filter being rinsed with a little distilled water, and the united solutions precipitated with an excess of solution of iodine in potassium iodide. The precipitate was thrown on a filter, quickly washed with a little distilled water, and dissolved in solution of sodium hyposulphite. The alkaloid was then removed from the latter solution by shaking first with 15 c.c. and then 10 c.c. chloroform, the mixed chloroformic solutions evaporated to dryness and the residue weighed.

2. Fifty c.c. of the tincture were evaporated with the addition of water until the alcohol was driven off, the volume of the residue made up to 20 c.c. with water and 1 c.c. seminormal sulphuric acid added when cold. The fatty oil was then removed by shaking with two successive 10 c.c. of light petroleum ether. The solution was next made alkaline by the addition of 1 c.c. of liquid ammonia and the alkaloid extracted by shaking first with 20 c.c., then with 15 c.c. of chloroform. The mixed chloroformic solutions were then evaporated in a tared dish and the residue dried at 100° C. and weighed.

The products obtained by each of the foregoing processes were similar in appearance and amount, but the latter was found to present certain advantages in working over the former and was consequently adopted for the estimation of the entire series of tinctures.

For the preparation of the tinctures ten samples of colchicum seeds from various sources were operated upon. Of these, all except one were of season 1890, and almost all were of German origin. The drug from which No. 10 series of tinctures was made was of season 1889. On reference to Table I. it will be seen that the 40 per cent. tincture in this series gave the highest percentage of extract, therein differing from all the other samples of seeds. The extractive in this instance certainly contained a less proportion of fatty matter. Age may have rendered the fatty oil less soluble in spirit, but we could not venture to say that this was the case on the strength of results obtained with one sample only.

For the sake of comparison, one series of tinctures was made from the powdered corm, the process followed and the quantity of drug used being the same as for the other tinctures.

Owing to the difficulty experienced in reducing

Table I.

Spirit used.	Alkaloid.					Extractive.				
	80 p. c.	70 p. c.	60 p. c.	50 p. c.	40 p. c.	80 p. c.	70 p. c.	60 p. c.	50 p. c.	40 p. c.
No. 1 . . .	·074	·082	·079	·080	·082	2·22	2·34	1·82	1·66	1·66
2 . . .	·094	·096	·093	·098	·094	2·70	2·60	2·18	2·02	1·96
3 . . .	·070	·073	·070	·070	·066	1·36	1·46	1·40	1·32	1·28
4 . . .	.099	·107	·109	·119	·104	2·46	2·56	1·88	1·68	1·68
5 . . .	.099	·093	·094	·107	·102	1·98	2·08	1·86	1·78	1·82
6 . . .	.065	·070	·074	·078	·074	1·92	2·02	1·36	1·16	1·16
7 . . .	.058	·059	·061	·066	·068	2·02	1·96	1·56	1·36	1·42
8 . . .	.068	·071	·080	·078	·067	2·40	2·52	2·36	2·38	2·42
9 . . .	·091	·092	·096	·097	·087	2·76	2·84	2·76	2·70	2·64
10 . . .	·052	·051	·056	·064	·057	1·58	1·56	1·58	1·62	1·80
11 . . .	·034	·037	·044	·058	·050	1·46	1·70	1·86	1·94	2·04

the seeds to the fine degree of comminution required by the B.P., all the samples were obtained in the state of powder. From each of these a series of tinctures was prepared by maceration and percolation with alcohol of 80, 70, 60, 50, and 40 per cent. strength (by volume). In making the tinctures the last portion of the spirit was displaced by menstruum until the requisite quantity of percolate was obtained.

The colour of the tinctures varied from a pale straw colour to a brownish yellow, the weaker menstrua giving the most highly coloured tinctures.

The amount of extractive was ascertained by evaporating 10 c.c. of the tincture, the residue being afterwards heated at 100° C. until it ceased to lose weight. The percentage amount was then calculated from the result thus obtained.

A noticeable feature in connection with this part of the work was that, contrary to the general rule, the tinctures made with the stronger menstrua gave the highest yield of extractive. This anomaly is obviously accounted for by the fact that the fatty matter which bulks so largely in the seeds is freely soluble in the stronger spirits, but practically insoluble in the weaker. As regards the extracts themselves, they varied much in colour and consistency; those obtained from the 60, 50 and 40 per cent. tinctures being firm, light brown in colour, and possessing all the characters of a true extract; those yielded by the 80 and 70 per cent. tinctures on the contrary were much paler in colour and of a soft fatty or oily consistency.

Table No. I. shows the results obtained, calculated in percentages.

No. 11 series of tinctures was made from the corm.

When mixed with three volumes of 90 per cent. alcohol none of the tinctures gave any precipitate showing absence of mucilaginous and albuminous matters.

The results obtained on admixture with water in the proportion of one vol. tincture with two vols. water are shown in the following table:—

Table II.

No.	80 per cent	70 per cent.	60 per cent.	50 per cent.	40 per cent.
1. . . .	Cloudy	Cloudy	Opalescent	Faint opalescence	Very faint opalescence.
2. . . .	milky	cloudy	opalescent	faint opalescence	clear.
3. . . .	opalescent	opalescent	opalescent	faint opalescence	clear.
4. . . .	milky	milky	opalescent	faint opalescence	very faint opalescence.
5. . . .	cloudy	opalescent	slight opal.	very faint opalescence	clear.
6. . . .	cloudy	cloudy	opalescent	opalescent	faint opalescence.
7. . . .	milky	milky	cloudy opal.	opalescent	clear.
8. . . .	milky	milky	cloudy	very faint opalescence	clear.
9. . . .	milky	milky	cloudy	opalescent	clear.
10. . . .	cloudy	opalescent	opalescent	bright	clear.
11. . . .	slight opal.	opalescent	slight opal.	opalescent	clear.

The majority of the tinctures had a marked tendency to throw out fatty matter on keeping and exposing to the low temperature which prevailed during the time these experiments were being carried on. This was most marked in the case of the 60 and 70 per cent. tinctures. Those made with the 50 and 40 per cent. menstrua merely became cloudy, the others deposited the fat in a semi-crystalline form. Warming gently effected a resolution of the deposited fat, the tincture becoming bright. The tinctures made from the corm remained perfectly bright throughout.

The experiments detailed above having indicated a 50 per cent. menstruum as the strength best adapted for securing perfect exhaustion of the drug it was thought desirabie to endeavour to ascertain by experiment the process best adapted for that purpose.

Two samples of powdered drug were taken and a set of tinctures made from each by the following processes:—

No. 1. *B.P. Process.*—Maceration and percolation.

No. 2. *Continuous Percolation.*—1 ounce of the finely powdered seeds was moistened with *2 fluid* drachms of menstruum, then packed in a conical percolator, more menstruum added, and percolation allowed to proceed slowly but continuously until 8 fluid ounces of percolate had been collected.

No. 3. *Simple Maceration.*—One ounce of the finely powdered seeds was macerated for seven days with 8 fluid ounces of menstruum, shaking occasionally; the tincture was then filtered off and a sufficient quantity of menstruum poured upon the marc on the filter to make the filtrate up to 8 fluid ounces.

No. 4. *Double Maceration.*—1 ounce of the powdered drug was macerated with 4 fluid ounces of menstruum for forty-eight hours, shaking occasionally, the tincture filtered off, the marc again macerated for twelve hours with a second 4 ounces of menstruum, and the tincture again filtered off and sufficient menstruum poured over the marc to make the volume of the mixed filtrates up to 8 fluid ounces. The tinctures thus prepared were estimated by the process already given, and the results were as follows:—

Table III.

	Alkaloid p. c.		Extract p. c.	
	No. 1.	No. 2.	No. 1.	No. 2.
B.P. process	·056	·078	1·23	1·83
Continuous percolation	·060	·095	1·47	2·19
Simple maceration . .	·051	·072	1·24	1·88
Double maceration . .	·057	.080	1·28	1·98

These results show that the process of continuous percolation without maceration is the one best adapted for securing perfect exhaustion of colchicum seeds.

The variation in the strength of tinctures made from different samples of the seeds is very great, the alkaloidal yield showing that some samples of the drug contain twice as much of the active principle as others. It is undesirable, to say the least, that a preparation of a powerful drug like colchicum should be allowed to vary to such an extent, and even if a definite standard of strength for the tincture be not fixed by a future Pharmacopœial committee, it is exceedingly desirable that some plan should be adopted whereby this variation in the strength of so powerful a medicinal agent should be obviated as far as possible.

ON THE THERAPEUTIC APPLICATION OF PRECIPITATES BY MAYER'S REAGENT WITH ALKALOIDS.

BY C. J. H. WARDEN,

Professor of Chemistry, Medical College, Calcutta.

The precipitates produced by Mayer's reagent—potassic mercuric iodide—with alkaloids may possibly in certain diseases be found of much therapeutic value. And the use of such compounds would perhaps be indicated in those cases in which direct absorption in the stomach was non-essential, but when the local action of the mercuric iodide in the compound on the intestinal tract was also considered necessary. As is well-known, Mayer's reagent is employed as a precipitant for alkaloids from solutions acidulated with sulphuric acid; while the compound of the alkaloid with the mercuric iodide is decomposed by alkalies. Theoretically it is possible that an alkaloid in this form of combination would escape decomposition, and hence absorption in the stomach, but be resolved into the free alkaloid and mercuric iodide on coming into contact with the alkaline pancreatic juice. In many intestinal diseases mercuric salts are highly beneficial, while mercuric iodide possesses in a marked degree germicidal properties.

Of the many drugs which have been suggested at various times for treating dysentery, ipecacuanha has been found the most successful, and that the active remedial agent in the drug is the emetine is a question not open to controversy. It is true that some cases will recover without specific treatment—and even under treatment with *coal dust* recovery will ensue in instances—but no series of cases can be successfully treated without ipecacuanha. In some cases the administration of the ordinary dysenteric doses of the drug would cause fatal collapse, but this fact does not detract from the generally recognized specific value of the medicament. The most distressing feature attending the treatment of dysentery with ipecacuanha is the deadly feeling of nausea which usually supervenes after the administration of the drug. It seemed possible that if the emetine could be prevented from being absorbed in the stomach, that nausea might be allayed, or, perhaps, wholly prevented. But militating against this theory, that nausea might be allayed by preventing the absorption of the emetine in the stomach, is the commonly accepted opinion that emetine acts as a *general emetic*, so that consequently the nauseating effects of the drug should ensue whether absorption took place in the stomach or not.

With the object of testing these theoretic assumptions, ipecacuanha was exhausted with 80 per cent. alcohol acidulated with 5 per cent. acetic acid, the spirit distilled off, and the extract heated on the water bath with constant stirring for several hours. Water was then added acidulated with sulphuric acid, and the solution filtered from insoluble flocks. Mayer's reagent in slight excess was then added to the clear filtrate, and the bulky precipitate allowed to settle, washed by decantation with water containing a few drops of Mayer's reagent, and the precipitate finally thrown on a paper filter, and dried by exposure to warm air. The partially dried precipitate was then powdered, spread in a thin layer on paper and exposed to a temperature of 140°–180° Fah. in a current of air for several hours. The dried precipitate was made into 1 per cent. powders with white sugar.

Dr. J. H. T. Walsh, Resident Surgeon, General Hospital, Calcutta, kindly consented to try the effect of this preparation in dysentery. After administration of castor oil, the 1 per cent. powder was given in 1 grain doses every one or two hours, the powder being simply placed on the tongue and washed down with a little water. Subsequently, when experience had been gained, a 2 per cent. powder was used, the dose being increased slowly up to 10 grains every four hours, as much as 40 grains of a 2 per cent. powder being taken in twenty four hours. Assuming the emetine mercuric iodide compound to possess the formula $C_{20}H_{30}N_2O_5HgI_2$ and to have been pure, 40 grains of a 2 per cent. powder would contain ·45 of a grain of mercuric iodide and ·35 of a grain of emetine. This mode of treatment was commenced early in December, and Dr. Walsh, writing to me on Feb. 22, states tha the results up to date were very satisfactory; *in no* *case was there any sign of nausea or vomiting due to the action of the emetine.* Dr. Dymock, of Bombay, also informs me that the drug seems to be very satisfactory as far as he has tried it.

At present the number of cases treated is not sufficiently large to draw a very positive opinion as to the entire success of the treatment. Moreover, the specific action of the mercuric iodide, if administered alone, is also a point which perhaps might be worth investigation. On the other hand, the results at present arrived at are sufficiently encouraging to warrant the treatment being tried on a large scale. Reports on the cases treated by Dr. Walsh will be duly published.

It is proposed to try the effect of the quinine mercuric iodide compound in typhoid fever, and bearing in mind the bacteriological origin of the disease, the treatment should be satisfactory.

ANTISEPTIC MATERIALS.*

BY JOSEPH W. ENGLAND, PH.G.

With the advent of antiseptic surgery, there has arisen a demand for certain new products in the form of medicated solutions, gauzes, cottons, etc., necessary for the successful prosecution of that form of treatment.

It is to be regretted that the preparation of these products, owing to their comparatively limited demand in the past, has fallen almost entirely into the hands of special manufacturers, when, by their preparation, a perfectly legitimate source of revenue could be added to the pharmacist's fast diminishing list. Their preparation requires no special machinery, nor demands any special skill, save only the exercise of absolute chemical cleanliness, and it is more than probable that, if physicians were made aware that all such appliances could be had of the pharmacist, made fresh and just as desired, their use would rapidly extend; resulting in a triple benefit to patient, physician and pharmacist.

Certain it is that antisepsis has come to stay. As a rational, scientific method of surgical treatment it has passed the experimental stage and amply proven its worth, and pharmacists, with but little trouble, could now establish a healthy demand for antiseptic materials.

It may not be amiss to here call attention to the composition of the various antiseptic solutions at present used. Corrosive sublimate, in various strength solutions, of from 1 part in 1000 parts to 1 part in 5000 parts of water, is most largely employed. Dr. C. M. Wilson's solution is 1 part, each, of mercuric chloride and ammonium chloride (or the old Sal Alembroth) in 1000 parts of water. It has been shown that gauzes and cottons made with this solution do not reduce the soluble, active, mercuric chloride into the insoluble, germicidally-inactive mercurous chloride or calomel, as is the case when mercuric chloride is used alone. Carbolic acid, especially the "$\frac{1}{20}$" solution, is still used quite largely, but more especially as a disinfectant and not as a germicide. Benzoic and salicylic acids, in the form of solutions, are now but rarely used. Boric acid, however, is developing strong popularity and is extensively employed in bed-sores, ulcers, inflammations, etc., and especially in ophthalmic practice (10–18 grains to each fluid ounce of water).

Dr. La Place's tartacid sublimate solution is a solution of 1 part of mercuric chloride and 5 parts of tartaric acid in 2000 parts of water. Dr. La Place was led to advocate the addition of tartaric acid, because he found that unless free acid be present, the mercury was precipitated as an insoluble mercuric albuminate upon coming in contact with blood serum. He informs the writer that he first suggested tartaric acid because of its convenience, but has since found that hydrochloric acid will answer equally as well, if not better. In his wards he uses the following formula:

Mercuric chloride, 1 troy ounce. Hydrochloric acid, 5 fluid ounces. Water, a sufficient quantity to make 8 fluid ounces. Dissolve. 1 fluid drachm to the pint equals $\frac{1}{1000}$ of mercuric chloride.

A criticism reported on this combination is that the large proportion of hydrochloric acid gives the solutions an irritating or slightly escharotic action, and causes considerable pain. This charge is also made upon the tartaric acid solution, though in the latter case the irritation is said to be much less.

It may be of value to know that the universal use of acids in germicidal solutions is strongly objected to by some physicians. It is claimed that acids are only desirable where false tissues, indolent ulcers and deep-seated abscesses exist, and though mercuric chloride may form at first an insoluble albuminate upon contact with blood serum, such a precipitate or film does not thereafter affect its germicidal action. It is of interest, in this connection, to note that, according to Mr. Martindale,* mercuric albuminate is soluble in an excess of albumen, so that after the dressing has been applied the filmy precipitate is probably dissolved away by exuding blood serum.

Pana's antiseptic solution, used only in ophthalmic practice, is made with ⅓ gr. of mercuric iodide, 60 m. of alcohol and 5⅓ fl. oz. of water. Dr. Conrad Berens silico-fluoride tablets are composed, each, of sodium silico-fluoride, 1 gr.; hydrastine hydrochlorate, $\frac{1}{10}$ gr.; sodium bicarbonate, 3 gr.; sodium biborate, 2 gr.; eucalyptol, ¼ m. For using, one tablet is dissolved in four fluid ounces of water. Dr. Carl Seiler's alkaline antiseptic tablets are made, each, of sodium bicarbonate, 3¾ gr.; sodium biborate, 3¾ gr.; sodium benzoate, ⅛ gr.; sodium salicylate, $\frac{1}{16}$ gr.; eucalyptol, ⅛ gr.; thymol, ⅙ gr.; menthol, $\frac{1}{24}$ gr.; and oil of gaultheria $\frac{1}{32}$ gtt. To use, one tablet is to be dissolved in two fluid ounces of water.†

An antiseptic solution much used in the Philadelphia Hospital, as an addition to gargles, washes and lotions, etc., is the following solution, prescribed under the name of "Liquid Antisepticus:" Menthol, 3 gr.; thymol, 8 gr.; boric acid, 30 gr.; sodium benzoate, 45 gr.; sodium salicylate, 45 gr.; oil of gaultheria, 6 gtt.; oil of eucalyptus, 18 gtt.; glycerin, 1 fl. dr.; alcohol, 2 fl. oz.; water, a sufficient quantity to make 6 fl. oz. Mix. Use largely diluted with water. A marked peculiarity of this antiseptic solution is the fact that, though at first it becomes opalescent on the addition of water from precipitation of the oils, yet on the further addition of water, it again becomes transparent.

An antiseptic which of late has attracted much attention is that first introduced by Dr. E. P. *Bernardy* (1886), of Philadelphia. It is a solution of mercuric iodide (1 part) with sufficient potassium iodide to dissolve. Theoretically, it would require *about three-fourths* of the quantity of the mercurial salt used, but in practice he uses equal parts, so as to prevent the possibility of subsequent precipitation of *mercuric* iodide on further dilution with water.

It is claimed that $\frac{1}{2000}$ solution of this compound is equivalent in germicidal strength to a $\frac{1}{5000}$ *solution* of mercuric chloride, and experiments made by Ber-

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[*] Read at the Pharmaceutical Meeting, before the Philadelphia College of Pharmacy. From the *American Journal of Pharmacy*.

[*] *Pharmaceutical Journal*, [3], xvi., 357.

[†] The original solution of Dr. Seiler's contained, also, in each two fluid ounces, 32 minims of glycerin and 5 minims of alcohol, but in the tablet these have, of necessity, been dispensed with.

nardy, Krassowski and others would seem to justify the claim. Further, Dr. Bernardy informs the writer that in his experiments he found, with a $\frac{1}{1000}$ solution, no precipitation, upon adding it to blood serum, and Mr. Listed states that red mercuric iodide is freely soluble in 200 parts of blood serum and remains most actively antiseptic.

One drawback to its more general employment is its ineligibility. Mercuric iodide and potassium iodide cannot be compressed together in tablet form on account of the deliquescent nature of the combination, and it is not advisable to add, as has been sometimes done to obviate that result, ammonium chloride, for fear of ultimate conversion of the mercuric iodide into mercuric chloride and ammonium iodide. The best way would seem to be to compress separate tablets of 3½ grains, and, on using, dissolve one of each in a small quantity of water first, and then add the balance of water to make the quart.

In introducing this antiseptic, the chemical error has been made of calling it "biniodide of mercury." It is nothing of the sort. By chemical addition a very deliquescent and entirely different compound is formed, namely, potassio-mercuric iodide ($2\,K.HgI_2$).

We, as pharmacists, know what a strongly decomposing influence this solution, in the form of "Mayer's Reagent," has upon alkaloidal solutions—even greater than a solution of mercuric chloride, and a possible explanation of the high germicidal value of potassio-mercuric iodide may be found in that fact, with also Dr. Van Arsdale's ('Annals of Surgery') explanation of the antiseptic action of iodoform, remembering that ptomaines are, in a strictly chemical sense, alkaloids. He says that "the germicide power of iodoform was long supposed to be the secret of its value in the treatment of wounds, but recently it has been conclusively proven that as a germicide it is feeble and acts within narrow limits. Further investigation into its mode of action has elicited that it is a chemical antidote to the ptomaines. The ptomaines, the product of the bacteria, are exceedingly devitalizing to the tissues, and their destruction by the iodoform enables the tissues to destroy the germs or resist their malign assaults. In dressing wounds, the surgeon must hereafter use two different sets of antiseptics. He must first seek, as far as possible, to exclude disease germs or to render them inactive, and for this purpose he must use germicides, such as corrosive sublimate. He must next endeavour, by applying agents like iodoform, to prevent formation of poisonous chemical substances in the wound, or to decompose them and render them inactive if once they have been formed."

In the writer's experience, the demand for oakum and jute has almost ceased; absorbent cotton being used instead. Lint is, comparatively, but little used, while borated, carbolated, and salicylated cottons are but semi-occasionally called for. Out of the large number of medicated cottons that have been introduced there is now in strong and active demand but one, namely, corrosive sublimated, or "sublimated," cotton, and the demand is constantly increasing both for it and absorbent cotton.

For the preparation of sublimated cotton, the following formula is recommended—

Mercuric chloride	35 gr.
Ammonium chloride . . .	35 gr.
Alcohol	1 pint.
Boiled water	4 pints.
Absorbent cotton.	1 pound (av.)

Dissolve the sublimate in the alcohol, add the boiled water containing the ammonium chloride dissolved in it, immerse the cotton, kneading thoroughly, so as to have the antiseptic solution uniformly distributed through it, and so that none of the liquid be left. Dry.

The product, when dry, contains one-half of one per cent. of mercuric chloride, in a form not reducible to mercurous chloride by the organic cotton, as occurs, after a time, when the corrosive chloride alone is used.

By far the most important of the antiseptic dressings are the gauzes, especially those impregnated with mercuric chloride and with iodoform; the others, carbolated, naphthalinated, and eucalyptol, are in very light demand.

There exists, at present, considerable differences of opinion amongst physicians as to the relative values of "moist" and "dry" gauzes. By the term "moist" gauze is here meant gauzes which are kept permanently moist with alcohol and glycerin. On the one side it is claimed that moist gauzes are better than dry gauzes, because they contain the antiseptic in the most active form, namely, a soluble form; while, on the other hand, many physicians prefer to use the dry gauzes, either applied dry, as practised by Professor Keen, or immersed, as is usually done, in the antiseptic solution just before applying, or, if the demand warrants it, as in hospital wards, keeping it in museum jars filled with antiseptic liquid, preferably of mercuric chloride and ammonium chloride, and removing on using.

As has been before said, there exists a wide divergence of medical opinion concerning the subject of gauzes, and it may be a matter of information to here present some of the arguments used. First, it is urged that if the statement be true that antiseptic gauze is only active when it is moist, it would seem to be also true that "moist" gauze, being active, is constantly undergoing progressive deterioration of germicidal strength; because, accepting the modern teachings as to the omnipresence of disease germs, no container could be kept sufficiently tight to exclude them, and as the containers are frequently opened, the germs of the air are repeatedly coming in contact with it, and, as fast as one colony is destroyed, another takes its place, until the entire germicidal power of the gauze becomes in time nil; whereas, the dry gauze (in which ammonium chloride is present) is a product of constant strength, which, though inactive when dry, becomes actively antiseptic on coming in contact with moisture exuding from wounds. Hence, on application of a moist gauze to a wound without previous immersion there is no positive guarantee that the gauze may not contain disease germs; while, if the moist gauze be first immersed before applying, wherein does there exist any superior advantages in its use?

Then, on the other hand, concerning the use of a dry dressing, immersed in antiseptic solution and applied, it is said that, while it is undoubtedly antiseptic, the moist condition has several disadvantages. It interferes with the evaporation of the wound secretions; it has a tendency to devitalize the tissues by inducing osmosis with their contained blood serum, and it is inclined to cause eczema. (See White, *Univ. Med. Mag.*, 1889, 208.)

The tendency of the times seems strongly in favour of following Professor Keen in his use of dry sublimated dressings without any previous immersion, by which method he claims to have obtained very superior results.

For the preparation of iodoform gauze, the following formula is used:—

Iodoform	5 oz. av.
Petroleum benzin .	18 pints.
Purified gauze. . .	100 oz. av. (about 54 yds.).

Dissolve the iodoform in the benzin, hang the gauze upon an antiseptic clothes-line, in a clean, dry room remote from fire, then saturate the gauze with the benzin solution. When dry, moisten with a mixture of alcohol (2 parts) and glycerin (1 part); cut it into 3-yard pieces. After the alcohol has largely evaporated wrap in paraffin paper with antiseptically clean hands, and keep in a closed container, having in it an open salt mouthed bottle containing water (to keep it moist).

The finished product contains 5 per cent. of iodoform. As a solvent, petroleum benzin possesses a number of advantages which make it superior to ether. It evaporates less rapidly and dissolves the iodoform, without decomposition, to form a clear solution, while commercial ethers, even the best, partially decompose the iodoform to set free iodine; forming a light red solution.

The gauze is previously purified in the following way: Boil 100 oz. av. of gauze, or common cheese-cloth, in a tin boiler, having a perforated false bottom, for two or three hours, with 6 gallons of water having had dissolved in it: powdered borax, 8 oz. av. and sodium carbonate, 32 oz. av. Remove, while hot, to a tub containing 2 gallons of solution of chlorinated soda; wring out in this solution and wash well in not less than three clean waters. Then pass through the wringer, dry, and it is ready for further treatment.

The borax is directed to dissolve the glue, used by manufacturers to stiffen the cheese-cloth, while the washing soda is employed to saponify the fat and dissolve the resin naturally present.

It sometimes becomes necessary to make the iodoform gauze 10, and even 25 per cent. in strength, in which case the benzin method cannot be used, and recourse is then had to the other method of Weir, of iodoform and soap-suds, modified by the omission of mercuric chloride, which, as White has pointed out, results in mutual decomposition of the mercuric chloride and the soap. To use this method, take the iodoform and mix it with ordinary castile soap-suds in the proportion of about 1 to 15; pour this mixture over the purified gauze and distribute it evenly through the meshes by rubbing. When dry, wrap in paraffin-paper.

Dr. La Place, however, prefers to use a pastry mixture of iodoform, ether, alcohol and glycerin to spread over the gauze and exposed to the air until all the alcohol and ether have volatilized.

To make sublimated gauze the following formula is used:—

Mercuric chloride	21½ gr.
Ammonium chloride	21½ gr.
Boiled water	6 pints.
Purified gauze . . .	100 oz. av. (about 54 yds.)

Dissolve the chlorides in the water, immerse the gauze, previously cut into pieces of 3 yards ("short") or 6 yards ("long"), each, in length. Express moderately, or so that no liquid shall be left. Dry in a clean, dry room, upon an antiseptic clothes-line. Remove, wrap in paraffin-paper and keep in a well-closed container. It is, perhaps, needless to say that in these operations the hands should be kept germicidally clean with "bichloride" solution.

The product contains $\frac{1}{10}$ of 1 per cent. of the active ingredient. The package should never be opened until about to be used, and then only by the physician, who uses it either dry or immerses it in the mercurial solution, before applying to the wound.

To protect the edges of the wound from irritation by the antiseptic used, it is usual to employ a piece of oiled silk, coated with copal varnish, and dusted with powdered dextrine (1 part), powdered starch (2 parts) and "$\frac{1}{20}$" carbolic acid solution (16 parts). This is the so-called "Lister-protective." The dextrine and starch are used to give the varnished silk a surface, which will allow a film of water to evenly spread itself over it. It is applied along the entire length of the wound, leaving free the ends from which the drainage tube or catgut protrudes.

To purify sponges, the method given in the National Formulary (p. 121), for bleaching sponges, is followed, with some important modification in details.

After freeing the sponges from sand and any other obvious impurities or damaged portions by beating, washing and trimming, they should be macerated for 12 hours in a solution of hydrochloric acid (8 fl. oz.) and water (1 gallon), to remove lime salts. Then wash thoroughly with water to remove excess of acid. Next, macerate in a solution of potassium permanganate (240 gr.) in water (1 gallon), wringing them occasionally and replacing them in the liquid, until they become, only, a very light brown colour. (Excessive oxydation rots the sponge.) Remove, wash well with water until the latter runs off colourless. Then place in a solution of sodium thiosulphite (hyposulphite) (8 oz. av.) in water (7½ pt.) and add hydrochloric acid (8 fl. oz.), macerate, expressing frequently and replacing in the liquid, until they are sufficiently light in colour. Remove, wash well with water to remove every particle of sulphuric and sulphurous acid and store in dry containers.

Professor Perkins* employs sodium bisulphite in place of sodium thiosulphate, in which case no free sulphur is precipitated, but this appears to be an expensive and unnecessary refinement, since precipitated sulphur is readily removed by washing.

For arresting hemorrhages physicians employ a ligature of either silk (which is but little used), or catgut, the inner media of sheep's intestines. The gut must be perfectly antiseptic, so that it can be left in the wound with a surety that it will be absorbed without septic poisoning. For the purification of commercial guts which come in five sizes, a, b, c, d, e, or 1, 2, 3, 4, 5, from the finest made to the largest cello string, and which can be procured from importers, wholesale dealers in musical or butcher's supplies, the writer follows the method of Lister, modified by Professor Samuel Gross, as yielding the most satisfactory results. It is, macerate in stronger ether for twenty-four hours. Remove, place in a $\frac{1}{1000}$ mercuric chloride solution, one-fifth part by weight of which is alcohol, the rest water, and macerate for thirty minutes; remove, cut into three or six feet each, dry and place in oil of juniper, to macerate for ten days, after which time it is ready for use, or may be kept indefinitely. To use, remove, wipe off adhering oil with an antiseptic towel or, better, wash with benzin, dry and keep in the $\frac{1}{1000}$ mercuric chloride solution above mentioned.

In some cases, where it is desired that the gut be longer than from five to ten days in being absorbed, as is the case with plain catgut rendered antiseptic, it becomes necessary to chromicise it, when it will resist absorption in from ten days to three weeks. This is done as follows:

Macerate of the gut (200 gr.) in stronger either for forty-eight hours, remove, dry, cut into three-foot pieces, and twist on a glass spool, not more than two threads deep, to prevent curling and place in a "$\frac{1}{20}$" carbolic acid solution (10 fl. oz), which has had added to it chromic acid (1 gr.) (containing no free sulphuric acid); macerate for forty-eight hours, by which time the colour of the solution changes from orange to very light yellow. Remove, dry and place in air-tight jar which has been previously antisepticized with a $\frac{1}{1000}$ mercuric chloride solution and dried.

This product will keep for two or three months. To use, immerse for a short time in a $\frac{1}{1000}$ mercuric chloride solution.

In conclusion, there is one subject which, though it does not belong to the class of antiseptic materials, is worthy of notice, because it is very often used therewith, and that is ether. In medicines, practically, ether is almost wholly used as an anæsthetic, and, in the writer's opinion, the U. S. Pharmacopœia errs in having two ethers officinal, or in not stating in the text which of the two should be used as an anæsthetic.

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* *West. Druggist*, Sept. 15, 1890.

The Pharmaceutical Journal,

SATURDAY, APRIL 25, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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EDUCATION OF APPRENTICES.

It is not unfrequent to find the passing of the Pharmacy Act of 1868 spoken of as having been the crowning achievement of the efforts that were commenced in 1841 with the view of placing the practice of pharmacy in this country upon a footing commensurate with the natural relation of that art to its sister art of medicine. But it is probably more consistent with reality to adopt a much less enthusiastic estimate of that legislative event, which is now sufficiently far distant to be regarded as having fallen very far short of an inauguration of a pharmaceutical millennium. One important advantage was gained by the Act of 1868, inasmuch as the persons engaged as chemists and druggists, previously undefined and popularly unrecognizable, were then to some extent incorporated, and in the eye of the law identified as being entitled to carry on their occupation. It may even be claimed that the position of those who are engaged in this occupation has been improved since the passing of the Pharmacy Act, 1868. But while admitting the reality of such improvement in some respects, it must also be confessed that it is only partial, and that in regard to many requirements essential for the advancement and well-being of pharmacy as a business, deficiencies still prevail which are of serious importance. The trade has been incorporated, but it has not been united. For purposes of legal and popular recognition the body exists, but it has not yet been inspired with a community of sentiment as to the principles by which its independence is to be maintained and its credit promoted.

In the matter of education, which is the very basis upon which the opportunities and advantages provided by the Act of 1868 were to be made the means of securing pharmaceutical progress, we stand at the present time almost exactly in the same position as that which obtained before the passing of the Act twenty-three years ago. In fact, one of the most striking results produced by the administration of the Pharmacy Act during that period has been the demonstration of the total inadequacy of the technical training to which chemists and druggists' apprentices are generally subjected for rendering them competent to act independently in the conduct of the business, and with due regard for the safety of the public. Notwithstanding the considerable lapse of time we are still without any educational system. It is still purely a matter of chance whether an apprentice is properly instructed even in the art of dispensing, practised in the reading of prescriptions, and made familiar by experience with the characters of drugs, the preparation of medicines, and the operations necessary for that purpose, or whether on the other hand he is merely trained as a porter or warehouseman in the performance of duties of purely manual labour. But although the demonstration of this grave defect commenced immediately after the passing of the Act of 1868, year by year has been allowed to slip by, not only without the provision of a remedy for this evil, but actually with continued opposition to the efforts made for its removal. The consequence of this neglect may be seen in the doubt expressed by medical men who are disposed to give up the dispensing of their medicines, as to whether they can rely upon this work being properly done, if it were handed over to chemists and druggists. This and other circumstances may be taken as indicating on the part of the medical profession and the public a sense of deficiency in the educational training which was unavoidable when any person was free to set up as a chemist and druggist, but under existing conditions can only tend to damage the interests of the body generally.

The correspondence that has appeared in the Journal during the past few weeks in support of the views put forward by Mr. SAUL on the subject of the Preliminary examinations serves to show how this matter of education has come up from time to time, and after some discussion has been left in the old position. Twenty years ago the same topic was discussed by Mr. ATKINS, much in the same direction. It was then pointed out that for the future good of pharmacy as a calling, it was essential that apprentices should be drawn from a class whose members could afford to give their sons a sound scholastic education, and that they should never be admitted into a business until they had given satisfactory proof of possessing the mental capacity and culture that would enable them to become proficient in all the details of the pharmacist's business and in the several accessory subjects with which he requires to be conversant. This was not an opinion originating from one of the west end pharmacists, who are supposed to be incapable of understanding or unwilling to consider the requirements of country business, nor was it expressed without regard to the necessity of facing work when it was required. But the urgent necessity for drafting apprentices from a better educated class for instructing them in the practice of pharmacy, and for affording them better facilities for qualifying themselves by study, was contended for as a matter of justice to the apprentice and equally of protection to the future interests of the pharmaceutical body generally. At the time when the papers we refer to were written, the Pharmacy Act, 1868, had only just come into operation, and from the requisite respect for vested interests, some of those admitted to registration might have had little further claim to recognition. It was probably to these that reference was made in the statement that many men could not educate their apprentices. Against that class time would provide a remedy, but another class was referred to who would not educate their apprentices. It is with these that most mischief is done, and the information collected at that time from various parts of the kingdom was epitomized thus: "Instruction furnished to apprentices lamentably deficient." It is a momentous question for those who have duly qualified themselves for a pharmaceutical career, and who look to that for their future subsistence, to consider whether their just expectations are still prejudiced by the continued existence of the evils we have above referred to, and whether, if that be the case, they will allow them to continue a source of peril to themselves individually and of detriment to the general interests of the occupation they are or intend to be engaged in.

We have received from Mr. P. W. Squire another letter in reference to the reaction of hyoscyamine with mercuric chloride, but as the difference now existing between him and Mr. Gerrard relates only to matters of opinion, it seems undesirable to prolong the correspondence. In regard to the main point, the logic of fact is in favour of Mr. Gerrard, and the correction made by Mr. Squire in the reprint of his Supplement to the 'Companion,' under the head of homatropine hydrobromate, shows that this is recognized by Mr. Squire. To whatever extent the statements of Flückiger and Schweissinger, as to the behaviour of hyoscyamine, differ from that of Mr. Gerrard, the difference between their observations and that of Mr. Gerrard appears to have been entirely due to differences in the conditions under which the test was applied, for in order to obtain a red precipitate or even any precipitate with hyoscyamine certain relative proportions of the base and the reagent are essential. Schweissinger, in trying Gerrard's test, and interpreting the term "a small portion" as being satisfied by using 1 milligram of hyoscyamine did not obtain a red precipitate on adding to it 2 c.c. of Gerrard's test solution, but he did get the red precipitate when he added to that quantity one or two drops of the test solution. Flückiger dealt with the test especially in its application to atropine, and although he did not get any precipitate with hyoscyamine, he nevertheless accepted Schweissinger's statement as to its being produced by that base, and himself confirmed the exceptional alkaline power of hyoscyamine and the other mydriatic alkaloids towards mercuric chloride which had been pointed out by Gerrard. Mr. Squire, in applying the test to a larger quantity of hyoscyamine, obtained a yellow precipitate, as stated in the original issue of the Supplement to the 'Companion.' That statement is now corrected in the reprint, and thus the accuracy of Mr. Gerrard's observation is recognized, while it will be seen from Mr. Squire's letter in the Journal for April 11, and from the reprint of the Supplement to the 'Companion,' that the discrepancy of obtaining a yellow precipitate with hyoscyamine was due to the use of a larger proportion of the base. There is therefore no room for dispute in this matter, and still less need for any imputations that the temporary differences in the descriptions given of the reaction were instigated by unworthy motives.

* * *

At the last meeting of the Council mention was made of the case of Mr. How, of Bournemouth, who is a candidate for an annuity from the Royal Masonic Benevolent Institution at the election which will take place on the 15th May next. Since that time a number of votes have been secured in Mr. How's favour, and there is a probability that if some thousand more votes can be obtained that he will be elected. We therefore take this opportunity of drawing attention to the case, and requesting the assistance of any masonic brethren who may have votes to dispose of, or are willing to promise their votes for the schools in exchange for votes for the Royal Masonic Benevolent Institution. Voting papers may be sent to Mr. Bottle, the Chairman of the Benevolent Fund Committee, or to the Editor of the Journal.

* * *

In the course of a recent discussion of the French Pharmacy Act in the chamber of deputies, M. Alcée Froin pointed out what he considered to be a serious defect in the measure, to remedy which he proposed as an amendment that the pharmacist should be obliged to perform his duties personally. The arguments he brought forward in support of this proposition were that the duties of the pharmacist in dispensing medicine require great care and constant vigilance. His eyes should always be upon his assistants, to control all they do. The maxim that it is human to err is in his opinion one that the pharmacist dare not trust to, and that would be no excuse for a mistake. Over and above the special knowledge that he requires to possess it is his duty to exercise a control over the prescriptions of medical men, and in case of suspecting any error or overdose to ascertain what is intended. Having regard to the length of time a pharmacist has to devote to study and training, and the fact that he is not allowed to carry on business until he is twenty-five years of age, M. Froin contended that he ought not to be allowed at a later period to delegate his functions to others, whose time and labour are of less value than his own.

* * *

We have pleasure in being able to state that the name of Mr. Adam Underwood, pharmaceutical chemist, and that of Mr. Henry Badcock, chemist and druggist, have both been added to the Commission of Peace for the Borough of Lymington.

Pharmaceutical Society of Ireland.

REGISTERED DRUGGISTS' EXAMINATION.

At an examination of druggists held at Queen's College, Belfast, on the 14th inst., Messrs. J. Allen, W. J. H. Brady, J. Cairns, A. Clements, J. Clow, Junr., S. Cosgrove, J. Edgar, J. Ferris, T. W. Gamble, J. Gillespie, C. W. Gilmer, J. Hill, W. Jamison, W. Maxwell, R. W. McAdam, J. McDonnell, T. McDowell, S. B. Pattie, Elizabeth Perrot, A. C. Scott, J. Shepherd, R. Spence and R. D. Turkington passed, and are entitled to be placed on the Register of "Registered Druggists." Two were rejected.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Electric and Magnetic Screening.

At an Evening Meeting of the Royal Institution, on Friday, the 10th inst., Sir William Thomson delivered a discourse upon Electric and Magnetic Screening. Sir William classified screens into five classes, electrostatic screens, magnetostatic screens, screens for electromotive forces, screens for magnetomotive forces, and window and fire screens. He illustrated the production of the various forms of magnetic and electric force, and pointed out that it had been Gilbert's task three hundred years ago to determine their differences, but that the relations between them have been only recently definitely established. Through the consideration of electrostatic screening Faraday was enabled to make many of his valuable discoveries and to recognize the fundamental principles involved in the transmission of electricity through an intervening medium. Maxwell's magnetic theory of light, which has received such substantial support from Hertz's brilliant experiments, bears also a close connection with this subject, and the speaker expressed himself as confident that its relationship to the phenomena observed by Crookes in his recent investigations on the passage of electricity *in vacuo* would also be established. Magnetomotive force, the force that sets a body in motion in virtue of its magnetism, is especially adapted for the experimental study or illustration of magnetic and electric screening in the lecture room. A simple experiment may be made by approaching an excited glass rod to a resinously electrified pith ball, which is screened from the direct effect of the magnetomotive force by a metal plate. If the pith ball is so suspended as to hang an inch above and about two inches from the edge of the screen, and the glass rod be then gradually approached towards the same edge from the under side of the plate, the pith ball will be apparently repelled in the opposite direction to that of the motion of the rod; but is really attracted by the glass around the corner. From this simple observation the screening effect of perforated bodies and wire gauze may be understood. The mathematical reasoning involved in the explanation of these phenomena has been elaborated by Maxwell, and rendered easily comprehensible by his diagrams of the lines of force occurring in the magnetic field of two adjacent magnets. As a further illustration of this screening effect, Sir W. Thomson mentioned that a man in a wire cage, of which the bars were about the same distance apart as in a parrot's cage, could not be struck by lightning; and that contrary to popular opinion gunpowder and nitro-glycerine were perfectly safe against lightning if stored in an iron house with iron roof. The lecturer then directed attention to an early observation of Newton's that electricity acts through glass, and proceeded to show that electric images were formed with glass screens analogous in every respect to optical images. A resinously electrified pith-ball suspended behind a glass plate was affected by an excited glass rod held about the same distance in front of it, to the same degree as if the glass rod were in close proximity. Upon warming the glass screen so as to render it a better conductor and removing the glass rod, a permanent vitreously-electrified image remained on both sides of the glass, which was capable of attracting the resinously electrified pith-ball in the same manner as the actual excited glass rod. If vulcanite sheet were substituted for a glass plate no effect was produced under ordinary conditions, except a slight attraction shown by Faraday to be due to the specific inductive capacity of vulcanite, but upon warming the vulcanite became a conductor, and the same vitreously electrified images were obtained as with the glass screen. These screens are therefore termed variational electromotive screens. Under the subject of magnetostatic screening Sir W. Thomson mentioned that ships' compasses are frequently affected to the extent of three to seven degrees, owing to the plan of single wiring for electric lighting purposes, adopted for the sake of economy. As a concluding experiment in illustration of the possible practical adaptation of metallic screens for the purpose of investigating magnetic fields, the lecturer brought forward a large coil of wire through which a rapid alternating current was passed. A telephone connected with a small metallic plate indicated by a rapid succession of beats the currents induced in the small screen when brought opposite the coil. Sir W. Thomson then localized the magnetic field by the directions given him by Professor Dewar, to whom the telephone was handed, and who sat with his back to the audience and experimenter.

SOCIETY OF CHEMICAL INDUSTRY.

London Section.

A meeting of the section was held at Burlington House on Monday, the 21st inst., Mr. T. Tyrer occupying the chair. A paper was read by Mr. W. P. Rix on "Stoneware and its Application to Chemical Apparatus," in which the quality of the raw material and its applicability to the manufacture of stoneware for various purposes was first discussed, and the need for careful adherence to principles based upon its inherent qualities insisted upon. The commonly received idea that the glaze was necessary to render the ware impervious to moisture was shown to be ill-founded, as the body of the ware was usually scarcely, if at all, porous; the real use of the glaze was to give a smooth surface that could be easily cleansed. Glazing was effected either on the ware after a first firing or at the same time as the body of the ware itself was burnt. The well known salt glaze had many advantages, being very thin and at the same time resisting the action of corrosive liquids exceedingly well. The more fusible glazes containing such constituents as lead and borax were to be avoided. A description was given of the methods in use for moulding the clay to the shape of the vessel to be made, the one needing most individual skill being the process of "throwing" on a potter's wheel. A method of great utility for small articles which were required to be very light and thin consisted in pouring the "slip," or mixture of clay and water, into a mould, allowing it to flow over all parts of the same, and draining off the excess, leaving a thin coat closely adherent to every part. Drain pipes were made by squeezing the clay by the pressure of a piston in the upper part of a chamber, the bottom of which formed an annular die. At Doulton's Staffordshire works pipes as much as 3 feet in diameter were thus made. The great shrinkage both in drying and firing made it difficult to construct stoneware vessels accurately to size, and as the shrinkage was different according to the method of moulding employed it was not feasible to build up a piece of apparatus of which the parts had been formed in diverse ways. The torsion put upon the clay in "throwing" caused a relative movement which might interfere with the design of a given vessel. Thus a cylindrical receiver made on the wheel and provided with tubulures for the insertion of a gauge glass would twist in firing to such an extent that the line joining the holes might be considerably out of perpendicular. The unequal thickness of parts of the same vessel was another source of trouble and should be considered in the original design. Many forms of joint for stoneware pipes had been devised, and some were satisfactory if chosen with regard to their intended use, provided care was taken in erection to remember that the material was excessively rigid and would not bear treatment that could be allowed in the case of even such a substance as cast iron. When used for vessels exposed to tolerably high temperatures stoneware was liable to breakage unless care were taken to avoid unequal heating, and the succussion due to the condensation of steam that could be borne by metal vessels with impunity. A fine collection of stoneware goods, including small stopcocks, highly glazed dishes of the same shape as those made of Berlin porcelain commonly used in the laboratory, and an improved pump for hydrochloric acid, was exhibited.

In the discussion which followed Mr. Howard endorsed the author's statement that regard must be had to the use to which any particular piece of apparatus was to be put, and to the unavoidable difficulties of manufacture, a result best attained by informing the maker of the precise function of the apparatus when ordering it, so that he might modify its design and composition accordingly.

Mr. Crowder thought that provided the acid pump exhibited would stand vitriol it might well be used for pumping that liquid.

Mr. Watson Smith recalled the difficulties that he had encountered in the use of stoneware acid pumps in 1873, and inquired whether these had been yet overcome.

Mr. Rix, in reply, said that such troubles as had then been common were largely things of the past. The design of the pump allowed of the renewal of parts liable to wear out or break without undue delay or expense. The 6 in. pump could be used with a pressure of 20 lbs., and the 4 in. with one of 30-35 lbs.; if higher pressures were needed some increase in strength was necessary.

The second paper of the evening, entitled "Tanning by Electricity," by Dr. Rideal and Mr. A. P. Trotter, was then read by the former. Dr. Rideal began by saying that mistrust had surrounded the subject with which he was about to deal, chiefly because of the lack of exact knowledge that has hitherto existed. That lack he hoped in some measure to supply. The sole object of the electrical process was to expedite the change of hide into leather, using for effecting the change the ordinary tanning agents. Efforts to hasten a process eminently tedious had been made long ago. One of the earliest inventions consisted in forming the hides into bags and forcing the tanning liquor through them, but the presence of imperfections in the hides, necessitating the closure of holes and rents by sewing, caused its abandonment. An inventor named Brown, of New York, had devised a process whereby the hides were attached to the outside of a revolving drum and dipped repeatedly in the liquor. The earlier methods might be divided into two classes, in one of which the hides were stretched and at rest, so that the tanning process went on without loss of albumen, while in the other they were loose and in motion, a portion of the albumen being consequently churned off. When attention was directed to the use of an electric current, the methods adopted plainly showed that their inventors were groping in the dark. In 1849 a tanner named Cross proposed the use of an arrangement of lead and zinc plates to open the pores of the hide, prior to its introduction into the tan pit, but the first fairly successful effort to hasten the process of tanning by the application of electricity while tanning was going on, was made many years later in St. Petersburgh. At the present time the hides were contained in a drum or cylindral or oblong box, and moved through the liquor while a weak current was passing. The addition of turpentine to the tanning liquor had been claimed in one patent, but there was no evidence to show either that it was beneficial, or, if beneficial, was in any way directly connected with the use of electricity. Coming to the experiments that had been carried out by Mr. Trotter and himself, Dr. Rideal said that the current used was so small that the hypothesis that the favourable action which was observed was due to electrolysis could not be maintained. The increase in the rate of absorption of the tannin by the hide, as measured by the quantity of tannin removed from the liquor, was very marked when the electrical process was used, and continued in smaller degree for some hours after the stoppage of the current. Apparently the pores of the hide are opened during the passage of the current, and do not close again immediately on its cessation. A measure of the rate of the conversion of hide into leather was afforded by the decrease in its nitrogen contents. Böttinger stated that the amount of nitrogen in normal leather was about [illegible] per cent., whereas that in untanned hide was about 16·5 per cent. By estimating the nitrogen in the leather as the tannin proceeded, the progress of the operation could be ascertained. For this purpose the Kjeldahl method had been employed, and the nitrogen thus determined sank as the total weight of leather increased in a regular and significant manner.

In the discussion which followed Mr. Hooper said that as a practical tanner he was chiefly interested in the curtailment of the time necessary for tanning, and that when he found that leather that required eight months or more to tan by the usual method could be made in three weeks, he could not but think highly of the process by which this feat was accomplished.

Mr. Swinburne inquired whether tannin was an electrolyte, and dissented from the analogy that had been drawn with Ostwald's semi-permeable membrane. He considered that the hastening of the process might be due after all to electrolytic effect, the action being repeated from particle to particle in the hide undergoing tanning.

Mr. Falkenstein endorsed most of the author's statements, and also considered that some electrolytic action took place, although it might be very small.

Mr. Trotter refuted the suggestions of the last two speakers that an appreciable amount of electrolysis occurred. The total quantity of hydrogen that could have been liberated by the action of the current throughout the period of the experiment was only [illegible] grams; representing an amount of decomposition that was wholly insignificant.

Dr. Rideal, in replying, emphasized the arguments of his colleague, and instanced experiments that had been made on the absorption of methylene blue locally in the skin of the back of the hand under the influence of weak currents, as well as the treatment of gouty joints devised by Edison, who caused the absorption of lithium chloride into the fingers of the patient by the same means, as examples of similar effects, the causes of which were not fully understood.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association on March 19, Mr. A. Campbell Stark, *President*, in the chair, a paper was read on:—

Elementary Pharmaceutical Latin.

BY JOSEPH INCE.

No greater unkindness can be done to a youth who may hereafter be trained for pharmacy than to neglect his early education.

In mid-career, when his attention should be devoted to special branches of science and to the technical details of his art, he has to waste his energies over the rules of arithmetic, and the elements of Latin grammar.

He runs a chance of being a poor scholar and an indifferent pharmacist.

The unkindness is of lesser magnitude than the injustice. It reflects equally on the student who is hampered and handicapped with a burden he should never have had to bear; and on the teacher, who is labouring over Latin verbs and substantives as a necessary preparation towards the understanding of those autograph prescriptions which a student has first to read and afterwards to dispense.

No systematic course of pharmacy should omit the reading of such formulæ; that is a distinct branch of instruction which a public institution has an unrivalled facility of presenting. But the grammatical construction on which medical recipes are founded, should not form part of the teaching, nor should it interrupt the practical introduction to the subject. Nevertheless the teacher is bound to accept the situation and waive his excelsior theories. He is not justified under existing circumstances in doing otherwise, or he would shipwreck the examination prospects of three-fourths of the students committed to his care.

For some sessions past I have conducted an oral and extemporaneous demonstration of just so much elementary Latin as was essential to be understood.

The labour of continually placing illustrative sentences on the board was irksome in the extreme, and therefore for the session commencing October last [1890] I drew up the eight introductory arranged diagrams which are now exhibited, and which appear to have given satisfaction. They are by no means exhaustive and they need much additional running comment.

Still they have been found convenient and the information they contain is indispensable. The beginner who would wish to read autograph prescriptions should learn far more than this; less he must not, provided always he be not content to halt, and stumble throughout his whole educational career.

These diagrams are commended to other teachers for adoption with any alteration, amplification or modification individual exigencies may suggest. They may be supplemented later on by English sentences to be translated into Latin.

To have these re-translation exercises stencilled is a great convenience, else they must be printed on separate slips (a plan entirely to be discouraged) or written out in full upon the black-board.

This is a matter of less importance, as abundant illustrations may be found in Pereira's excellent little book and elsewhere.

Let me assure those whom it may concern, that mere oral teaching in this department is useless. Our average students do not know the correct spelling of Latin terms commonly used in dispensing pharmacy.

Diagram I.

℞. Recipe.
(*a*) Quantity in Accusative.
Ingredient in Genitive.
R. Pulveris Rhei drachmam.
Aquæ Destillatæ unciam.

(*b*) An adjective agrees with its own noun.
Spiritus ammoniæ aromaticus.
Spiritus Ammoniæ Fœtidus.
Pulvis Ipecacuanhæ Compositus.

R. Tincturæ Chloroformi Compositæ.
Tincturæ Cardamomi Compositæ.
āa drachmas duas.
Extractum Cinchonæ Rubræ.
Extractum Cinchonæ Liquidum.

Neuter Nouns in *a*.
Cataplasma, ătis. Plural, Cataplasmăta.
Enĕmă, ătis. Plural, Enĕmăta.
Gargarisma, ătis. Plural, Gargarismăta.
Physostigma, ătis. Plural, Physostigmăta.
Theobroma, ătis [not Theobrōmæ, as in the U.S.P.].

Feminine Nouns.
Alvus, i. [no plural.] In translated English, plural chiefly used: "The Bowels."
Crystallus, i.

(*d*) Medical words ending in *io*.

(*a*) The government of the verb Recipe extends only to the actual prescription and ends after the abbreviation M., misce, or sign-signa or signetur.

Beyond that point a new sentence is begun and the noun should be in the nominative. Directions appended to a prescription form an independent sentence: thus, Misce, fiat mistura. "A fourth part to be taken every two hours;" should be translated, pars quarta secundis horis sumenda, not partem. In case of an active verb present in the text, the construction is the same as in ordinary Latin prose, thus: let the patient take a fourth part; sumat æger partem quartam.

Latin is a definite language, hence drachmam *is* one drachm, and unciam *is* one ounce.

The phrases drachmam unam, or unciam unam are frequently met with, but the numerical adjective is unnecessary.

(*b*) The agreement of the adjective with its own noun is shown in the official titles for spirit of sal volatile and fetid spirit of ammonia. It is the spirit which is aromatic or fetid, not the ammonia. Ipecacuanha is always a simple substance entering into compound preparations; the same applies both to chloroform and cardamom; but "rubræ" agrees with *its* noun "cinchonæ," because in this illustration it is the red cinchona, and might have been the pale or yellow variety. Lastly, it is the liquid extract of cinchona, not the extract of liquid cinchona.

(*c*) These neuter words in *a* are simply Greek titles in Roman letters and follow Greek rule.

(*d*) Feminine words ending in *io*, of which confectio, embrocatio, injectio, lotio, solutio, sudatio, and venæsectio, will serve as examples. I know of no exception in medical Latin.

Diagram II.

Verbs.

Active and Passive Voice.
Active with Accusative.
Sumat æger haustum.
Capiat ægra pilulam.
Mitte uncias octo.

Passive.
Accusative changed into nominative.
Haustus sumatur.
Pilula capiatur.
Unciæ octo mittantur.

Sum.
Same case after as before.
Sit dosis.
Sint Pilulæ parvæ.
Si tussis molesta sit.

Fio.
Passive meaning. Active form in *o*.
Fiat massa.
Fiant pilulæ duodecim.
Misce fiat mistura.

Passive.
Participles in *dus*.
Used as adjectives, and agreeing with substantives.

Haustus	Capiendus	capiendus.
Massa	Dividendus	dividenda.
Unguentum	Illinendus	illinendum.
Cataplasma	Imponendus	imponendum.
Embrocatio	Infricandus	infricanda.
Pilulæ	Mittendus	mittendæ.
Dosis	Repetendus	repetenda
Scrupuli duo	Sumendus	sumendi.
Gargarisma	Usurpandus	usurpandum.
	Utendus, a, um.	

The sole student difficulty in this diagram is the use of the verb Fio, for two reasons. First, because ending in *o* it is mistaken for an active verb, followed by an accusative. Secondly, because the English translation is in the active voice and confirms the error. We say, "Make twenty-four pills," which is "Fac (from facio) *pilulas* quatuor et viginti;" but the general phrase in a prescription is "fiant *pilulæ*, let pills be made."

The explanation is simple; correctness in this example seems very difficult to obtain.

DIAGRAM III.

In, meaning "in," Ablative.
In phialâ. In scatulâ.
In folio argenti.
In pyxide.
In, meaning "into," Accusative.
In pilulas divide massam.
Divide in chartas sex.
Mitte in phialam.
Serva in phialâ.
In, meaning "in some vehicle," Ablative.
E or *ex*,
E vehiculo idoneo.
E quovis crasso.
Ex aquæ cyatho.
Ex aquâ. E pulmento.
In (English), meaning "after."
Post, Accusative.
Post horam. In an hour.
Dimidium statim sumatur,
Reliquum post horas duas.
Let half be taken immediately,
The remainder in two hours.
Cum, C. or c̄, Ablative.
Cum cibo. Cum cibis.
Semi. Adjective, indeclinable. "Half."
Semis, *issis*. M. noun. "The half."
Cum semisse—"*and* a half."
Ad, preposition, "up to." Accusative.
Mistura ad uncias octo—(vel) sex.
An eight-ounce or six-ounce mixture.

The sole difficulty in this diagram is to distinguish between the indeclinable semi used thus—Semi uncia, or as a true contracted word Semuncia, semi-scrupulus or semi-granum, and the masculine noun semis.

To the perplexity of a student it is used chiefly in the ablative, the English "and a" being in Latin, cum = "with a." Example—

Take two grains *and a* half.
Recipe grana duo cum semisse.

DIAGRAM IV.

N. Duo duæ duo.
A. Duos duas duo.
D. and Abl.
Duobus duabus duobus.
Sing.: Cochleare, ia. D. and Abl., i.
Plur.: Cochlearia. D. and Abl., cochlearibus.
N. and A. Tres, tria.
G. Trium.
D. and Abl. Tribus.

Haustūs tres.	Doses tres.	Grana tria.
M.	F.	N.
Decem.	Undecim.	Sedecim.
em.	im.	im.

Viginti. [i] 20 Undeviginti. [i] 19
Duodeviginti. [i] 18
Triginta. [a] 30 Undetriginta. [a] 29
Duodetriginta. [a] 28
Centum. indecl. 100.
Mitte pilulas centum.
Ducenti. æ. a. 200.
Trecenti. 300 Sexcenti. 600
end in *centi*.
Quadringenti 400.
Quingenti 500. Septingenti 700.
Octingenti 800. Nongenti 900.
Declinable adjectives ending in *genti*.
Mitte pilulas ducentas.
Suppositoria quingenta.

MISCELLANEA.

Collyrium, ia.
Congius, ium, ios.
Cyathus. C. Vinosus.
Dosis. dosin. doses, Fem.
Granum, i. Grana duo.
Octarius, ium, ios.
Pro usu externo.
Scrupulus, um, os.

This purely elementary diagram needs no expla tion. Happy is the teacher who gets one hal contents clearly impressed on the mind of the stu and *producibly* remembered.

DIAGRAM V.

Latin Grain Weights.

℞. Recipe cum Accusativo.
1 Granum. Grana. N. duo. tria.
$\frac{1}{2}$ Grani dimidium or Semi-granum.
$1\frac{1}{2}$ Granum cum semisse.
$\frac{1}{3}$ Grani partem tertiam.
$\frac{1}{4}$ Grani quadrantem, or
Grani partem quartam.
Thirds, Fifths, Sixths, Sevenths and Eighths.
Partes tertias, quintas, sextas, septimas et octa
$\frac{3}{4}$ Grani partes quartas tres, or
Grani tres quadrantes.
$\frac{2}{3}$ Grani partes tertias duas.
$\frac{1}{6}$ Grani partem sextam.
$\frac{2}{5}$ Grani partes quintas duas.
$\frac{3}{5}$ Grani partes quintas tres.
$\frac{4}{5}$ Grani partes quintas quatuor.
$\frac{6}{8}$ Grani partes octavas sex.
$\frac{1}{12}$ Grani partem duodecimam.
$\frac{1}{16}$ Grani partem sextam decimam.
$\frac{1}{20}$ Grani partem vicesimam.
One, 1, equals partem.

A dozen or more of these fractional numbers sh be placed at random on the board, and the stu should himself write the correct Latin underne The moment he has grasped the general method, troubles in this direction are at an end.

DIAGRAM VI.

Time. De Tempore.

Minutum, i; Minuta, minute.
Minuta quinque, five minutes.
Horæ.
Pars sexta, ten minutes.
Pars quarta, fifteen minutes.
Pars tertia, twenty minutes.

Minuta quinque et viginti, 25 minutes.
Horæ dimidium, subs. } half an hour.
Hora dimidia, adj., }
Minuta quinque et triginta, 35 minutes.
Minuta quadraginta, 40 minutes.
Minuta quinquaginta, 50 minutes.

Hora, an hour.
Horâ unâ, 1 o'clock.
secundâ, 2 o'clock.
tertiâ, 3 o'clock.
quartâ, 4 o'clock.
orâ quintâ, sextâ, septimâ, octavâ, nonâ, decimâ,
undecima, duodecimâ.
5, 6, 7, 8, 9, 10, 11, 12 o'clock.

Every, Each. Omni, Quâque.
Omni tertiâ horâ.
Tertiâ quâque horâ.
in singular.
Every three hours.
Tertiis horis, in plural.
Horam, for one hour.
Horas duas, for two hours.

he authorized translation of the Bible is the exact dering of the Latin expression of time.

And he went out about the third hour; again he nt out about the sixth and ninth hour and did like- e, and about the eleventh hour he went out, and nd others standing idle."

'Yesterday at the seventh hour the fever left him."

he rule that duration of time is put in the accusa- e, without as well as with a preposition, is exempli- in "horam"—meaning for the space of one hour. rases like "per horam," "per horæ quadrantem," are ar in themselves and need no explanation.

DIAGRAM VII.

Ablative Absolute.

Fiat haustus invadente paroxysmo sumendus.
Fiat mistura urgenti flatu sumenda.
Cujus capiat cochleare amplum acido infestante.
Fiat haustus urgenti dolore capiendus.
Vomitu finito.
Pulvis omni mane absente febri sumendus.
Frigore adhibito
Calore adhibito
Tum decantato liquore exprime.
Cæteris paribus.
D.V.
Perstet in usu misturæ dyspnœâ superveniente.
Caute pulverem serva vase bene obturato.
Misce fiat linctus tussis urgentibus paroxysmis.
Misce fiat lotio phialâ prius agitatâ usurpanda.
Applicetur embrocatio cephalagiâ instanti.
Dosi post horas duas repetitâ.
Linimento diligenter nocte maneque infricato.

DIAGRAM VIII.

Gerund. Gerundive. Ablative Absolute.

Fiat pilula ter die sumenda.
Fiant pilulæ duæ ter die sumendæ.
Calore spissatus liquor.
Liquore calore spissato.
Pulvere bene trito.
Pulverem bene terendo.
Phialâ prius agitatâ.
Phialam bene agitando.
Mitte embrocationem sæpe utendam.
Embrocatio sæpe utenda.
Sumat cochleare amplum misturæ sequentis sæpe embrocatione utendo.
Embrocationem sæpe applicando.
Lotio ter in die utenda.
Lotione ter in die utendâ.
Lotione ter in die utendo.
Superbibendo haustum.
Augendo vel diminuendo dosin.
Sumat cochleare minimum augendo dosin ad minima duo.
Nom. Omnia bene miscenda.
Accus. Omnia bene miscendo.

These two concluding diagrams may be taken together; they seem to present insurmountable difficulties to the non-classical student, and to be not less perplexing to many whose school learning has been in abeyance.

I am afraid that oral explanation with much discursive illustration must accompany the teaching of this part of the subject, a knowledge of which is indispensable if autograph prescriptions are to be understood. In medical Latin this ablative absolute is nearly always a noun united with an adjective or participle used as such, standing by itself in the sentence; capable of being removed without altering the construction of the rest of the sentence; always an additional remark by way of comment or special instruction; and always capable of being written in a bracket.

The true difficulty consists in the English translation seldom corresponding word for word to the Latin. Take parts of Diagram VII. as an example. Invadente paroxysmo: when the fit comes on. Urgenti flatu: when troubled with flatulence. Acido [noun, Dr. Paris] infestante: in case of acidity. Urgenti dolore: on an attack of pain. Absente febri: in the absence of fever.

There are two languages, Latin and English, and here they are idiomatic and distinct. So we are glad to refer to a popular adopted phrase, "cæteris paribus," other things being equal; and to the mysterious letters invariably attached to the announcement of a sermon, and as invariably in a bracket, [D.V.], Deo volente, "God being willing," or in better English, "by the permission of God."

I would willingly omit the last diagram but that I find it a necessity.

The Gerund, it has to be explained, is the active form of a verb and governs the same case as the verb from which it is derived; this is most frequently the accusative, but the ablative when *utor* is employed.

Unfortunately it has the same spelling as the passive participle in dus, grammatically called Gerundive. The Gerund corresponds to the English particle which ends in *ing*.

Thus, terendo *in rubbing*; agitando, *in shaking*;
applicando, *in applying*; utendo, *in using*;
superbibendo, *in drinking at the same time*;
augendo, *in increasing*; miscendo, *in mixing*.

All these gerunds govern the accusative, except utor, which as above stated is followed by the ablative.

The Gerundive, of which capiendus, imponendus, mittendus, dividendus, may be taken as examples, is in the passive voice, generally to be translated by "to be;" and never governs anything, but is always in agreement with the noun, precisely like an adjective.

Thus, Pilulæ duæ sumendæ, two pills *to be* taken.

Embrocatio utenda, the embrocation *to be* used.

Three lines in the diagram give the key to the whole subject.

Lotio ter in die utenda (gerundive).
The lotion *to be* used three times a day.
Lotione ter in die utendâ (ablative absolute).
The lotion being used three times a day.
Lotione ter in die utendo (gerund). This seems a clerical error, but it is not, and it should be translated, in (or while) using the lotion three times a day.

Having mastered these preliminaries the student may venture with more confidence on Autograph Prescriptions. Of printed formulæ, abbreviated or in full, there are many serviceable compendiums; they are both cheap and good, and are extremely useful in the direction of learning words and phrases. None of them will teach the art of deciphering the peculiar handwriting of the medical profession. I would open two Government schools: one to teach the clergy how to read, and the other to teach the prescriber how to write.

While I hope the day may come when the necessity for teaching Elementary Latin in our Schools of Pharmacy may cease, the study of Autograph Prescriptions should never be omitted from the syllabus. To be of practical use these autographs should be mounted separately and not presented in book form. The volume soon becomes worn and its contents almost illegible; moreover, comparatively few students at a time can consult its pages.

I am firm in one article of faith, that two students reading together and comparing notes, correcting each other's errors and supplying mutual deficiencies, work at supreme advantage. The chances of slurring over difficulties, or of falling into positive mistakes are greatly diminished.

To ensure their union having a beneficial result the pair should be sufficiently advanced in preliminary groundwork; both should have passed the stages of learning grammar rules and the ordinary run of words.

Then let the two friends see how many good Latin phrases they can raise respecting misturæ, guttæ, linimenta, embrocationes, haustus, pilulæ, emplastra, unguenta, enemata, pulveres, gargarismata, suppositoria, and the like.

Or let them stand up and try by personal demonstration how many parts of the body each can correctly name, thus: Caput, capillus, auris dextra et læva, frons, oculus, palpebræ, supercilia, gena, mala, nasus, nares, os, gingiva, dentes, labia, lingua, mentum, barba, cervix, nucha capitis, claviculæ, scapulæ, pectus, sternum, dorsum, tergum, costæ, latus, lumbi, brachium, humerus, lacertus, cubitum, carpus, manus, digiti, palma, ungues, crura, femur, sura, genu, patella, pes, cor, pulmones, jecur or hepar.

A text-book will supply the blanks (*lacunæ*) and soon the series will be complete, and each may say "Civis Romanus sum."

This plan may be extended until without weariness a whole mass of medico-technical latinity may be acquired.

The diagrams exhibited of sentences for translation from English into Latin are those in daily use and may be varied indefinitely.

They are stencilled in order to save the demonstrator trouble.

For about a month or six weeks the task of retranslation seems hopeless, especially in the case of those who have been accustomed only to abbreviations. From that date the prospect brightens, and it is remarkable what facility is gained.

A student may read books by himself for a very long time and make little progress; he will gladly welcome a weekly exercise of his powers when his work is rigidly corrected and conversationally explained.

The President expressed the indebtedness of the Association to Mr. Ince for his interesting and useful paper. He thought that the state of the present Preliminary examination was a subject of regret, and it was time the Pharmaceutical Society moved actively in the matter. A paper on idiomatic Latin scarcely afforded matter for discussion, but Mr. Ince would be glad to hear any remarks that might be made.

Mr. Elliot said he had listened with great pleasure to Mr. Ince, and would like to raise the question as to the application of the Neo-Latin term "adeps lanæ," which appeared in the Addendum to the B.P., 1885. He submitted that this term was used in the Pharmacopœia for a substance that was not obtainable. He had sent orders to wholesale houses for "adeps lanæ," B.P., and they invariably forwarded preparations labelled "lanoline anhydrous" or "adeps lanæ (lanoline anhydrous)." Samples were passed round. He had decided that the only way of obtaining it was to heat adeps lanæ hydrosus on a water-bath and separate the supernatant fat. He stated that some time since a meeting of wholesale dealers was held at which it was decided that whenever "adeps lanæ" was ordered, lanoline should be supplied; but this was not what his customer required, it was a "preparation not of the nature and substance demanded," and herein was his difficulty. He handed round a tin labelled "lanoline anhydrous," but on account of the wording of the label he did not believe this to be a pure substance. The label read:—"Note. An additional quantity of from 20 to 30 per cent. of oil or vaseline may be used in making ointments with lanolin." These words implied that the contents of the tin were already mixed with oil or vaseline, the term "anhydrous" applying equally as well to the mixture as to the pure product. He had also obtained a specimen which contained upwards of 30 per cent. of vaseline.

Mr. Ince said there was no doubt that "adeps lanæ" could not be obtained by ordering it under its official name.

Mr. Helbing had not the least doubt but that the tin labelled "anhydrous lanoline" was really such, and that it did not contain oil or fat. There were in the market three different preparations of lanoline. (1) Lanoline itself which contained 30 per cent. of water; (2) anhydrous lanoline free from water, fat, and oil, and undoubtedly the preparation indicated by the name adeps lanae of the Pharmacopœia; (3) unguentum lanolini, an ointment base, originally recommended by himself, prepared by mixing 70 parts of lanoline with 30 parts of vaseline. He thought the Pharmacopœia compilers would have done better to have adopted the established names instead of "adeps lanæ" and "adeps lanæ hydrosus," for by adeps lanæ medical men certainly understood lanolin and not the anhydrous body.

Mr. Elliott said the preparation should be obtainable under the Pharmacopœial name, but it was not.

The President said there should be no difficulty in obtaining the anhydrous preparation. It was quite possible for a wholesale house to overlook the fact that "lanolin" was a synonym for "adeps lanæ hydrosus." He held that the retailer would be responsible for the preparation after it was handed over the counter.

A vote of thanks to Mr. Ince, proposed by Mr. Stark and seconded by Mr. Helbing, concluded the proceedings. Time did not permit of Mr. Ince giving the second part of his paper on "Neo-Latin."

THE PRELIMINARY EXAMINATION.

The last meeting of this session was held on Thursday evening, April 16. Mr. A. C. Stark, President, in the chair at 9 o'clock.

Mr. Stark announced that the subject for discussion was the Preliminary examination. It might surprise some members that they should be discussing the subject when it had been discussed some years ago and a resolution passed unanimously which was practically the same as the one he was about to propose. But as new members were constantly coming forward it was as well to discuss a subject like this, which was of primary interest, especially as they were on the point of a new departure in pharmacy, not only from the legal but from the educational point of view. The recently revised schedule contained no mention of the Preliminary examination, but many held that that required re-organization more than the others. The points to be discussed were first whether it needed altering at all, and secondly, if so, in what direction? And they were desirous of obtaining the opinion, if possible, of each member of the Association on these points. Personally he was strongly in favour of mak-ng the Preliminary much stiffer, because his own experience showed the desirability of doing so. The Preliminary differed from the other examinations, it being framed more in the interest of the student than that of the public, because unless a young man had a sound educational basis he was not able to acquire that subsequent knowledge which he would require for passing the other examinations. No doubt students would deprecate the examination being increased in stringency, but for his own part he should have been grateful if it had been so, because he found in his after career that he had had to study up subjects which he ought to have been forced to learn when a boy. At an early stage young men did not feel the want of this Preliminary examination at all, but when they got older, and engaged in the struggle for existence, they found they were hampered from the want of Preliminary knowledge. Apart from this he was quite sure the public would be more inclined to recognize them as educated men if a higher standard were required in the first place. With regard to the points in which the examination should be extended he thought the first necessity was algebra, at least as far as equations, as there were many subjects comprised in the new schedule which could not be properly grasped without a knowledge of algebra; gravitation, the conservation of energy, and many points connected with physics could not be understood without some elementary knowledge of mathematics. The same with regard to Euclid, and he was also an advocate of a modern language being required. He had had several students who were good Latin scholars, and fairly good mathematicians, but who did not know a word of a modern language. He concluded by moving:—

> "That this meeting is of opinion that the scope of the Preliminary examination should be extended so as to constitute a better test of a youth's general education and ability, and that it should be compulsory before entering on apprenticeship."

He then read a letter in which Mr. F. Rogers, one of the Vice-Presidents, supported the view put forward n the resolution and expressed in the columns of the Journal by .Mr. Saul. Mr. Rogers laid particular stress on the examination being passed before apprenticeship.

Mr. Seccombe said it was with deep interest he had read the able paper of Mr. Saul on the Preliminary examination, and the letters which subsequently appeared in the columns of the *Pharmaceutical Journal*. He had listened with equal interest to Mr. Stark, and said it was gratifying to note that those who had aken the initiative in this matter either had been or hen were prominent members of the Chemists' Assis-ants' Association. And the occasion was a fitting one. They were to have an extended syllabus for the higher examinations, and they were agitating for a curriculum; surely an inquiry into the state of the Preliminary examination in order to make it, if pos-ible, a guarantee of a sound general education was of he utmost primary importance. It was a subject that had impressed itself strongly upon his mind, for he was persuaded that just as a nation was judged by the individuals it produced, so the profession of pharmacy would be estimated by the personal worth of its indi-idual followers. The Preliminary examination, as at present constituted, was nothing but a floodgate hrough which rushed headlong the unsuspecting ictims to a career for which they were in no way dapted. The case of the board schoolboy who excelled the Preliminary candidates had been referred o, and quite recently a case came under his own bservation of a lad who had not received the average oard school education passing the "Preliminary" on he merit of a good memory alone. He had learnt his Cæsar off by heart, and he had committed to memory three or four good essays, previously composed for him, one of which he was able to reproduce in his paper on English Grammar. He did not blame the boy, but what could he say in favour of such a system? There had been put forward two ways of adjusting the Preliminary test—(1) By extending the examination itself; (2) By accepting certificates from specified examining bodies. The number of subjects suggested by which the Preliminary could be made more stringent were rather bewildering. Botany, chemistry, Greek, French, mechanics, history, geography, Euclid, algebra, and other branches of mathematics had been earnestly recommended. Herein a difficulty presented itself, the difficulty of selection. It was generally agreed, however, that a deeper study of mathematics should be insisted upon, and of all subjects he thought that this was the most useful that could be added. It was quite possible that this extension of the examination itself would serve the necessary end, but personally he would do away with the examination altogether, and accept in its stead certificates from specified examining bodies. In order to pass such examinations as the first or second-class College of Preceptors in the first division, or the Oxford and Cambridge local examinations in honours, a considerable amount of training was required. A man could not cram for these examinations if he was anxious to show up well in the pass list, and he was convinced that the acceptance of one of these certificates in lieu of a Preliminary examination, provided it included Latin, English, and mathematics, would be the soundest criterion of fitness to enter upon the calling of a pharmacist, and there would be few certificates presented that did not contain two or three subjects besides those absolutely necessary. Moreover there would be the prospect of a better class of chemists. It was pretty well decided that it was to education and not legislation pharmacists were to look for attainment to that prosperity and subsequent acknowledgment they considered themselves entitled to receive. To begin well, therefore, was half the battle. It was indeed unfortunate that there were those entering the ranks year after year to lower the status of the calling, to serve monetary ends, to find fault with the Society and everything it did, simply because they did not understand its politics, to be the chief instruments in preventing that unity which was so desirable and essential amongst chemists, and who would eventually become the drones of pharmacy. Here was a state of things actually existing, and when he said that the Pharmaceutical Society had the remedy in its own hands he expressed an opinion coincident with that of the majority of those who were interested in the subject of the Preliminary examination.

Mr. Stead remarked that Dr. Stevenson's report on the annual examination contained much for reflection. He there stated that the failures for the Preliminary during the past year were nearly 60 per cent., although the examination was by no means severe. These failures had a very important bearing on the subsequent failures to pass the Qualifying examinations. The main point in the Preliminary should be to test the quality rather than the quantity of education the student had received, in order to be sure that he was fitted to acquire that further technical and scientific knowledge which he would require in after life. It should not allow anyone to pass to whom the passing of the Minor or Major afterwards would be an insurmountable difficulty. Some spent years and never passed the Minor and others scrambled through with great difficulty; and these he considered typical results of the present system. The present Preliminary only demanded a very ordinary amount of education or application, there was no appreciable mental discipline necessary. The result of all this was that pharmacists only ranked as ordinary shopkeepers. There was a great desire at the present day for more protection and a higher status, but he saw no prospect of that desire being gratified. On the continent their confrères were protected, but they were a more highly educated body, and when the bulk of pharmacists in this country took up the same position, it would be acknowledged that they stood in a different position to the ordinary tradesman. He thought it would be a good thing to take a hint from the Teutonic mode of making the first examination the most difficult of all.

Mr. Hillhouse regretted to see so few members present to discuss this important question. He thought increased stringency in the Preliminary would prevent badly educated youths entering the ranks of pharmacy. He thought that was an end they would all desire. Sentiment was a very good thing, but it was not easily convertible into £ *s. d.* They might talk about administering to the welfare of suffering humanity, but until they showed that they were a better educated class of men, neither their social nor their pecuniary position would be enhanced. They would all agree that the better a boy was trained at school the better he would be qualified to follow any business career. He doubted whether they were all agreed however on the minimum of education requisite for a Preliminary certificate, or that he should pass this examination before entering on his apprenticeship. The principal point to insist upon was evidence of mental training, so that the youth might be competent to pursue his further studies. It was comparatively easy to cram a boy with a good memory with a certain amount of useful knowledge, but a different thing to thoroughly educate him.

Mr. J. C. Umney remarked that as the super-structure of the higher examinations was being raised, so ought the basis upon which it rested to be enlarged and rendered more substantial. The advantage of a more complete Preliminary examination was proved by the results of last year's competition for the Bell and Redwood scholarships, all the successful candidates being young men who instead of passing the Preliminary examination of the Society had passed the London Matriculation Examination. The President had laid stress on the importance of mathematics, but it was an open question with him whether a modern language was not even of more importance.

Mr. Sherlock considered it a great grievance that pharmacists did not hold a higher position in the estimation of the public. He had recently seen an advertisement issued by a board of guardians for a dispenser whose wife was to cook and attend on the resident medical officer, and they often saw as a condition in advertisements that applicants were to send particulars of age, height and a photograph. If the calling were at all scientific what did these things matter? Age might be some consideration, but what about the height, and why should there be a photograph? It showed that those who engaged assistants put very little value on their mental capacity. He was at present a hospital dispenser, and he found that many of the patients, especially the women, who were politically polite to the physicians and pupils, always addressed him as "young man." It appeared to him that the reason for this distinction lay in the higher Preliminary examination which all medical students had to undergo. It was recognized that they were in a higher social position, and were better educated. The remedy would be that laid down in the resolution. He thought they would all be in favour of increased difficulty in this examination, and the principal difference would be as to the lines which it should take, some preferred mathematics and some modern languages. He was quite convinced that too much attention was paid to Latin, which was really of very little value, because classical Latin was not that used in prescriptions. He rather thought a modern language, especially German, was of the first importance for those engaging in pharmacy; a stiffer examination would lead to fewer members, and a select body of pharmacists. The majority of chemists in small towns were Minor men who would never pass the Major, and they might go in for selling Epsom salts and senna and a superior grocer's business, whilst the select body would find their employment in other ways, particularly in chemical analysis, the investigation and preparation of new remedies, and so on. There was quite sufficient scope for educated men in pharmacy if there were not too many of them. With regard to the other examinations, he noticed that Mr. Wills had published a pamphlet dealing with the curriculum, and proposed changes, and quoting extensively from the reports of the former Government visitor, Mr. Greenhow, but as against that they might put the report of Dr. Stevenson, who was distinctly in favour of the curriculum and the higher standard.

Mr. Harrison also supported the resolution. It seemed to be taken for granted that it would be an advantage for the Preliminary to be passed before apprenticeship, but there might be something to be said on the other side. When a youth had passed the Preliminary he knew it was a long time before he had to pass the Minor, and there was, therefore, no particular incentive to study, whereas if the Preliminary was still in front of him he would have that incentive, and so might keep up studious habits, which would afterwards be useful to him. They were all pretty well agreed as to what the scope of the Preliminary should be, and he thought Mr. Saul had expressed the opinion of the majority. Elementary mathematics, and a little Euclid were very useful as training for the mind, but the importance of modern languages could not be over-stated. The British pharmacist was generally very useless away from England, whereas the continental generally had two or three languages at command. If the Preliminary were stiff enough to weed out the incapable men he thought it would largely affect the number of failures in dispensing, which were due he believed not so much to want of skill in manipulation as to the lack of brain power and general capacity.

Mr. Helbing said this matter was rather out of his line, not having been educated in this country, but having lived here for some years he was very glad to see that steps were being taken to increase the stiffness of the Preliminary examination. In Germany there was no Preliminary at all in the same sense, because no one could enter on apprenticeship without showing a certificate that he was up to a certain educational standard. Then after three years he passed the examination for assistants, which was about equal to the Minor. It had been suggested that if the Preliminary were passed before apprenticeship there would be no object to work for. He might say that in Germany at least once a year pupils were supervised and examined to some extent by special examiners who came round from time to time, their visits not being announced beforehand, and who convinced themselves whether the apprentice was making due progress in his studies, keeping the necessary books, etc., as he was required to do by law. The great thing required of all the calling was to support the Pharmaceutical Society, and especially to support it in passing an improved Pharmacy Bill; then a higher standard of education would gradually be introduced and English pharmacists would take a higher social position.

Mr. Stead then formally seconded the motion.

The Chairman in putting it, said he considered mathematics absolutely essential. Anyone who attempted to teach light and heat to a man who knew nothing about mathematics would find the task utterly hopeless, and he believed that many of the failures in dispensing arose from the same cause.

The motion was then put and carried unanimously, and the meeting concluded.

OTOGRAPHIC SOCIETY OF GREAT BRITAIN.

t the meeting held on Tuesday, March 14, J. isher, F.R.S., President, being in the chair, Messrs. C. Dent, T. H. H. Harrison, J. D. Waller, and H. ng, M.A., D.C.L., were elected members of the iety.

he President congratulated Mr. H. Perigal, who had ed the Society in the first year of its existence, on ining his 90th birthday.

Ir. Perigal having responded,

Ir. W. Willis read a paper on "Platinotype." In paper the author described a process he had ked out in 1873, and afterwards gave a sketch of process as he described it in 1878. He also referred he hot bath process of 1880, and read a lengthy de- ption of the cold bath process which he brought ore the Camera Club Conference of 1888, and gave lemonstration of the process. The author next wed how by this process it was possible to obtain nts upon wood for the use of engravers, etc., and icluded by exhibiting a number of scales of tints to w the action of developers of various strengths at erent temperatures.

he President having proposed a vote of thanks,

Ir. J. Spiller inquired which process Mr. Willis con- ered preferable, the hot or the cold; he also asked v the platinum was to be recovered from the bath.

Ir. W. E. Debenham considered there was more dation in the early prints, and inquired whether that s due to the gloss.

Ir. Chapman Jones asked whether Mr. Willis did find that a bath which had been used from some ee or four prints gave a different result with the ne negative?

Mr. J. Gale wished to know whether the cold bath cess was applicable to rough surfaced papers?

Mr. Willis, in reply, thought that when the cold th was perfected it would be the preferable one, as th it it seemed possible to do anything that was shed. The platinum was recovered by adding excess hydrochloric acid and boiling with zinc. He con- lered the gradation was entirely in the hands of the rker. He agreed that every print did alter the com- sition of the bath, but this might be overcome by ding a definite quantity of fresh solution after de- loping every two or three prints. He avoided getting um on the print by violently rocking the developing sh. The cold bath process gave excellent results th rough papers.

Mr. J. Spiller, having taken the chair, drew attention a specimen of so-called photography in colours, om M. Lippmann, and pointed out that it did not iow the blue as well by gaslight as by daylight.

Mr. Chapman Jones explained that it was taken by e light of the electric arc.

Mr. T. Bolas did not think the colours were as well ndered on this plate as on the albumenoid paper Mr. arnerke exhibited at the last technical meeting. He nsidered that the spectra Becquerel obtained were uch more satisfactory than this specimen of M. Lipp- ann's results. He thought it was well known that if a ery thin plate was exposed to a very strong light for a ng time a similar irridescent appearance was obtained. e did not consider that the example exhibited was all convincing that M. Lippmann had made any pro- ress in photographing colours.

Mr. Chapman Jones thought the important point as that M. Lippmann had been able to fix these hotographs. This Becquerel had been unable to do.

Mr. L. Warnerke redescribed his experiments, and xhibited specimens of the colours he had obtained n albumenized paper.

Mr. Sebastian Davis had obtained similar results to hose described by the last speaker.

Mr. W. H. Harrison said that probably the first aguerreotype was relatively no better than the feeble specimens of M. Lippmann's work exhibited that evening. He wished to know whether the specimen was exhibited with M. Lippmann's knowledge and consent.

The Assistant Secretary replied he did not know.

Mr. Harrison continued that any public discussion upon it might be unjust to M. Lippmann, who had proved the truth of the theory first published by Lord Rayleigh that heliochromes were due to the interference of light and could be fixed. It was too late in the day to question the genuineness of the discovery, which had been recognized by the members of the Academy of Sciences of Paris and the Photographic Society of France.

Mr. H. M. Elder pointed out that three totally different methods of producing colour had been brought forward that evening. He believed the colours obtained by Mr. Warnerke were due to the salts of silver described by Carey Lee under the name of photo-salts. Then there was M. Lippmann's method, the most important of all. The third method was due to diffraction caused by the scattering action of small particles.

Mr. Spiller, in closing the discussion, said they were indebted to Dr. Lindsay Johnson for bringing this specimen from Paris, and trusted that ere long M. Lippmann would favour the Society with a finer example of his work.

THE WESTERN CHEMISTS' ASSOCIATION (OF LONDON).

At a meeting of the Western Chemists' Association, held on Wednesday evening last, a note on "Pharmacy in Relation to Medicine," by Mr. J. C. Hyslop, was read. The note will be published in our next number.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The annual business meeting of the Brighton Association of Pharmacy was held at the Athenæum, North Street, on Friday, April 17, Mr. W. D. Savage, J.P., President, in the chair.

After the minutes had been read and confirmed the Honorary Secretary presented the financial report, which showed a balance at the savings bank of £18 17*s*. 10*d*.

On the motion of Mr. W. D. Savage, a resolution was passed expressing sympathy with Mrs. Cornish and family on the loss by death of Mr. W. Cornish, for many years Treasurer of the Association.

It was next decided to offer to the Committee of the Brighton Junior Association of Pharmacy two prizes of the value of one guinea and half a guinea respectively for competition amongst their members.

The Ball Committee reported a profit of £5 on this year's ball, and on the motion of Mr. Williamson, seconded by Mr. Marshall Leigh, it was decided to send the amount to the Benevolent Fund of the Pharmaceutical Society.

The following officers were elected for the ensuing year: President, Mr. W. D. Savage, J.P.; Treasurer, Mr. J. R. Gwatkin; Hon. Secretary, Mr. Marshall Leigh. These also to form the Committee together with Messrs. Williamson, Costerton and Nosworthy.

On the motion of Mr. Marshall Leigh, seconded by Mr. Williamson, it was decided to present a congratulatory address to the Pharmaceutical Society at the official celebration of the jubilee on May 26.

A vote of thanks to the chair brought the meeting to a close.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Midland Counties Chemists' Association was held at Mason College, Birmingham, on Tuesday, April 21, at 8.30 p.m., when a paper was read, entitled "Methods for Taking Specific Gravities," by Mr. John F. Liverseege. Mr. Alfred Southall took the chair.

The paper, which will be printed in a future number, was copiously illustrated, and apparatus new and old were exhibited.

A vote of thanks was accorded the author by acclamation.

The attendance was not good owing, no doubt, to the inclement weather.

The Secretary announced the receipt of two handsome new cabinets of materia medica specimens, valued at £15. One from Messrs. Evans and Son, Liverpool, and the other from Messrs. Evans, Lescher, and Webb, London. The Pharmaceutical Society had also presented a copy of the Register of the Pharmaceutical Society.

A vote of thanks was accorded the donors on the proposition of Mr. Perry, seconded by Mr. Wilfred Southall.

Parliamentary and Law Proceedings.

Poisoning by Prussic Acid.

A case is reported from Sheffield in which a man named Dawson, who is said to "have been drinking for some weeks," presented two prescriptions at the establishment of Mr. Botham, pharmaceutical chemist, one to be made up for a person staying at the same hotel as himself and the other for the cook at the hotel. He was informed that about twenty minutes would be required to make them up and left them accordingly. Upon his return he wished to purchase some "dog poison," but was informed that it could not be supplied except in the presence of a witness who could certify as to the purpose for which it was to be used. Dawson went away and fetched a man who signed the poison book, and was then supplied with two drachms of prussic acid (Scheele). Dawson seems then to have gone back to the hotel and called for a glass of water, and was shortly afterwards found lying on some straw in a shed in the hotel yard. He was removed to the hospital, but died within a quarter of an hour of his arrival.

Obituary.

Notice has been received of the death of the following:—

On the 29th of March, Mr. Sharman Robbins, Norfolk Street East, Wisbeach. Aged 77 years.

On the 13th of April, Mr. Thomas Knowles Hey, Chemist and Druggist, Hebden Bridge, Yorkshire. Aged 78 years.

On the 17th of April, Mr. John Slater Meadows, Chemist and Druggist, Wantage, Berks. Aged 65 years.

On the 18th of April, Mr. Rann Dolphin Hicks Gaunt, Chemist and Druggist, Union Street, Southwark. Aged 69 years. Mr. Gaunt had been a member of the Pharmaceutical Society since 1869.

On the 19th of April, Mr. John Whitwell, Chemist and Druggist, Peterborough. Aged 84 years.

BOOK RECEIVED.

Sea-Sickness, Cause, Prevention and Cure: Voyaging for Health. With an Appendix on Ship Surgeons. By Thomas Dutton, M.D., etc. Second Edition. London: Baillière, Tindall and Cox.

Review.

New Official Remedies. By Ralph Stoc
M.D.*

This useful and compact little volume cont
concise account of the Additions made in 1890
British Pharmacopœia of 1885.

The additions are forty-four in number and
seventeen are new drugs. The additions ar
lated alphabetically, and the source, charact
parations, action and therapeutical uses of
are briefly described. It is an invaluable litt
for practitioners of medicine.

Correspondence.

*** *No notice can be taken of anonymous*
tions. Whatever is intended for insertion must be
ticated by the name and address of the writer;
sarily for publication, but as a guarantee of good

The Preliminary Examination.

Sir,—I need hardly say that I have followed
interest the correspondence which has been pub
the last few numbers of the Journal with referen
Preliminary examination, realizing as I do the im
of a thorough training for the pharmaceutical
I only feel at liberty to speak on the subject
standpoint of one who has to take part in cond
further studies of some of those who have passed
the examination needs remodelling is, I think,
the letters that have appeared, altogether apart
priori considerations.

Speaking as a teacher it seems to me that
modelling the further course of study of the
might well be kept in view. While not
the advantage of general culture, I should be
advocate the inclusion of such subject or subjects
lead up to the special sciences which now form the
ments of the Minor examination. I do not
issue with Mr. Ince in the question of whether
or not to "drag into a strictly scholastic exa
diluted portion of a science subject," but I should
point out that at present a large number of the
who come under my care have no idea of the way
science at all. I notice in many an utter abse
power of detailed observation. A specimen shown
presents to them at first none of the salient
which it is intended to illustrate, and the same
to be brought out time after time till they
acquire the power of appreciating such disting
features. In fact they look at the specimen as
and disregard the minor points on which frequ
individuality depends. As a result of this, a
ciency soon appears. They have little power of
conclusions from what they see. These two
observation and deduction, are at the very foundation
scientific training. The result is that such
make much slower progress than their more
comrades who come here with a certain amount of
rience in these two directions.

Mr. Saul's suggestion to include an acquaint
the elements of Euclid will, if carried out, be
value in developing the power of reasoning from
facts; but this will not be sufficient unless the fac
observing is also cultivated. Why would it not be
ble to include in the Preliminary examination so
mentary science in which this power is essential?
a subject might very well be elementary physics, tre
such a way as was proposed by Professor Armstrong i
schedule which formed part of the report of the com
of the British Association on the teaching of chem
etc., presented to the meeting in Newcastle in 1889.
mentary botany again, based on actual practical exa
tion of the general features of the flowering plant,
be a very valuable subject to develop the power I am
vocating. The introduction of such work would

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* Percival and Co., King Street, Covent Garden.

ıer purpose, helping to make the Preliminary an in-
ıction to the subjects of the Minor, so that the three
ınations now held would be related to each other
ı more thoroughly than they are at present. This
can be seen to underlie the examinations of the Uni-
ty of London, where the matriculation examination
s as an introduction to those for degrees, both in arts
science, besides affording evidence of the attainment
ertain standard of general education.

notice that a great many of your correspondents call
ıtion to the very low standard at present required in
Preliminary. This appears to me one of its great de-
. Why could not such a standard be taken as that of
unior local examination conducted by the University
ambridge? For my own part I should like to see this
ınation substituted altogether for the Preliminary as
conducted. A detailed discussion of this point would,
ever, take me beyond the limits of a contribution to
correspondence.

, *Bloomsbury Square.* J. R. GREEN.

THE PRELIMINARY EXAMINATION.

r,—Having been unable to be present at the meeting
he Chemists' Assistants' Association last Thursday, I
therefore, with your permission, express my views
ı the subject through the medium of your most valu-
columns.

rstly, then, I am of opinion that the "Preliminary exami-
on," consisting as it does of essentially three subjects,
mentably deficient in that groundwork which would
f advantage to the embryo pharmacist. I admit the
ective subjects taken individually are sufficiently severe;
I think algebra, including simple equations, geometry,
ading Euclid books 1 and 2, and natural philosophy,
ially hydrostatics and pneumatics, should be at least
ıded. It should also be compulsory that this examina-
be passed prior to apprenticeship or pupilage. This,
ı, is my view of the Preliminary examination; but if
will allow me whilst speaking upon examinations to
e another assertion I shall esteem it a favour. I am
pinion the "Minor" examination is not above criti-
ı; in fact, I think no examination conducted in the
e manner is, for although I am prepared to admit
tical and *viva voce* work should be a fair test of a
lidate's knowledge, a very much fairer test is that of a
ten paper, together with practical and *viva voce* work.
eak thus forcibly because, being engaged in tutorial
k and acting as assistant examiner in a Governmental
urtment, I am in a position to observe that which
her might fail to see. Mr. Carteighe—most able Pre-
nt—in his longsightedness undoubtedly included this
ıge in the Pharmacy Acts Amendment Bill, having
erved the same thing. My idea of a model examina-
is a written paper for the first part, practical work for
second part, to be followed by the *viva voce* or third
, bearing chiefly upon any weak points which the can-
te may have evinced in the foregoing portions of the
nination; a system such as this would be fairer both
the candidate and examiner.

r. Saul, if I remember rightly, describes many candi-
s for examination "as deficient in intellectual capa-
." For my own part I do not think this is the case; I
upon the average pharmaceutical student as a sharp
w lacking opportunity rather than sense. Mr. Car-
ıe's Curriculum Bill will remedy this.

kaminers, it must be borne in mind, are but men, and
ndidate with fluent speech and pleasing manner may
an examination where a better man not gifted with a
ery tongue would fail. It is therefore policy to en-
thorough education previous to examination, remem-
ıg education does not mean "cram," or a course of
e months at a so-called school, but true study extended
a lengthened period, with intermediate examinations
st the progress of the pupil.

FREDERICK DAVIS.

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r,—Although Mr. Saul's estimate of the average in-
ctual capacity of the young pharmacist must fairly be
down as at least pessimistic, we owe him a debt for his
k exposition of what is an undoubted evil. So to
k, many young men are lured into pharmacy by the
comparative easiness of the Preliminary examination; and the subsequent discovery of the necessity for genuine preparation for the Qualifying examination is not expected by them, nor by those responsible for their indentures.

The admirable scheme fathered by the President would, however, help to modify even Mr. Saul's estimate of the average mental capacity, derived as it doubtless is in the examination room; but as he has so clearly and logically proved, would not strike the root of the evil. The case for immediate action is well defined in Mr. Saul's pithy article—those who know him, know he does nothing by halves—and it is to be hoped that the large support his proposition has elicited, will compel the Council, and I believe not unwillingly, to take immediate action.

Edinburgh. GEORGE LUNAN.

THE PRELIMINARY EXAMINATION.

Sir,—I have read the proposals of extending the Preliminary examination, and of compelling the aforesaid examination to be passed by all youths desirous of becoming chemists, before entering a chemist's shop to be taught the practical part of the profession, with very great interest. Considering the business of a chemist now-a-day, the examinations are far too great at the present day, without any extension, whatever. It is as well to study for a doctor and done with it. It seems anything but fair to compel youths to pass the Preliminary before being placed under the supervision of a chemist to be taught the business part. There are many youths (whose parents have not the means of giving them grammar school education) who have far better brains for a chemist than many youths whose parents go to a great expense to have the studies drilled into their heads, and by mere chance get them through the examination. The former youths, attaining the degrees of a chemist, turn out to be far better practical men than the latter, because all will surely own that work done willingly is better than work done under compulsion. Now if youths are to be compelled to pass the Preliminary before entering a chemist's shop, intelligent youths with little means must be stamped on, and instead of raising themselves into a better position of life and education, they must follow their father's footsteps and go to the puddling furnace, cotton mill, or whatever industry surrounds them. Must the ignorant remain ignorant under the eyes of their fellow men?

I feel sure that influential men, if they will be ruled by their true consciences, will not compel youths wishing to become chemists to accomplish the requirements of the Preliminary examination, prior to binding themselves to chemists in business. How many men, honourable men, have risen from low lives, comparatively speaking, to lives ever to be remembered in history; who had they have been compelled to pass certain examinations at the age of schoolboys, would have lived and died, unknown and immemorable.

AN APPRENTICE.

Sir,—The Preliminary examination question, opportunely introduced by Mr. J. E. Saul, is in many respects an important one, but I think the beneficial results expected to be produced by the institution of an amplified Preliminary would be only partially realized. The proposed innovation, if carried out, would, doubtless, tend to elevate the social status of the pharmacist, for, as has been pointed out, the public, not being in a position to appreciate technical attainments, regard general education as a criterion of professional ability.

The effect, however, which, it is conjectured, would be produced in diminishing the percentage of rejections at the Minor, would not, I think, be very evident. It is hardly to be supposed that greater proficiency on the part of candidates in merely scholastic subjects would increase, to any great extent, their chances of success in that essentially practical subject, dispensing, in which by far the largest proportion of failures occurs. Would mathematics, which is the principal addition advocated, work such wonders in this respect as Mr. Saul believes? Probably not.

In short, I do not consider that an extension of the scope of the Preliminary would, alone, afford much aid in brightening the prospects of the Minor aspirant. By all means let such an extension be effected. It is greatly to be desired, for many reasons. Until, however, in addition, a real curriculum either in all the subjects of the Minor or in dispensing only, is rendered compulsory it is scarcely conceivable that the deplored condition of affairs at the examinations will undergo any appreciable change for the better.

I should like to add that the recommendation of Mr. John Moss, in his letter of last week, *re* a curriculum, is, in my opinion, a sound and practical one and deserving of more than passing notice. E. H.

Commemoration of the Jubilee.

Sir,—Although several ideas have been expressed upon this interesting subject, I have not noticed anything more definite than a dinner, addresses, deputations, etc., which must inevitably soon become merely matters of history. I now beg to propose a new idea; viz., that a medal be struck with the profiles of the two first Presidents, Wm. Allen and Jacob Bell on one side, and on the obverse the arms of the Pharmaceutical Society.

These medals might be executed in gold, silver and bronze, and each member might have his name engraved with date of membership on his particular medal. Prices charged: £5, gold; 10*s*., silver; 5*s*., bronze. Profits to augment the funds of the Benevolent Society of our body.

Richmond, S. W. R. Goodwin Mumbray.

Apocodeine.

Sir,—In regard to the correspondence on the above in your columns (pp. 916 and 955, April 4th and 18th, 1891), I beg to say that the hydrochlorates of apocodeine, Nos. 1, 3 and 4, referred to by Dr. Murrell, were obtained by me from Messrs. J. F. Macfarlan and Co., Edinburgh. Mr. D. Brown of this firm is the gentleman, referred to by Dr. Murrell, who worked out a process for the manufacture of apomorphine with the late Dr. Matthiessen. Mr. Dott was also connected with the same firm. Nos. 1 and 3 were identical, being supplied on December 21, 1882 (not 1881, as stated by Dr. Murrell). This sample is now very dark in colour. No. 4, supplied on December 31, 1890, is a brownish white slightly granular amorphous powder, soluble about 1 in 33 of water, which solution has a faintly acid reaction. Both preparations give the characteristic blood red reaction with nitric acid, but I know of no distinctive characteristic tests for the salt. Being obtained direct from the above makers, the solutions and pills were dispensed by me as *bonâ fide* preparations.

10, *New Cavendish Street, W.* W. Martindale.

Sodii Salicylas.

Sir,—Sodii salicylas (physiologically pure) and sodii salicylas (natural) threaten to become a source of considerable difficulty to the dispensing chemist, owing to the wide difference in value. The one being about 11*s*. a pound and the other 52*s*., necessitates of course a wide difference in the prices charged for the medicine, much to the surprise and annoyance of the customer, who having previously paid a smaller sum, and being perfectly satisfied with the effect of the medicine, entirely fails to appreciate any explanations respecting natural or artificial products, the probable result being the permanent loss of a customer, who simply regards the charge as an extortionate imposition on the part of the really unoffending chemist anxious to supply none but genuine drugs.

In the presence of the unfavourable opinions expressed by many of the profession regarding the effect of what is known as the physiologically pure preparation, it becomes a question of serious importance with the dispenser how far he is justified in using that preparation, even when the prescriber has omitted to specify the natural as being desired.

An official expression of opinion upon the subject is very desirable, and would tend to remove the uncertainty which at present exists. Dispenser.

Defective Lime Water.

Sir,—If "tap water" is used in the preparation of the above I should quite expect to find it "attenuated," and it certainly will never be attempted by those who are guided by "the precepts" of the Pharmacopœia. Experiments with "tap water" must be perfectly useless, the data will vary in different localities.

Dawlish. Geo. Jno. Cutcliffe.

Mist. Ol. Ricini.

Sir,—Having in common with most who have attempted to prepare the above by the official process failed, I have found the following mode of manipulation in my hands most satisfactory:—Put the oils into the bottle and pour to the top of the oils an equal bulk of orange flower water, then add the liq. potass. diluted, and shake gently; the syrup last, again shaking.

Probably any emulsion method properly carried would be successful if, as was suggested last week, fatty acid were present in the oil. C. Flux.

Hotwells, Bristol.

"German" Oil of Lavender.

Sir,—Referring to your abstract of Messrs. Schim and Co's "Bericht" (p. 940), may I be allowed to say I have seen many samples of so-called "German" lav oil in London, all of very inferior quality and dou origin. Brokers explained to me that it was "Germ but I could not learn in what part of Germany the pl grew from which it was prepared, any more than I c discover the native place of the animals from "German" sausages are prepared. (I think two are used for the sausages and two plants for the oil.)

Brighton. J. Ch. Sawe

Symbols and Insignia of Alchemy, Chem and Medicine.

Sir,—A friend in the United States writes, "I am endeavouring to make a complete collection of illustrations of the various badges and insignia that have been used from time to time, in all ages, to charact or distinguish the professions of pharmacy, chemi medicine, surgery, and the allied sciences, incl alchemy and pharmaceutical or medical colleges and lar bodies. Will you give me what assistance you this matter by describing such signs as may be kno you, or referring me to publications containing particulars." Can any readers assist me?

Newcastle-on-Tyne. George We

NOTICES OF MEETINGS.

Photographic Society.—Tuesday, April 28.—Disc Animal Photography.

School of Pharmacy Students' Association.—T April 30.—Notes on "Commercial Benzole" and Melting-Point of Citric Acid," by Mr. E. F. H and a report on Analytical Chemistry, by Mr. W. Shepheard.

Royal Institution.—Thursday, April 30, at 3 p "Recent Spectroscopic Investigations."——Friday 1, at 8 p.m., "Hawks and Hawking," by Mr. Harting.——Saturday, May 2, at 3 p.m., "The Dy by Professor S. P. Thompson.

Arrow Poison of the Pigmies.—Mr. Martindale say that in the discussion on "The Arrow Poison Pigmies" (*Pharm. Journ.*, April 11, p. 927) his was that "a *Strychnos*" was also the principal curare, not "strychnine," as reported.

W. N. G. Lance.—The question is one that sho submitted to the Inland Revenue authorities. a material difficulty would arise from the character of preparations sold under the name.

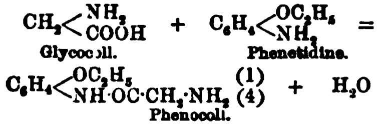
A. P. S.—Your questions, as formulated, are in general terms to allow of an unqualified answer being to them. For instance, the Pharmacy Acts place restriction on the dispensing of a medicine that does contain a scheduled poison. The existing law on the ject is contained in the Pharmacy Act, 1868, section and the Pharmacy Act, 1869, section 3.

H. F. Cowper.—Allen's 'Commercial Organic Analys vol. ii.

Communications, Letters, etc., have been received from Messrs. Cornish, Hill, Atkins, Philpotts, Milton, Live seege.

"THE MONTH."

Phenocollum Hydrochloricum. Phenocollum hydrochloricum, another addition o the group of antipyretic and anti-rheumatic compounds, forms the subject of a lengthy report by Dr. Hertel (*Deut. med. Wochensch*, April 9, p. 521). The compound is represented as being the hydrochloric acid salt of amidoacet-p-phenetidine, a base produced by the condensation of glycocoll, or amidoacetic acid, with phenetidine, under the elimination of water:



$$CH_2{<}\begin{matrix}NH_2\\COOH\end{matrix} + C_6H_4{<}\begin{matrix}OC_2H_5\\NH_2\end{matrix} =$$

Glycocoll. Phenetidine.

$$C_6H_4{<}\begin{matrix}OC_2H_5 & (1)\\NH{\cdot}OC{\cdot}CH_2{\cdot}NH_2 & (4)\end{matrix} + H_2O$$

Phenocoll.

Phenocoll is accordingly represented as a phenacetin into the acetyl radicle of which an amide group has been introduced. The free base is said to be fairly stable towards caustic alkalies and alkaline carbonates, being split up only after boiling with them a considerable time into phenetidine and glycocoll. It is also stable towards dilute acids; but after long boiling with concentrated hydrochloric acid it is partially hydrolysed, phenetidine-hydrochloride and glycocoll being formed. Phenocoll is precipitated from a solution of the hydrochloride by ammonia, caustic potash or an alkaline carbonate in white felted crystals containing one molecule of water of crystallization, the crystals melting at 95° C, or when rendered anhydrous at 100·5°. The pure base is fairly soluble in alcohol, but only slightly so in ether, benzol and chloroform. In hot water it is very freely soluble, but with difficulty in cold, and for this reason the use is recommended of the hydrochloride, which is sent out as a white microcrystalline powder, forming a neutral solution in sixteen parts of water at 17° C. From hot water phenocoll hydrochloride crystallizes out in cubes and from hot alcohol in needles. Professor Kobert has reported that in some preliminary experiments on animals he found phenocoll to be non-poisonous, and that its administration did not involve injurious changes in the blood as in the case of other antipyretics. Professor v. Mering, who administered the hydrochloride in typhus and pneumonia, states that a dose of 1 gram reduced the temperature about 2°, or about equal to 1·5 to 2 grams of antipyrin or 0·8 to 1 gram of phenacetin, no collapse or cyanosis being observed. Dr. Hertel himself found that simple doses of 0·5 gram quickly lowered the temperature about 0·5°, but only for a short time; single doses of 1 gram produced sometimes within an hour a fall of 1° to 1·5°, lasting about two hours. With 5 grams distributed over the day the fever temperature could be almost entirely controlled. After the administration of about 5 grams of phenocoll the urine becomes coloured brown-red to brown-black; but the elimination appears to occur rather quickly, no reaction being produced in the urine by ferric chloride solution after about twelve hours.

Antipyrin and Phenols. The formation of a compound of antipyrin with resorcin, recently mentioned in these columns (Feb. 28, p. 758) under the name "resopyrin," has led M. Barbey to experiment with other phenols (*Bulletin Comm.*, March, p. 132). Among the resulting compounds described are "picropyrin," consisting of fine yellow needles, obtained by pouring a concentrated solution of antipyrin drop by drop into a saturated aqueous solution of trinitrophenol and recrystallizing the precipitate from boiling water. "Phenolpyrin" was obtained on triturating together equal parts of pure and well dried phenol and antipyrin as an oily, colourless, inodorous liquid, crystallizing after a time, insoluble in alcohol and very soluble in ether. Similarly upon triturating one part of β-naphthol with two parts of antipyrin, "naphthopyrin was obtained as a viscous liquid, crystallizing subsequently, insoluble in cold and nearly insoluble in hot water, but very soluble in alcohol and ether. Upon triturating pyrogallol with antipyrin a viscous mass was formed that after a time became dry and pulverulent, insoluble in cold water, soluble in ether, alcohol and boiling water. If, however, solutions of the two constituents be mixed and heated, "pyrogallopyrin" can be obtained after four or five hours in beautiful stellate-grouped prismatic crystals.

Resorcin Compounds. The observation also is published by M. Barbey (*Bulletin Comm.*, March, p. 130) that eucalyptol in contact with resorcin in excess, combines in the cold to form a hard pulverulent mass, while if heat be applied a very compact nacreous crystallization is obtained that gradually becomes amorphous and very hard. The new compound is soluble in chloroform, a property that can be utilized to remove uncombined resorcin, the chloroform, upon spontaneously evaporating, depositing the "eucalyptoresorcin," as it has been named, in interlacing crystals. The crystals are insoluble in cold water, form oily drops in water at about 90° C., volatilize and sublime at 100° much more readily than water vaporizes, and give off a strong odour of camphor; they are also very soluble in alcohol and ether. Experiments were also made with other phenols, such as pyrogallol, naphthol, and trinitrophenol. The reaction with picric acid was rather violent, but in each case the crystals finally obtained appeared to be identical in their physical properties with those formed with resorcin. Some experiments described by M. Barbey throw very little light upon the nature of the compound or compounds formed, but it seems probable that the substance referred to would consist mainly of an alteration product of eucalyptol. Lastly, M. Barbey states that he has obtained a compound of caffeine with resorcin, which he has named "caffeoresorcin," and proposes to describe in a future paper.

Aristol. Some question has been raised recently as to the purity of the substances met with in commerce as representatives of the compound introduced as an antiseptic first under the name "annidaline" and then as "aristol." It will be remembered that aristol has been described as being obtained by treating an aqueous solution of iodine in potassium iodide with thymol in caustic soda solution (*Pharm. Journ.*, [3], xx., 601). The impurities that it might be expected to contain therefore would be free iodine, alkali, or alkaline iodide. Herr Reuter reports (*Apot.-Zeit.*, Jan. 28, p. 61) the examination of two samples, one of older date than the other. Both upon being shaken with water gave a solution which was perfectly neutral, but which upon evaporation left a residue of alkaline iodide, amounting in one case to 1·6 per cent. Upon treating the samples with ether, in which pure aristol is perfectly soluble with a yellow, not a brown colour, a residue was left from the older specimen amounting to 4·8 per cent. and from the other to 1·6 per cent., this residue containing much alkaline iodide and possibly an insoluble organic iodine compound. Upon shaking the samples with 1 per cent. potassium iodide solution the filtrate from the older one gave with starch paste an intense coloration, showing the presence of free iodine, but the filtrate from the other remained free from colour. It seems probable, therefore, that the aristol of recent manufacture is less contaminated with free iodine than the earlier specimens, but that it still contains alkaline iodide. In respect to purification Herr Reuter states that if a solution of aristol in cold glacial acetic acid be treated with water and the precipitate thoroughly washed and dried at 60° C., a faintly yellowish product is obtained that dissolves clear and without residue in ether and contains no free iodine. But the question arises whether an absolutely pure preparation is advantageous, for it would appear that pure aristol is much more stable than has been supposed and consequently less likely to act as a bactericide than a preparation rendered instable by the presence of more or less free iodine or alkaline iodide. This might account for some of the contradictory experiences with this substance that have been reported, as for instance that of Professor Neisser, in whose hands aristol proved quite inactive, except in some cases of lupus, where it was applied to patches that had been treated previously with a caustic.

Hydrargyrum Oxycyanatum.

Hydrargyrum oxycyanatum, HgO(CN), is another addition to the already long list of mercurial compounds (*Pharm. Zeit.*, April 15, p. 241). It is recommended by Dr. Boer as surpassing mercuric chloride in antiseptic properties, and is said not to coagulate albumen, to exercise only a faint caustic action, and not to attack instruments so readily as corrosive sublimate.

Ethyl Chloride as an Anæsthetic.

Attention is being called to the value as a local anæsthetic of ethyl chloride, C_2H_5Cl (*Pharm. Central.*, April 16, p. 228). It is stated to be prepared by the direct action of hydrochloric acid upon alcohol under strong pressure, and is sent out in hermetically closed tubes containing about 10 grams. The compound is described as a liquid having an agreeable ethereal odour, and boiling at 10° C. When required for use the capillary point of the tube is broken off, and the warmth of the hand is sufficient to cause the compound to volatilize and issue in a fine stream, which can be directed upon the part that it is desired to anæsthetize.

Conversion of Cupreine into Quinine.

Cupreine, an alkaloid first isolated from the bark of *Remijia pedunculata* by Paul and Cownley, gives evidence of a phenolic character in its ready solubility in alkalies and coloration by ferric chloride. From this consideration and the comparison of its formula, $C_{19}H_{22}N_2O_2$, with that of quinine, $C_{20}H_{24}N_2O_2$, Hesse inferred that quinine may be a methyl ether of cupreine, the two bodies standing in similar relation to each other as anisol, $C_6H_5\cdot O\cdot CH_3$, to phenol, $C_6H_5\cdot OH$, but his experiments in support of this hypothesis furnished only negative results (*Pharm. Journ.*, [3], xvi., 624). Messrs. Grimaux and Arnaud have, however, bee more successful and report (*Compt. Rend.*, Apr 13, p. 774) the experimental verification of Hess opinion. Upon boiling for several hours under a upright condenser a solution of cupreine in methy alcohol, to which the theoretical quantity of sodiu and excess of methyl iodide had been added, mixture of two iodomethylates was obtained, po sessing all the physical characters of the compoun resulting from similar treatment of quinine. Fu ther, by the substitution of methyl chloride f the iodide and conducting the operation in a sealed tube at 100° C., a base was obtained, whi isolated as sulphate, conformed to all the physi and chemical characteristics of quinine, so tha doubt a reaction of the following nature m obtain :

$$\underset{\text{Cupreine (sodium compound)}}{C_{19}H_{21}N_2O\cdot ONa} + CH_3Cl = NaCl + \underset{\text{Methylcupreine (quinin}}{C_{19}H_{21}N_2O\cdot OCH}$$

Messrs. Grimaux and Arnaud comment upon th frequency with which the methyl group occurs i chemical products of the vegetable kingdom, to th almost entire exclusion of the ethyl group, a consider that the assumed reduction of the absorb carbonic acid gas to formic aldehyde and sub quently to methyl alcohol in the economy of th plant would furnish sufficient explanation of th fact. It is also proposed by these chemists t prepare the homologous ethers of cupreine a compare their physiological action with that quinine.

A Violet Dye from Morphine.

The classes of dyes known as indophenols an safranines result from the action of para-nitros dimethylaniline upon phenols an aromatic amines respectively. M. P. Cazeneuve has experimented with th same reagent upon morphine (*Compt. Rend.*, April 13, p. 805), and finds that a violet of definite composition is formed that is neither a indophenol nor a safranine, but most probably an indamine, analogous in constitution to the called "Bindschedler green." The new compou which is markedly dichroic in its solutions, by reflected and violet by transmitted light, gi wool, silk, and cotton a beautiful violet colo somewhat fugitive on exposure to light. Its for mation is, however, of greater interest, since throws some light on the constitution of pseud morphine, which has been the subject of mu controversy and has been stated by Polstorff to represented by a combination of two molecul morphine with elimination of two atoms of hy gen. But if such be the composition of pseudom phine, a safranine, or compound of two molec of the base with one molecule of nitroso-dimeth aniline, and not an indamine, would result fr morphine. Further, it is known that combinati is not effected by means of the phenolic OH group in morphine, since the methylic ether codei yields an analogous dye under similar conditio This dye, the first derived synthetically from natural alkaloid, may be regarded as a derivative of phenanthrene, since morphine apparently con tains a phenanthrene nucleus.

Phenacetin Oxidation Products.

The fact that phenacetin, after splitting off th acetyl group by means of a suitable oxidising agent, gives in hydrochloric acid solution an intense red or purple colour is well known, and the reaction is utilized as an identity test for phenatin in the 'Additions to the Pharmacopœia.' he course of this oxidation process was not quite ear, but it has been studied by Herr W. Kinzel, ho has communicated his conclusions to the erlin Pharmaceutical Association (*Pharm. Cent.*, pril 9, p. 208). He states that in the oxidation phenacetin with potassium permanganate or ichromate up to a certain stage a considerable uantity of quinone is formed, besides much car- onic anhydride and some acetic acid; but that if be carried further the benzene nucleus is broken p and oxalic acid results. Under certain condi- ons, however, small quantities of other com- ounds are transitorily formed in the course of xidation, all containing the oxyethyl as well the amide group. One of these is a brown ye-stuff, represented by the empirical formula, $_{24}H_{22}N_2O_5$, which is sublimable in red-brown eedles, and gives with mineral acids violet or lue salts that dissolve in excess of acid with a agnificent indigo-blue colour. This colour reac- on is so intense that one milligram of the com- ound will impart a distinct sky blue colour to a tre of strong sulphuric acid. A second com- ound, *p*-azophenolethylether, crystallizes in yellow scales, and is obtainable in yellow needles by ublimation. It is considered to be the source of he red amidophenetol reaction, in combination robably with traces of the previously mentioned ubstance. In cold concentrated hydrochloric acid dissolves with a blue colour, becoming pome- ranate-red when boiled. According to the tem- erature and the proportion of oxidizing agent dded the compound is obtained with more or ss bluish tinge. In acetic acid it dissolves with yellow colour, passing into red on the addition a mineral acid. It is to this compound probably at the reddish colour of some of the earlier sam- les of phenacetin was due. A third body, crystal- zing in brownish scales, differing from the preced- g two in being freely soluble in water, Herr Kinzel onsiders to be an isomer of *p*-oxyazophenetol.

Creosotic and Salicylic Acids.

In consequence of the discussion that followed e reading of the communications on the artificial salicylic acid of commerce at a recent evening meeting, Dr. Charteris has made some further experiments as to the physiological action of paracresotic acid. He reports (*Brit. Med. ourn.*, March 28, p. 695) that an injection of 6 ains of paracresotic acid killed an animal weigh- g 2½ lbs. in three hours and that 12 grains killed e weighing 3½ lbs. in the same time, from hich results he fixes the lethal dose as about grains per lb. weight of the animal. Orthocre- tic acid, in the proportion of 1 grain per lb. weight the animal, was found sufficient to cause ath in twelve to thirty-six hours. A mixture of e acids was still more prompt and pronounced in action, 5 grains of a mixture containing one part ch of ortho- and paracresotic acid (or less than a arter grain of each) to 20 parts of salicylic acid, oving fatal in twelve hours to an animal weighing lbs. The question raised as to the therapeutic lue of the sodium salt of paracresotic acid Dr. harteris declines to discuss, but he considers that s experiments have demonstrated that the removal ortho- and paracresotic acids from commercial licylic acid is a *sine quâ non* before it can be rmed "physiologically pure."

Digitonin and Digitogenin.

H. Kiliani has previously shown that the soluble or so-called German "digitalin. pur. pulv." of commerce is split up by heating with dilute hydrochloric acid into dextro-glucose, galactose, and digitogenin. An analysis of the digitogenin gave results corresponding to the formula $(C_5H_8O)x$, and a study of its derivatives indicated 3 as the most probable value of x. Kiliani therefore attributed the formula $C_{27}H_{44}O_{13}$ to the glucoside digitonin, which Schmiedeberg had shown to be the mother-substance of digitogenin. He has now succeeded in obtaining the glucoside in the crystalline state by treatment of the commercial digitalin with 85 per cent. alcohol and found the formula of the crystals to be $C_{27}H_{44}O_{13}+H_2O$ (*Berichte*, xxiv., p. 339). Digitonin, which occurs to the extent of about 53 per cent. in the commercial product, is optically active, and in 3 per cent. alcoholic solution turns the plane of polarized light 50° to the left. According to Professor Boehm, of Leipzig, neither the glucoside nor any prepared derivatives of digitogenin exert any action upon the heart. Treated with hydrochloric acid digitonin yields almost the theoretical quantities of digitogenin, galactose, and dextro-glucose, though as digitogenin only yields a mono-acetyl derivative, Kiliani suggests that digitonin is a glucoside of milk-sugar rather than a double glucoside of the two sugars. Among the oxidation products with chromic acid, a monobasic acid of the composition $C_{14}H_{22}O_4$, digitogenic acid, was observed, and through further oxidation with permangangate of potash a monobasic oxydigitogenic acid, $C_{14}H_{20}O_4$, resulted. Both acids yielded difficultly soluble crystalline magnesium salts. A third monobasic acid, digitic acid, $C_{10}H_{16}O_4$, with a beautifully crystalline barium salt, was also isolated from the oxidation products.

Saponin.

The varying statements made by different authors in respect to saponin have induced Dr. Hesse to attempt to ascertain whether the substances described in recent years under that name are identical; and, if so, by what empirical formula saponin would be best represented (*Annalen*, cclxi., 371). The first question he answers in the affirmative, having arrived at the conclusion that pure saponin from quillaia bark is identical with that obtained from various caryophyllaceous plants and with senegin. As to the second Dr. Hesse favours the formula $C_{32}H_{52}O_{17}$, assuming the correctness of the formula attributed by Rochleder to sapogenol, the decomposition product, together with three molecules of glucose, of saponin, and that the reaction goes on in the normal way, one molecule of water being taken up for each molecule of glucose split off. The successive decompositions effected by acids may then be represented as follows:—

$$\begin{array}{lclcccc}
2\,\underset{\text{Saponin.}}{C_{32}H_{52}O_{17}} & + & 6\,H_2O & = & 2\,\underset{\text{Sapogenol.}}{C_{14}H_{22}O_2} & + & 6\,C_6H_{12}O_6. \\
2\,C_{32}H_{52}O_{17} & + & 5\,H_2O & = & \underset{\text{Sapogenin.}}{C_{34}H_{54}O_9} & + & 5\,C_6H_{12}O_6. \\
2\,C_{32}H_{52}O_{17} & + & 5\,H_2O & = & \underset{\text{Saponetin.}}{C_{40}H_{66}O_{15}} & + & 4\,C_6H_{12}O_6. \\
2\,C_{32}H_{52}O_{17} & + & 4\,H_2O & = & 2\,\underset{\text{Saporetin.}}{C_{20}H_{32}O_7} & + & 4\,C_6H_{12}O_6.
\end{array}$$

The study of tannins and of their *rôle* in the economy of plants has led Dr. A. Tschirch to carefully observe the conditions under which the phlobaphenes, or reddish brown colouring matters

The Formation of Phlobaphenes

of the bark, are formed. He states (*Journ. Pharm. Elsass. Lothr.*, April, p. 98) that the tannins occur, with few exceptions, in solution in the cell-sap of living plants, but that on the death of the cell the primordial utricle becomes permeable to the tannin solution, which is absorbed by the cell-membrane. Under these conditions the tannins oxidize more or less readily—either directly or if of glucosidal character after hydrolysis—to red-brown phlobaphenes, and the dead cellular tissue acquires a red-brown colour. The rate of oxidation of the tannins varies considerably in different plants; thus the filix-red is formed very slowly in the rhizomes of *Aspidium Filix-mas*, whilst Dr. Tschirch asserts that in Java he has observed the reddening of the bark of *Cinchona succirubra* fifteen seconds after its removal from the tree. Other tannins are extremely sensitive to heat, especially the tannin of tea (*Thea assamica* and *T. chinensis*), so that if the leaves be dried on hot plates immediately after plucking, the tannin is destroyed before conversion into a phlobaphene and consequently the leaves retain their green colour.

Constituents of Star-anise Fruit.

The constituents of star-anise fruit form the subject of a lengthy memoir by Dr. F. Oswald (*Archiv*, ccxxix., 84). He reports that the essential oil consists principally of anethol, together with a small quantity of terpenes, saffrol, a monoethyl ether of hydroquinone, anisic acid, and probably some complex compounds of the aromatic series, having long side chains, which under oxidation yield veratric acid and piperonal. The fat oil is described as containing, besides considerable quantities of fatty and oleic acid glycerides, perceptible quantities of cholesterin and phosphoric acid compounds, but no choline was found. The watery extract contained protocatechuic and shikiminic acids, the latter differing by H_2O less in its formula from quinic acid, into which, however, Dr. Oswald failed to convert it. Sugar is not present in any considerable quantity, the sweet taste being thought to be probably referable to essential oil, neither was any nitrogenous base detected.

Tumbeki or Persian Tobacco.

Further information concerning the plant yielding the tumbeki, or Persian tobacco of eastern commerce, is contained in the *Kew Bulletin* for April. Reference is made to the article on the subject in this Journal ([3], xvi., 681), in which a statement, made on the authority of Professor Hausknecht and Colonel Dennis, that tumbeki is the product of *Nicotiana rustica*, is criticized by Mr. Holmes, who remarks that the weight of evidence points rather in the direction that M. Zanni, of Constantinople, is right in referring it to *N. persica*. It appears, however, from the *Kew Bulletin* that *N. persica*, Lindl., is identical with *N. alata*, Link. and Otto (*Icon. Plant. Rar. Hort. Ber.*, i., 32), which is a Brazilian species, and not likely to be cultivated commonly in Persia. Moreover, plants received from Persia as those of "tabaku," when examined at Kew, proved to be *Nicotiana Tabacum*. In fact, the difference between tumbeki and ordinary tobacco, known in Persia as "tutun," is attributed to the growth of the former in dry districts, and the use of brackish water for irrigating the plants. Details of the mode of cultivation and preparation of tumbeki for the market are given by Haider Ali Khan, of Shiraz, but two of his remarks require further explanation. One is that "tutun pipe tobacco and tanbaku are from two different plants," and the other is that "prickles on the leaves" are mentioned as being present on the tanbaku or tumbeki plant.

Quinine as a Cardiac Tonic.

At the last meeting of the British Medical Association, Sir W. Foster mentioned that he had found quinine of great service in reducing the pulse rate in Graves's disease, when given in sufficiently large doses. Commenting upon this (*Lancet*, April 25, p. 930) Mr. Hare, of Brisbane, states that in the treatment of typhoid he has met with results pointing to quinine exercising an influence in slowing and strengthening the heart's action, independent of the antipyretic effect. The action is slow in appearing, usually after twenty-four hours, but persists for two or three days, even if the quinine be discontinued, whilst the antipyretic effect is never prolonged beyond thirty-six hours. The dose sufficient to produce the tonic effect on the heart appears to be from 3 to 7 grains given every three hours, whenever the pulse rate commences to range above 120.

Bilharzia hæmatobia and Drinking Water.

From an article on "Botanical Enterprise in the Niger Protectorate," in the *Kew Bulletin*, it appears that in response to the frequent application of the Royal Niger Company for assistance in turning to account the natural productions of its territory, two picked men were sent from Kew to take charge of botanical stations established in the interior, but that both of them have died from what is known as blackwater fever. A paper by Mr. R. T. Castle, M.B., late Medical Officer of the Usambara District (*Lancet*, April 25, p. 931), on Hæmaturia in East Central Africa, one of the symptoms of which is the passing of black urine containing disintegrated blood cells, has a direct bearing on this subject. He states that this disease is in most cases due to drinking water containing the free swimming embryo of the trematode, *Bilharzia hæmatobia*. But those who only drink water that has been boiled do not suffer from the attack of the parasite. Stanley also has already published his experience in Darkest Africa on the dangers of drinking unboiled water. It may be hoped therefore that the importance of always boiling water before drinking it in Africa and other tropical countries will be duly impressed on all men who may in future be sent out from Kew or other Government departments. The only treatment found by Dr. Castle to be effective consisted in allaying the irritability of the bladder with small doses of opium and buchu freely diluted.

Parasitic Plants.

M. A. Chatin has contributed to the Paris Academy of Sciences a note on the biology of plant parasites (*Compt. Rend.*, cxii., p. 599), which demolishes the old ideas concerning the non-elaboration of sap by these plants. He finds that the tannin of the mistletoe is not identical with that of the oak on which it grows, but gives a green colour and not a blue-black with iron salts; that the *Loranthus* which grows on *Strychnos Nux-vomica* does not, as has been asserted, contain a trace of either strychnine or brucine, and that the *Balanophora* parasitic on *Cinchona Calisaya* does not contain any of the alkaloids of cinchona barks. The *Loranthus* growing on orange trees never partakes of the yellow colour of the wood of its host plant, nor does the *Orobanche* of the hemp possess the odour of the latter; while *Hydnora africana*, used as food in South Africa by the Hottentots, grows on an acrid and even vesicating *Euphorbia*. It is evident, therefore, that the sap absorbed from the host plant must be modified by the parasite to form its own peculiar products.

Pancreatic Juice.

In the person of a patient recently operated on in Warsaw for tumour of the pancreas, an opportunity has occurred of ascertaining the composition of human pancreatic juice (*Lancet*, April 25, p. 948). After the removal of the tumour by the thermocautery a drainage tube was inserted, and when the discharge ceased to be purulent and assumed the character of pancreatic juice alone, it was examined. It formed a tenacious yellowish turbid liquid, with a distinctly alkaline reaction. At a temperature of 100° F. the juice actively converted starch into maltose, egg albumen into peptone, and olive oil into an emulsion. On analysis it gave water 86·405 per cent., organic compounds 13·251 per cent., including albuminoid bodies 9·205 per cent., and extractive matters soluble in alcohol. Salts—consisting of carbonates, chlorides, phosphates, and sulphates of sodium, potassium, calcium, and iron—0·344 per cent. On comparing the human pancreatic juice with that of other animals it was found to resemble most nearly that of the dog, according to Schmidt's analysis.

Primula obconica.

The irritant properties possessed by *Primula obconica* appear to affect certain individuals only, just as is the case with many species of *Rhus*, and it is doubtless for this reason that the irritant action is altogether denied by some observers. Dr. S. A. L. Swan (*Lancet*, April 25, p. 960) records two cases that came under his notice in Ireland in which the symptoms produced by handling the plant resembled those of acute eczema or erysipelas. With the use of an evaporating lotion and saline purgatives, all the symptoms disappeared the next day.

Allotropic Silver.

A further communication on allotropic silver by Mr. Carey Lea (*Phil. Mag.*, April, p. 320) treats of the relation existing between the allotropic forms generally and silver as it exists in its compounds. It is a well established law that when a substance is capable of existing in two forms, of which one is the polymeride of the other, the polymeric form possesses greater density and less chemical activity. Spring has also shown that if the two allotropic forms of such a substance are convertible from the one to the other by pressure, the body resulting from pressure is always the more dense of the two and is a polymeride of the first. These laws appear applicable to the case of allotropic silver, since Mr. Lea has found that gold-coloured silver possesses a specific gravity of 8·5, whilst that of normal silver is 10·5 to 10·6. The greater chemical activity of the gold-coloured form is demonstrated by its greater affinity for oxygen, sulphur and the halogens, and it is also conspicuous by the remarkable facility with which, by the mere pressure of the finger, or by a temperature of 100° C., it passes to the normal state. It will be remembered that of the three distinct forms of silver recognized by Mr. Lea allotropic silver is protean in its nature: it may be soluble or insoluble in water, may be yellow, red, blue or green, or almost any colour; but in all its insoluble varieties it always exhibits plasticity, that is, if brushed in a pasty state upon a smooth surface its particles dry in optical contact and with brilliant metallic lustre. The intermediate form, which may be yellow or green, also shows metallic lustre, but is never plastic and is almost as indifferent chemically as white silver. The property of solubility in water of one variety of allotropic silver possesses peculiar interest, since hitherto the only solvent known for a metal has been another metal. The behaviour of metals when so dissolved has formed the subject of very interesting examinations by several chemists, amongst which the researches of Ramsay, Heycock and Neville, and Tammann have led to the general conclusion that in the case of a dilute solution of one metal in another the dissolved metal exists in the atomic form. From analogy it is argued that the solubility of silver is occasioned by the existence of a very simple, perhaps an atomic, molecule; but, at any rate, all considerations tend to show that the allotropic forms of silver, as a whole, have a more simple molecular nature than the intermediate form, and this, again, is more simply constituted than ordinary silver. Moreover, although the allotropic and intermediate forms can be so readily converted into ordinary silver, the reverse change can only be effected by solution in an acid as a preliminary step. As silver in its compounds and saline solutions exists in the atomic form, it is easily conceivable that when it separates from such solutions by reduction, the atoms may or may not unite to molecules. Usually elementary atoms do so unite, but the phenomena of nascent action indicate that this union does not take place at the instant of separation, and it is at least conceivable that under particular circumstances the union may be prevented. Bearing these facts in mind Mr. Lea adopts as a working hypothesis the view that the allotropic, intermediate and normal forms may represent respectively atomic, molecular and polymerized silver. The only other assumption tenable is that the different forms are differently polymerized, and this view is the more improbable since an analogy has been traced between the allotropic form of silver and silver as it occurs in its compounds. It is a familiar fact that certain forms of energy, light especially, affect the silver haloids. Mr. Lea finds that high tension electricity also produces a visible effect, and that in the case of heat and of contact action on these haloids an indication of the effect, though invisible to the eye, is readily furnished by the action of a reducing agent. Though the action of each form of energy seems to be almost counteracted by opposing affinities, yet in every case action does take place and always in a direction corresponding to the action of that form of energy upon allotropic silver. The further investigation of this subject on these lines appears therefore to promise a clue to several problems in photographic chemistry.

Suboxide of Silver.

The existence of salts of a suboxide of silver corresponding to the formula Ag_4O, has been a subject of long-continued dispute. The indirect affirmative evidence recorded by Wöhler has been strenuously contested, and as no such salts have been actually isolated, while theoretically the ordinary silver salts correspond to cuprous salts, the majority of chemists have denied the existence of a suboxide. The matter is one of considerable interest, since the nature of the alteration product of silver chloride by light has never yet been determined, it being considered by some to be a subchloride, by others an oxychloride of silver. The observation of a perfectly definite and crystalline subfluoride of silver, Ag_2F, by M. Güntz, will therefore furnish a fresh factor in the discussion, especially as this investigator now reports (*Compt. Rend.*, April 20, p. 861) that he has isolated the corresponding subchloride, subiodide, subsulphide and suboxide of silver by the respective action of chloride of phosphorus, hydriodic acid, sulphuretted hydrogen, and steam at 160° upon the subfluoride. He further proposes to determine the heat of formation of the subchloride, with a view to the verification of its identity with the alteration product of silver chloride.

Allotropism in Sulphur.

The various physical modifications of sulphur known up to the present time have been all referred by M. Berthelot to two stable forms, rhombic and insoluble sulphur. Monoclinic sulphur and the amorphous sulphur obtained from polysulphides are both convertible by heat into the rhombic form, whilst the several "insoluble" sulphurs possess in the dry state two common characteristics, absence of all crystalline form and insolubility in bisulphide of carbon. In studying the stability of hyposulphurous acid in the presence of different quantities of hydrochloric acid M. Engel (*Compt. Rend.*, April 20, p. 866) has met with two new varieties, a crystalline sulphur that passes spontaneously into the insoluble form, and an amorphous sulphur soluble in water. A solution of hyposulphurous acid, obtained by admixture of two volumes of saturated hydrochloric acid solution with one volume of saturated hyposulphite of soda solution, possesses sufficient stability to allow of the separation of the precipitated sodium chloride before decomposition commences. After filtration the solution slowly assumes a yellow tint and sulphurous acid gas is evolved. If the solution be extracted with chloroform after the yellow colour has well developed, but before actual separation of sulphur takes place, the chloroformic extract leaves upon evaporation small crystals of sulphur that differ from any form hitherto observed. The crystals are of orange-yellow colour and possess a density of 2·135, but, although at first transparent, they become opaque after three or four hours, increase in volume, and assume an insoluble form resembling the amorphous sulphur usually obtained by the decomposition of hyposulphites. The results of a crystallographic examination undertaken by M. Friedel (*Ibid.*, p. 834) show the crystals to be of the rhombohedral type in which tellurium and selenium also crystallize. The soluble sulphur observed by M. Engel obtains when the above hyposulphurous acid solution is allowed to deposit the sulphur resulting from its decomposition. Quickly collected upon a filter it is soluble in both water and bisulphide of carbon, but is readily transformed into a modification insoluble in both these reagents, and therefore resembles the δ-sulphur of Debus derived from Wackenroder's solution. M. Engel interprets these facts by assuming that the sulphur generated together with water and sulphurous acid by the decomposition of hyposulphurous acid under the above conditions, first separates in the atomic state and then suffers molecular condensation by different stages until the limit is reached, in the amorphous and insoluble sulphur of Berthelot. This view of the atomic or comparatively simple character of the sulphur molecule in its soluble modification bears a striking analogy to the deductions of Mr. Carey Lea concerning the molecular constitution of soluble allotropic silver.

PLANT-GROUPS AND THEIR CONSTITUENTS AND PROPERTIES.*

BY JOHN M. MAISCH.

On several occasions when fulfilling the assigned duty of addressing the students of this College, introductory to the annual courses of lectures, I have discussed questions relating to the origin and the supply of drugs, or referring to physiological processes of plant-life. The study of materia medica affords a never-failing source of inquiries into matters of the utmost interest to mankind, which are not confined merely to the identity and quality of a drug, but which involve also commercial and economical questions and frequently are influenced by, and more or less closely related to, historical events. We are thus in upon a field which is entirely distinct from the pharmaceutical uses and medical application of drugs and which enlists the interest of the student of general and special history equally well, and sometimes even to a much greater degree, than it does the student of medicine and pharmacy. I need but refer to the discoveries that have resulted from the efforts to find direct communication by sea with the countries where the most valued spices are indigenous; to the changes in the habits of civilized nations occasioned by the introduction and extension of the use of the potato and of coffee and tea; to the influence exerted by Arabian physicians upon the medical armamentarium of Europe; to the events which favoured the general use of tobacco in Europe; to the causes of scarcity in the supply of senna and gum arabic; to the political complications which were engendered by the cultivation of opium; to the introduction into medical use of cinchona bark; to the changes in commerce and manufacture, as well as in pharmacy and medicine, which are the direct outcome of the cultivation of the cinchonas in the Eastern hemisphere.

The investigations in materia medica have supplied the infant chemistry with a multitude of valuable facts, and helped to nourish that science, until it is now able to repay the debt by furnishing, from its own retorts, many compounds which may take, and to some extent do take, the place of medicines that heretofore were procured only from Nature's bountiful laboratory.

Medicine, that is, materia medica, was to a large extent the incentive that led to the study of botany, and that science, in turn, again leads to the study of the possible uses of plants, or to economic and medical botany. That, apparently, a certain relation exists between the generic forms or groups of plants and their properties, useful as well as deleterious, was pointed out more than a century ago, after Linné had laid the foundation for the scientific classification of plants. Though subsequently repeatedly denied, such a relation has, in more recent times, been unquestionably established, and will doubtless become still more apparent, as continued researches make us more

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* Introductory Lecture to the seventieth course of instruction in the Philadelphia College of Pharmacy, October 1, 1890; published at the request of the Publication Committee. From the *American Journal of Pharmacy*.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the meeting held on Tuesday, March 14, J. Glaisher, F.R.S., President, being in the chair, Messrs. C. T. Dent, T. H. H. Harrison, J. D. Waller, and H. Young, M.A., D.C.L., were elected members of the Society.

The President congratulated Mr. H. Perigal, who had joined the Society in the first year of its existence, on attaining his 90th birthday.

Mr. Perigal having responded,

Mr. W. Willis read a paper on "Platinotype." In this paper the author described a process he had worked out in 1873, and afterwards gave a sketch of the process as he described it in 1878. He also referred to the hot bath process of 1880, and read a lengthy description of the cold bath process which he brought before the Camera Club Conference of 1888, and gave a demonstration of the process. The author next showed how by this process it was possible to obtain prints upon wood for the use of engravers, etc., and concluded by exhibiting a number of scales of tints to show the action of developers of various strengths at different temperatures.

The President having proposed a vote of thanks,

Mr. J. Spiller inquired which process Mr. Willis considered preferable, the hot or the cold; he also asked how the platinum was to be recovered from the bath.

Mr. W. E. Debenham considered there was more gradation in the early prints, and inquired whether that was due to the gloss.

Mr. Chapman Jones asked whether Mr. Willis did not find that a bath which had been used from some three or four prints gave a different result with the same negative?

Mr. J. Gale wished to know whether the cold bath process was applicable to rough surfaced papers?

Mr. Willis, in reply, thought that when the cold bath was perfected it would be the preferable one, as with it it seemed possible to do anything that was wished. The platinum was recovered by adding excess of hydrochloric acid and boiling with zinc. He considered the gradation was entirely in the hands of the worker. He agreed that every print did alter the composition of the bath, but this might be overcome by adding a definite quantity of fresh solution after developing every two or three prints. He avoided getting scum on the print by violently rocking the developing dish. The cold bath process gave excellent results with rough papers.

Mr. J. Spiller, having taken the chair, drew attention to a specimen of so-called photography in colours, from M. Lippmann, and pointed out that it did not show the blue as well by gaslight as by daylight.

Mr. Chapman Jones explained that it was taken by the light of the electric arc.

Mr. T. Bolas did not think the colours were as well rendered on this plate as on the albumenoid paper Mr. Warnerke exhibited at the last technical meeting. He considered that the spectra Becquerel obtained were much more satisfactory than this specimen of M. Lippmann's results. He thought it was well known that if a very thin plate was exposed to a very strong light for a long time a similar irridescent appearance was obtained. He did not consider that the example exhibited was at all convincing that M. Lippmann had made any progress in photographing colours.

Mr. Chapman Jones thought the important point was that M. Lippmann had been able to fix these photographs. This Becquerel had been unable to do.

Mr. L. Warnerke redescribed his experiments, and exhibited specimens of the colours he had obtained on albumenized paper.

Mr. Sebastian Davis had obtained similar results to those described by the last speaker.

Mr. W. H. Harrison said that probably the first daguerreotype was relatively no better than the feeble specimens of M. Lippmann's work exhibited that evening. He wished to know whether the specimen was exhibited with M. Lippmann's knowledge and consent.

The Assistant Secretary replied he did not know.

Mr. Harrison continued that any public discussion upon it might be unjust to M. Lippmann, who had proved the truth of the theory first published by Lord Rayleigh that heliochromes were due to the interference of light and could be fixed. It was too late in the day to question the genuineness of the discovery, which had been recognized by the members of the Academy of Sciences of Paris and the Photographic Society of France.

Mr. H. M. Elder pointed out that three totally different methods of producing colour had been brought forward that evening. He believed the colours obtained by Mr. Warnerke were due to the salts of silver described by Carey Lee under the name of photo-salts. Then there was M. Lippmann's method, the most important of all. The third method was due to diffraction caused by the scattering action of small particles.

Mr. Spiller, in closing the discussion, said they were indebted to Dr. Lindsay Johnson for bringing this specimen from Paris, and trusted that ere long M. Lippmann would favour the Society with a finer example of his work.

THE WESTERN CHEMISTS' ASSOCIATION (OF LONDON).

At a meeting of the Western Chemists' Association, held on Wednesday evening last, a note on "Pharmacy in Relation to Medicine," by Mr. J. C. Hyslop, was read. The note will be published in our next number.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The annual business meeting of the Brighton Association of Pharmacy was held at the Athenæum, North Street, on Friday, April 17, Mr. W. D. Savage, J.P., President, in the chair.

After the minutes had been read and confirmed the Honorary Secretary presented the financial report, which showed a balance at the savings bank of £18 17*s.* 10*d.*

On the motion of Mr. W. D. Savage, a resolution was passed expressing sympathy with Mrs. Cornish and family on the loss by death of Mr. W. Cornish, for many years Treasurer of the Association.

It was next decided to offer to the Committee of the Brighton Junior Association of Pharmacy two prizes of the value of one guinea and half a guinea respectively for competition amongst their members.

The Ball Committee reported a profit of £5 on this year's ball, and on the motion of Mr. Williamson, seconded by Mr. Marshall Leigh, it was decided to send the amount to the Benevolent Fund of the Pharmaceutical Society.

The following officers were elected for the ensuing year: President, Mr. W. D. Savage, J.P.; Treasurer, Mr. J. R. Gwatkin; Hon. Secretary, Mr. Marshall Leigh. These also to form the Committee together with Messrs. Williamson, Costerton and Nosworthy.

On the motion of Mr. Marshall Leigh, seconded by Mr. Williamson, it was decided to present a congratulatory address to the Pharmaceutical Society at the official celebration of the jubilee on May 26.

A vote of thanks to the chair brought the meeting to a close.

metapectic acid of the beet and other plants is in reality identical with arabic acid of gum acacia.

While the algæ grow submersed, the lichens are air plants, usually fastened upon rocks, walls or the bark of woody plants. Some are of industrial value as the source of litmus or cudbear; others are used as food, principally in the arctic regions, and a species of *Lecanora* has, by some scientists, been regarded as the manna of the Hebrews. The species which have been employed medicinally were regarded as being valuable in pectoral complaints, and of these the so-called Iceland moss still holds its place in the Pharmacopœia. Its bitter principle, cetraric acid, has been recently employed medicinally; to what extent it is related to the bitter principles of other lichens is not known.

Colouring matters—others than chlorophyll—are formed by all plants with but few exceptions, and are not confined to plants of low organization. Aside from those principles imparting colour to flowers and fruit, the chemistry of which is still involved in obscurity, many of the industrially important chromogenes and colouring matters have been investigated to a larger or more limited extent, like indigo and alizarin, and the colour-compounds present in or obtainable from logwood, quercitron bark, red saunders, saffron and others. But little or no chemical relation exists between these bodies, and with the exception of indigo and quercitrin they are mostly met with only in one plant, or in a few which are botanically related. However, the yellow crystals of chrysophanic acid yielded by a *Parmelia* are identical with the same compound prepared from rhubarb or yellow dock of the Polygonaceæ, or from senna and from araroba of the Leguminosæ. To what extent this principle, or such yielding it, may be distributed throughout the vegetable kingdom, must be left to future researches.

The few species of the liver mosses, mosses and equisetums, which were formerly medicinally employed, have long since been discarded from regular practice, and but very little is known of their chemical constituents. Of more than passing interest is the presence, in the species of equisetum, of large amounts of silica, doubtless serving for the purpose of protection. Though the same mineral compound is present in small percentage in the ash of most plants, the equisetums share only with the grasses, sedges and a group of the palms, the very general distribution of silica and its relatively large proportion.

In regard to the medicinal properties of the ferns, we meet with a notable distinction between the effects of the foliaceous fronds and those of the rhizomes. In the former, we find mucilaginous principles predominating, and associated with mildly astringent and slightly aromatic qualities; these fern-leaves have, therefore, been used as remedies in pectoral complaints, for which purpose the European and North American species of *Adiantum*, known as maidenhair, are still employed. However, the only ferns officinal, according to our and most other Pharmacopœias, are known by our authority as *Aspidium*; the rhizome, which is the part used, has the same constituents which are met with in other ferns, varying in proportion in the different species. Fern rhizomes are generally reputed to possess anthelmintic and tænifuge properties, due to the presence of filicic acid or similar compound. Only a small number of ferns are indigenous to the northern hemisphere; the home of most of the nearly 3000 species of ferns is in damp localities of the tropics, where quite a number assume a tree-like aspect, attain a height, sometimes, of fifty or sixty feet, and in habit resemble a stately palm. A handsome *Cyathea* and others have a farinaceous tissue which is used as food and establishes a resemblance with the sago palms, independently of the general habit. The astringency, which is observed in some degree in the male fern, becomes so strong in some species that they may be used for tanning. In fact among the cryptogamous plants, only those having vascular tissue contain tannin, and the ferns are the only group in which notable quantities of it are met with. This compound—or rather class of compounds—is more generally diffused among phanerogamous plants, where different kinds appear to be most largely found in the leaves, in the bark of trees, in rhizomes, in some perennial roots, and in such morbid excrescences like galls.

The gymnospermous plants, to which class the pines belong, though numerous as regards individuals, comprise only about four hundred and fifty species, two-thirds of which are coniferous. The latter are characterized by the production of volatile oils, many of them being hydrocarbons, and by the secretion of resins. Both these classes of compounds, as we have seen, occur only to a very limited extent in the cryptogams. But volatile oils and allied aromatic compounds are met with, to some extent at least, in most phanerogamous orders. They are produced in certain groups of the grasses, orchids and lilies of the Monocotyledons, and likewise in certain genera or species of the violets, geraniums, Leguminosæ, Rosaceæ, Compositæ and others, while these principles very generally pervade the Scitamineæ, laurels, Labiatæ, Umbelliferæ, the myrtles, oranges and other groups. A peculiar variety of volatile oils, containing sulphur, imparts a unique pungency to the cruciferous and some allied plants; and similar in composition, though different in scent, are the volatile oils of the Alliums and of certain Umbelliferæ, of which the asafetida plants are representatives.

Resins are likewise widely distributed throughout the Phanerogams, and but few of these plants appear to be destitute of such compounds. Very frequently they are associated with volatile oils, or with gum, or with both; in the two last-named cases they usually form milky exudations, from which the officinal gum resins are obtained.

Saponin has received its name from a plant of the Carophyllaceæ, in which order it appears to be of frequent occurrence; but it or an allied compound has also been shown in the Polygalaceæ, in the rosaceous quillaia, in the Smilaceæ and other plant-groups, while volatile acrid compounds exist in many Aroideæ, in buttercups and their immediate relatives. Somewhat allied to the saponins are certain powerful poisons of the Liliaceæ, Primulaceæ and of digitalis and other Scrophulariaceæ.

The aroideous calamus owes its medicinal virtues to a volatile oil and bitter principle, types of compounds which are frequently associated in the bitter-tonic drugs. But others, like the Simarubaceæ and Gentianaceæ, have developed the bitter principle to the total or almost complete exclusion of aromatic and astringent compounds.

Many of the principles referred to belong to the class of glucosides, so called because upon decomposition under certain influences glucose or an allied carbohydrate makes its appearance as one product. A peculiar group of the same class should be mentioned here, apparently confined to the Convolvulaceæ, like jalap and scammony, which owe their cathartic action to so-called resins, in reality, to water-insoluble anhydrides of water-soluble acids, both splitting into compounds, one of which is sugar.

The bitter taste is not solely confined to the glucosides and so-called neutral compounds. A very large number of the most important class of alkaloids share with the former this property. It is now nearly three-quarters of a century since the first alkaloid, morphine, was announced as a basylous organic compound; to-day the members of this class, both natural and artificial, are almost innumerable. Among the Acotyledons it is almost exclusively the class of fungi which in its different groups produces alkaloids, quite distinct, as a rule, in composition and effect, from those generated within the living tissue of phanerogams. Such alkaloids are in nearly all cases confined to a single species, or genus, or tribe, and only in rare cases have been met with in several orders. Thus, berberine exists in plants of the Ranunculaceæ, Anonaceæ, Menispermaceæ, Berberidaceæ, Rutaceæ and Leguminosæ; and caffeine in the orders of Rubiaceæ (coffee), Ternstroemiaceæ (tea), Sapindaceæ (guarana), Sterculiaceæ (colo and cacao) and in Ilicineæ (maté, etc.). But colchicine has only been observed in colchicum; veratrine and jervine in veratrum; piperine in certain peppers; quinine and allied alkaloids in cinchona and remijia; strychnine and brucine in strychnos; morphine and congeners in opium, and one or two of these compounds also in other poppies; sanguinarine in a few Papaveraceæ; pilocarpine, physostigmine and cocaine, each only in a single species; aconitine and its near relatives in several aconites; nicotine in species of tobacco, etc. A most interesting group are the mydriatic alkaloids of the Solanaceæ, which are widely distributed throughout this order, are very similar or identical in elementary composition, and may, in part at least, be converted one into the other.

I have dwelt upon a few only of the relations between plants and their constituents and properties, and have merely hinted at some of the structural causes. Enough has been said, I trust, to show the intense interest attached to the questions involved. As we proceed with the work beginning this evening, we shall have frequent occasions to note some facts of the kind spoken of, and it has been my object to enlist, in advance, your earnest attention to their importance —important to the pharmacist and to the physician, and not less so to the student, both junior and senior.

PHARMACY IN RELATION TO MEDICINE.*

BY J. C. HYSLOP.

Pharmacy an integral part of medicine is the position that I undertake to maintain in this short note on this branch of pharmaceutical ethics.

With simpler conditions of society the physician, the surgeon, the pharmacist, the dentist were well combined in the same individual; an individual for the most part lovingly devoted to the cultivation of these noble avocations connected with the relief of human suffering and the prolongation of human life. Differentiation, however, becomes imperative in the complex conditions of modern life, for each of these callings becomes sufficiently intricate in itself to engross the energies and prove a life-time work for one man devoted to its special culture.

None ever yet was able to keep *au courant* with any kind of human progress who was lax or indistinct as to his ideals. We must build our castles in the air—capacious, lofty, and as perfect as possible—then life's work consists in putting foundations to them, and if in the performance of this latter task we are called to lay aside the sword and trowel, others fall in and carry on the work to its full completion.

Progress, we all wish for progress, but the very word itself is meaningless apart from an ideal, more or less perfect, at which we aim: to this sense agree the words of one of the loveliest songsters of old England—

"Pitch thy behaviour low, thy projects high,
So shalt thou humble and magnanimous be;
Sink not in spirit, who aimeth at the sky
Shoots higher far than he that means a tree."

Pharmacy, one of the main branches of the complex art of medicine. That branch of medical science whose province it is to diagnose the multitudinous articles of the materia medica, and to mix and prepare them for administration.

Many were the services rendered to medicine by the founders of the Pharmaceutical Society in 1841, and not the least of these was the recognition of the breadth and dignity of pharmaceutic art. As if in a vision, in outline, there lay before them all the marvellous extension of chemical and botanical science of which our eyes see the filling up in detail in a manner to surpass the anticipations of the most sanguine and enthusiastic.

The pharmacy of Great Britain in their day was cramped, imprisoned, and paralysed in a most cruel manner by its adventitious surroundings. How could it have advanced on the course of progress as we see it now but for the clearance, the breathing space, the fair field, and no favour provided for it, by the joint labours of Allen, Bell, Payne, and their coadjutors?

"Deus nobis haec otium fecit" I recognize most fully, but none the less must one acknowledge the apostles, and venerate them, too, who, raised up for such a work, did it, and left us but little more to do than to add a few finishing touches.

They did it, I say, for what is the opinion of representative medical men of to-day? Hear what said Dr. Langdon Down, speaking at Bloomsbury Square, October 9, 1880. Hear also what says Sir Dyce Duckworth seven years afterwards, October 6, 1887.

J. Langdon Down, M.D. F.R.C.P., October 9, 1880.

"I am able to speak with some authority in the matter, and can assure you that in no medical school in London is chemistry taught as efficiently as it is taught here. Nowhere do medical students have the advantages which are furnished here for acquiring a knowledge of botany and materia medica. It is in these directions that your power lies, and when one considers the importance of chemistry, and its endless ramifications in sanitary and pharmaceutical directions, and how very much the tendency is growing on the part of medical students to give it but slight attention, and to ignore more and more botany and materia medica, it does not require much prescience to predicate that you may be as superior to your medical *confrère* in these branches of knowledge as he will certainly be to you in the diagnosis and treatment of disease."

Sir Dyce Duckworth, M.D., October 5, 1887.

"I affirm without hesitation the fact that your diplomates, as a rule, are better fitted to act as public dispensers than members of my profession, and I can therefore only express the hope that you may steadily wrest this sphere of work from men who have already too much else to do and think about, and who are less well-qualified than you to do it. I am aware that fears have been expressed that if you took over the dispensing duties of medical practitioners generally, you would be tempted even more than you now are to engage in treating disease both on your own premises and outside them. For my part I entertain no such apprehensions. On the contrary, I feel every confidence that your temptations in this direction would be diminished, and that you would abide more constantly in your own proper sphere.

"Your own proper sphere," "aye, there's the rub." Still wisdom and honour alike demand that we settle for ourselves what our own proper sphere is, and that we act therein with industry and courage.

My chief wish now, sir, is for a full and a free discussion on the greater and the less portions of our subject alike. Having treated of the greater in some detail allow me for the sake of a finish to simply state in a terse dogmatic manner a few of what I regard as the smaller ones:

How about counter prescribing? Well, I say to all, if you can tell me what is the matter with you I can usually tell you what to take to do you good, and if I cannot tell you what to take I can tell you what to do—go to a good doctor and bring me back the prescription.

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* Paper read at a meeting of the Western Chemists' Association (of London), Wednesday, April 22.

How about arrangements with a local medicus to do his dispensing for him at a low figure, he send you customers, you send him patients? Well, do not; it is a species of quackery that does not at all fit in with my ideal of pharmaceutical ethics or true progress.

As to duplicates of prescriptions? Do not, except, of course, to one's own personal friends, and then only under exceptional circumstances.

"Faithfully" prepare, but do not deface, the physician's prescriptions. If you must put a trade mark on a professional document, at least do it in a modest and careful manner, and as possessing some idea of Nature's beauty with respect to her forces, always acting in straight lines, either parallel, convergent, or divergent. Mine goes neatly on the back, where there is plenty of room, and where, if my experience goes for anything, prescribers generally like to see it. Besides which, it cannot be torn off, and looks as if one did his duty with some amount of pride.

As to various other *minutiæ* that occur in actual practice, always be ready to consult the prescriber's convenience and meaning and general wishes. Never mind a snub or two, which young beginners will often venture; stiffen up like a brick when needs be, and let them have the lessons intensified.

> "Seest thou a man diligent in his business
> He shall stand before Kings, he shall not stand before mean men."

TESTING CASSIA OIL.

BY E. HIRSCHSOHN.

1. The oil is shaken in a graduated tube with three volumes of light petroleum (0·65). A diminution in its volume indicates the presence of other ethereal or fat oils, or of resin or kerosene; an increase would probably be due to the presence of much castor oil. 2. The petroleum extract is shaken with copper hydroxide. A blue solution indicates colophony or copaiba balsam. 3. One volume of the oil must give a clear or merely opaline solution with three volumes of 70 per cent. alcohol at 15°. A turbidity or sediment indicates the presence of petroleum, or of foreign ethereal or fatty oils, or of a large excess of colophony. 4. The alcoholic solution from 3 is poured into half its volume of a cold saturated solution of lead acetate in 70 per cent. alcohol. No precipitate should be produced.

To estimate the cinnamaldehyde in the oil, 75 grams of it is well shaken in a capacious flask with 300 c.c. of a boiling, 30 per cent. solution of sodium hydrogen sulphite. After a short repose, 200 c.c. of hot water is added, and the whole is warmed on the water-bath until the compound of the aldehyde with the sulphite is completely dissolved, when the constituents other than aldehyde and all the impurities form an oily layer on the surface. After cooling, this oily layer is dissolved in ether, and the filtered ethereal solution is evaporated in a tarred beaker as rapidly as possible on the water-bath, and is weighed at intervals of ten minutes. When two weighings differ by no more than 0·3 gram, the last but one is taken as that of the non-aldehydic substances present. The cinnamaldehyde is known from the difference. Cinnamic acid, if present, may be removed by shaking the oil with hot sodium carbonate solution, and the amount found deducted from that of the aldehyde ascertained as above.

A rough technical method for the same purpose consists in placing 10 c.c. of the oil in a special flask of about 100 c.c. capacity, with a cylindrical neck graduated in tenths of a cubic centimetre. The oil is treated in the flask with the sodium hydrogen sulphite, and when the crystalline sulphite has been completely dissolved by prolonged heating on the water-bath and the non-aldehyde constituents have formed a clear oily layer on the surface, they are driven up into the graduated neck by cautious addition of sulphite solution, and their volume read off when cold. The specific gravity of the non-aldehydic oil may, without serious error, be taken as 1·06 at 20°, or identical with that of the original cassia oil. A good cassia oil should contain at least 75 per cent. of cinnamaldehyde.—*Journ. Chem. Soc.*

ACTION OF LEECH EXTRACT ON BLOOD.

BY W. L. DICKINSON.

The general properties of the extract of the anterior part of the medicinal leech which as Haycraft showed (*Proc. Roy. Soc.*, xxxvi.) possesses a strong anti-clotting action on blood, are the following:—It is neutral to litmus paper; its specific gravity is not appreciably higher than that of the medium used for extraction. Boiling causes no precipitate and no loss of activity. Alkalis cause no precipitate. A trace of acetic acid causes cloudiness, readily soluble in excess. Strong acetic acid causes no precipitate in salt-free, but a copious cloud in salt-saturated, extracts. Nitric acid in the cold causes a precipitate soluble on boiling, and reappearing on cooling. Saturation with ammonium sulphate causes a precipitate, after which no proteid remains in solution: saturation with magnesium sulphate or sodium chloride, on the other hand, causes no precipitate. If all salts are removed from the extract by dialysis, there is no precipitate produced and no loss of power. Copper sulphate, lead acetate, and mercuric chloride give precipitates insoluble in excess of the reagents. Copper sulphate and potash give a pink (biuret) reaction. Alcohol causes no loss of the activity of the extract.

The leech extract, therefore, contains a proteid having some features in common with Kühne's proto-, and others with deutero-albumose. The albumose precipitated by ammonium sulphate has all the anti-clotting power of the original extract; the extract minus the albumose has no such powers. Hence, probably the albumose is itself the active principle.

Clotting in plasma obtained from blood prevented from coagulating by admixture with leech extract (either intravenously or after it is shed), cannot be induced by carbonic anhydride or by dilute acetic acid; it can, however, always be induced by a sufficient quantity of fibrin ferment. Such plasma gives no precipitate on cooling.

Fibrin soaked in leech extract fails to yield ferment when subsequently treated with 8 per cent. sodium chloride solution. The extract, however, still contains cell globulin. Cell globulin prepared from lymphatic glands by Halliburton's method retains all its properties, except its fibrinoplastic power, when treated with leech extract. This is regarded as an argument in favour of the non-identity of the cell-globulin and fibrin ferment.—*Journ. Chem. Soc.*

ANTIDOTE TO RATTLESNAKE POISON.

A correspondent of the *Botanical Gazette* of Crawfordsville, Indiana, Mr. F. D. Kelsey, states that a native plant of Oregon and Montana, *Hieracium Scouleri*, Hook., has been successfully used in that region as a safe and sure cure for rattlesnake bite. The plant is taken up whole and fresh, though he believes it can be made into a pharmaceutical preparation, such as a powder, or a decoction, or an extract. The plant is bruised and washed, and then gently steeped in milk. This, after straining, is to be drunk in large quantities; and it is stated that several patients who have been thus treated have all recovered. An allied species, *Hieracium venosum*, L., is known in the United States as "rattlesnake weed," and it is stated to be a well-known fact that deer, antelopes and other animals, when bitten by rattlesnakes, seek relief in eating some weed known to the hunters in early days.

The Pharmaceutical Journal.

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SATURDAY, MAY 2, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PRELIMINARY EXAMINATION.

THE correspondence on the subject of the Preliminary examination will probably continue for some time yet, and as we have no desire to restrict the expression of opinion on a matter of so much importance we refrain from offering any remarks on the letters that have been published. But there is one of those letters, that of Mr. Moss, which bears rather upon the question as to the necessity of a curriculum, that offers opportunity for remark without neglecting the principle above expressed. Mr. Moss, while sympathizing with the desire of reducing the proportion of failures in the examination, professes to entertain doubts whether that effect would be secured by the proposed raising of the standard of the Preliminary examination. Naturally the number of failures in that examination would be increased, and instead of fifty-six per cent. there might be seventy or even more. But at the same time there would be reason to expect that since the higher standard of the entering examination would prevent any but the better educated and more intellectually cultivated candidates from obtaining admission to the pharmaceutical fold, the very important result would be secured that the proportion of failures in the qualifying examination should therefore be smaller than it is at present. That is the way Mr. Moss puts the argument in favour of raising the standard of the Preliminary examination, and he admits it appears to be a plausible argument. The objection he raises to it is based upon a consideration of the report of the Privy Council Visitor, to which attention has recently been directed (see p. 923). As Mr. Moss points out it is stated in that report that the failures in botany were 2·18 per cent. in each of the subjects, chemistry and materia medica, and in prescription reading 7·5 per cent., while in pharmacy the failures were 10·1 per cent., and in dispensing 21·3 per cent. On the ground of these data he comes to the conclusion that since dispensing is the only subject in respect of which anything of the nature of a compulsory curriculum may be said to exist, "it is not curriculum *quâ* curriculum that is at fault, but the system." We confess to have no little difficulty in comprehending exactly what is intended by the conclusion thus stated; but we take it to mean that Mr. Moss considers that the candidates presenting themselves for the qualifying examination have actually gone through a practical training in dispensing, which would be entitled to be called a "curriculum in that particular subject." Such an opinion certainly suggests a greater amount of credulity than we should have attributed to Mr. Moss, but his conclusion without this significance would be of no value for his argument and still less for the use he proceeds to make of it, when he goes on to argue that since the failures in a subject for which there is a curriculum amount to 21·3 per cent., and those in subjects for which there is no curriculum are only one-tenth, one-seventh and half as numerous, there is no need for a curriculum in regard to these latter subjects.

We have endeavoured fairly to state the nature of Mr. Moss's argument against what is termed the curriculum, but we cannot omit to say that it is one most extraordinarily fallacious in every respect. To speak of the certificate of practical occupation in dispensing now required in the qualifying examination as furnishing evidence that anything approaching the character of an adequate technical training has been gone through by candidates, even in regard to practical dispensing, would indicate a want of acquaintance with existing conditions. Whether or not Mr. Moss is really in that position there should not, we think, be any doubt that he is perfectly well aware, as a past examiner of the Pharmaceutical Society, that the comparison he institutes between the proportions of failures in dispensing and pharmacy on the one hand, and those in botany, chemistry and materia medica on the other, is in the present case absolutely fallacious and utterly worthless for the purpose of any inference as to whether a curriculum is needed. Mr. Moss ought at least to know that all the Society has done for chemistry, botany and materia medica has utterly failed to obliterate the plague spot which renders careful, competent and painstaking examiners unable to distinguish with certainty the candidates who, with a good memory and some mental effort, have verbally learnt enough of chemistry, botany and materia medica to stand a good chance of being able to answer any questions that can be put to them in the brief course of their examination. The figures in the Privy Council Visitor's report do not prove what the Society has done for the honest study of the subjects above referred to; on the contrary, they rather prove what the system of cramming has done to frustrate those efforts on the part of the Society, and to destroy the beneficial influence they might have produced. This is the great evil to be dealt with in regard to pharmaceutical education, if the practice of pharmacy is not to revert to the position it occupied before the passing of the Act of 1868, or even to that prior to the foundation of the Society.

And if the subject of pharmaceutical education is to be dealt with at all for the advantage of the body corporate, and in advance of what is demanded by the State in regard to the safety of the public, it must be dealt with under conditions in which every individual connected with the business will feel that his own interest is at stake and that he is therefore bound to take part in the work. It is idle at the present time to call upon the Society to do what Mr. Moss suggests in establishing schools for dispensing, which would entail loss to the Society, as its other educational enterprises have done, and would not even ensure the attendance of those persons as students who might be benefited. The increasing urgency of the educational question generally appears more likely to receive its solution from an internal segregation of the trade having regard to diversity of trade demands and qualifications. We hear it constantly argued that for certain kinds of business education is not required, that the knowledge of which evidence has to be given in the qualifying examination is never afterwards of any value in practical life. On the other hand it is urged that for the higher duties of pharmacy the best educational provisions we now possess are inadequate. Surely this seems to be a situation in which the common sense and common interests of those concerned should suffice for devising means of satisfying the requirements of each part of the trade and thus put an end to the conflict over educational matters which has continued so long without a satisfactory settlement.

According to the statistics appended to the Calendar of the Pharmaceutical Society of Ireland for 1891, a copy of which has just been received, the Register on the 14th of March last contained the names of 369 pharmaceutical chemists. Of these 112 (14 named in the original Act) were, at the same date, members of the Society. Under the provisions of the amending Act of last year 74 persons had been registered as "chemists and druggists" without examination and 31 after examination, four had been registered as "registered druggists" after examination, and one had been elected as an "associate druggist."

* * *

A petition to the House of Commons against the Pharmacy Acts Amendment Bill, presented on the 15th of April by Mr. Jackson, is officially described as from "botanists and herbalists of Leeds," and as bearing thirty-five signatures.

* * *

Arcardian simplicity, though rare at the present day, is a quality that still exists, as we learn now and then from the police reports of proceedings that are in common parlance termed the confidence trick, and though it is sufficiently surprising that illustrations of this fact should be furnished by citizens of the United States, a recent legal report affords a still more remarkable indication that the quality we refer to may exist even in such an unpromising locality as the Stock Exchange. In an action for damages brought by a firm of stockbrokers against a "patent medicine" company, it was alleged by the plaintiffs that they had been induced by the defendants to enter into contracts for the sale of shares by which they had lost upwards of seven thousand pounds, and they now sought to recover that sum from the defendant company. To any one conversant with the nature of the financial operations often carried out in connection with the shares of joint stock companies extreme Arcadian simplicity might not at first sight appear to be the only reasonable explanation of the plaintiffs' loss, consistent with the terms of their complaint. But the defendants' counsel rather disturbed the possibility of retaining this opinion by his argument that the plaintiffs had merely entered independently into speculation, from which they hoped to realize a large profit. The judges in a court of appeal were more impressed with this view of the matter than by that put forward by the plaintiffs, and they decided that there was no evidence of privity between the parties which could render the defendants liable for the loss the plaintiffs had sustained. There is therefore still a possibility of believing that even among stockbrokers there may be some very simple minded people.

* * *

At a recent meeting of the Société de Thérapeutique, M. Constantin Paul reported a case of poisoning by a "*pâte pectorale.*" It appeared that the preparation was one that in compliance with the French law as to specialities had been licensed as containing only traces of codeine; but the patient presented the dryness of the throat, dilatation of the pupils and all the other signs of poisoning by atropine or hyoscyamine. In the discussion that followed M. Dujardin-Beaumetz attributed the existing demand for specialties to the negligence of the pharmacist of the present day in making up magistral preparations and to the inability of the medical man to construct a formula. It was regrettable, he said, to see the most simple medicines, even simple aqueous solutions, specialized in France by certain pharmaciens.

* * *

According to the *Pharmaceutical Record*, the manufacture of "arrowroot starch" in Florida, which was formerly confined to the Indians, is developing into an important and lucrative industry. The starch is said to be obtained from the root of a plant resembling the "soap weed," which grows wild in abundance throughout the States. Hitherto it has been understood that the so-called "Florida arrowroot" was obtained from the stems of the *Zamia integrifolia*, one of the Cycadaceæ.

* * *

We desire to acknowledge the receipt, from various sources, of votes for the Royal Masonic Bevevolent Institution in favour of Mr. How, and hope that a sufficient number will eventually be obtained to secure his election.

* * *

It may interest some of our readers to know that the new part (No. 20) of Cassell's 'Cabinet Portrait Gallery' contains, besides portraits of Mr. and Mrs. Henschel, an excellent portrait of Sir Henry Roscoe.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 8, 9, 10, 15, 16, 17, 21, 22, 23 *and* 24, 1891.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gerrard, Greenish, Holmes, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 9th, 15th and 21st on behalf of the Privy Council.

MAJOR EXAMINATION.

15*th.*—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Dalton, Robert	Wilmslow.
Fielding, Clement	Elland.
Halsted, Arthur Walter	Wigton.
Lobbett, James Godfrey	Hingham.

16*th.*—*Five* candidates were examined. *Three* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Charles, David	Llanelly.
McFall, John Edwd. Whitley	Liverpool.

17*th.*—*Five* candidates were examined. *Three* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Dudderidge, Frank Rawlinson	Blandford.
Roper, Henry Arthur	Plymouth.

21*st.*—*Four* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Riddle, Thomas Edward	Hexham.
Silversides, Richd. Benj. Garbutt	Darlington.
Whitehead, Frederick Nathl.	Morecambe.
Williams, Arthur Harold	Chester.

22*nd.*—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Norton, Frank	Cheltenham.
Richardson, Hubert Naylor B.	Leicester.

MINOR EXAMINATION.

8*th.*—*Thirty-two* candidates were examined. *Nineteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Agar, Robert Langbourn	Bridport.
Aitken, John Downie	Southsea.
Allen, Herbert Llewellyn	Basingstoke.
Appleby, Robert Colquhoun	Hull.
Back, Charles Thomas	London.
Barrett, William Louis	Portsmouth.
Baugh, John Wm. Mahanoora	Boston.
Bell, John Renwick	Newcastle-on-Tyne.
Bridgman, William Herbert	Holsworthy.
Brimson, George Frederick	Frome.
Bugden, Arthur	Bicester.
Button, Arthur Edward	Lincoln.
Callaway, Alfred James	Salisbury.

9*th.*—*Thirty-two* candidates were examined. *Twenty* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bell, William	Southampton.
Chambers, John Wm. Parsons	Derby.
Chapman, John	Southwell.
Cook, Harry	Barrow-in-Furness
Cousins, Alexander	Weston-super-Mar
Cowles, Hector Charles	London.
Cupit, Alfred Henry	Loughborough.
Curtis, John	Newport, Salop.
Davies, David	Lampeter.
Dickinson, George	Hackney.
Dyson, John Geo. Peacock	Barnsley.
Eastland, John	Margate.

10*th.*—*Twenty-nine* candidates were examined. *Eighteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Eden, William James	Manchester.
Ellis, David	Ellesmere.
Field, Ebenezer	Cambridge.
Fillingham, John	Grantham.
Fowles, Frederick William	Liverpool.
Freeman, John	London.
Fugler, Augustus	Probus.
Furnivall, Wm. Heber Gunning	Cardiff.
Gard, John	Camelford.
Garnett, Henry	Evesham.
Gibbs, Arthur	Blackheath.

15*th.*—*Twenty-four* candidates were examined. *Nine* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Davies, Evan James	Cardigan.
Evans, Griffith	Machynlleth.
Gibbs, Christopher John	Weymouth.
Goy, William Henry	Stamford.
Green, William Henry	Gargrave.
Griffiths, Arthur Daniel	St. Clears.
Harrington, William	St. Bees.
Harris, Edwin Thomas Pile	Bristol.
Harrison, Edward Frank	Holloway.
Hart, John Henry	Strangford.
Heath, William	Derby.
Hicks, Joseph	Banbury.
Hiscox, Walter Reeve	Wisbeach.
Hoblyn, Edward Robert	Exeter.
Middleton, James	London.

16*th.*—*Twenty-eight* candidates were examined. *Fifteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Evans, Griffith William	Aberayron.
Harrison, William Arthur	Louth.
Hoile, William Bonny	Sandgate.
Howell, Treharne	Newport, Mon.
Jeeves, Arthur Thomas	Brighton.
Jewell, John Ernest	Liverpool.
Jobbins, Edwin	London.
Kempton, Ernest Arthur	Ely.
Kendall, George William	Rawdon.
Kenderdine, Alfred George	Stafford.
King, Edwin Harry	Nottingham.
Kirkby, John George	Algarkirk.
Latham, Ernest James	Mansfield.

17*th.*—*Twenty-six* candidates were examined. *Sixteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Johnson, John Richard	Over Darwen.
Jones, Frederick Pryce	Newtown.
Leaper, John Shirley	Spalding.
Lee, Ernest Harry	London.
Le Seelleur, George	Jersey.
Llewellyn, George Parry	St. Clears.
Long, Frederick Coleman	Norwich.
Mason, John Henry	Wirksworth.
Melhuish, Andrew Ralph	Windsor.
Mills, Arthur	Walsall.

21*st.* — *Twenty-seven* candidates were examined. *Seventeen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ashton, Daniel Aspinall ......Mytholmroyd.
Martin, William Montagu......Plymouth.
Morris, David Thomas ....Pontardulais.
Myers, James ....Tadcaster.
Newman, George Franklin ...Portsmouth.
Oates, Walter William ....Audlem.
O'Brien, Albert Christopher...Pembroke Dock.
Osborn, James Ernest ....Middlesborough.
Owen, William ....Carmarthen.
Padley, Gillies............... .....Boston.

22nd.—*Twenty-eight* candidates were examined. *Fifteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Plowright, John ....Ryde.
Pritchard, Elias Roberts ......Aberdaron.
Puckrin, Thomas Edward ......Whitby.
Ramsden, Thomas Prince......Pontefract.
Retallack, William Cyrus ......St. Austell.
Richardson, Wm. Nathl. Saunders...Warminster.
Riches, Frank Fraser............Torquay.
Ringer, Frank Arthur ....Norwich.
Roberts, Frederic Lancelot ...London.
Robinson, Richard Hardy......Wainfleet.
Smith, Richard Sidney .... .Dartford.
Sturton, Frederick ....Peterborough.
Taylor, Thomas Morley ....Bath.

23rd.—*Thirty* candidates were examined. *Eighteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hornby, Frederick William ...Cottingham.
Sanders, Basil Stanley ....Newport, Mon.
Sant, Ernest ....Burslem.
Shakespear, William ....Birmingham.
Sharman, Herbert Broughton.London.
Shearman, John Samuel ......Cambridge.
Smith, Edward Charles.........London.
Spyer, Arthur Jesse ....Watlington.
Sturton, Samuel Ainsworth ...Framlingham.
Summers, Stanley ....London.
Tavener, William Sidney ......Sherborne.
Wilson, Arthur ....Grimsby.

24th.—*Thirty-one* candidates were examined. *Sixteen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brooke, Edward .. ..Barking.
Butterworth, Henry Lindsay...Oswaldtwistle.
Coley, William Henry ....Wednesbury.
Minett, Edward Pigott ....London.
Roberts, Walter ....Stroud.
Smith, Stanley John ....Colchester.
Thomas, William John ....Beaumaris.
Walton, Frederick John ......York.
Whittock, William Henry......Warminster.
Williams, Richard Watson ..Hanley.
Williamson, Fredk. Arthur ...Ashton-on-Ribble.
Wilson, Charles ....Louth.
Witney, Frederick Harcourt...Devonport.
Wood, James Arthur............Barnsley.
Woodcock, Herbert Hy. Addis.Margate.

MODIFIED EXAMINATION.

15th.—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

Holme, Henry Thomas ....Shurdington.

PRELIMINARY EXAMINATION.

24th.—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Arthur, Harvey Phillips ......Glasgow.
Berry, Alfred ....Hitchin.
Brown, Joseph Winspear ......Wimbledon.
Cadman, Charles Thomas .....Blackheath.
Chapman, John William ......Scarborough.
Donington, Robert Spencer ...London.
Fordham, Sidney Herbert ...London.
Forrester, Ephraim ....Ulverston.
Gibson, James A. ....Glasgow.
Hines, Harry Thomas ....Greenwich.
Kerrah, William Thomas ......Liverpool.
Norris, Reginald James.........York.
Randall, Bruford Henry ......Wareham.
Sanders, Richd. Bishop Payne.Woodbridge.
Shaw, Thomas Alexander......Hull.
Spooner, William Cushing ...Wymondham.
Stevens, William Goyne, Jun..London.
Street, Spencer ....Littleport.
Thomas, Fras. Moutague W...London.
Thompson, Charles Reginald..Oxford.
Tunbridge, Fras. Fredk. Arnull...Reading.
Turney, Herbert Blandford ...Plymouth.
Wilby, Frederick Tertius ......Leicester.
Wilkinson, Alfred Bates ......Dartmouth.
Wooddisse, Frank Bagshawe...Nottingham.

Proceedings of Societies in London

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Thursday, April 23.

Present—Mr. Martindale (President) in the chair; Professor Green, Mr. Gerrard, Mr. Davies (Treasurer), Messrs. Naylor and Ransom (Hon. Gen. Secs.), and Mr. Johnson (Assistant Secretary).

The minutes of the previous meeting were read and confirmed.

The "Blue List" was considered and some slight alterations were adopted previous to its circulation amongst members for the current year.

A few volumes of the 'Year-Book of Pharmacy' were presented to the Leeds Chemists' Association to complete a set.

The last edition of the "Unofficial Formulary" being exhausted, the Formulary Committee was authorised to revise and publish a new edition as early as possible.

Mr. Naylor read a letter from Mr. Coleman (Local Secretary) stating that the arrangements for the forthcoming meeting of the Conference at Cardiff are progressing satisfactorily.

Several gentlemen were proposed and elected to membership.

CHEMICAL SOCIETY.

The annual general meeting of the Chemical Society was held on March 25, Dr. Russell, F.R.S., President, in the chair.

The President delivered an address, of which the following is an abstract:—

The number of fellows is 1786, of whom 32 are honorary foreign members. One foreign member, Dr. Heinrich Will, and 17 Fellows have died during the year; 13 Fellows have withdrawn; and 28 Fellows have been removed from the list on account of arrears; 114 Fellows have been elected during the year, being 31 fewer than last year. The financial state of the Society is not quite so satisfactory, said the President, as it has been for some years past, the receipts from subscriptions being £177 less than last year. This falling off is to be accounted for, partly by the accidental circumstance that there were 11 fewer life compositions than last year, but chiefly by the fact that no fewer than 26 candidates had been blackballed. The same number of papers, viz., 72, had been printed in the Transactions as last year, but they occupied no fewer than 1051 pages, instead of 772 pages in the previous year. There had been a considerable increase in the number of abstracts, 2341 appearing this year, and occupying 1527 pages, whereas last year the number was 2131, which occupied 1252 pages. Hence the cost of the Journal had been greater this year by £413. All the new and valuable works on chemistry had been added to the Library as they were published. The time had again come round for the award of the Longstaff medal, given every third year to the Fellow of the Society who, in the opinion of the Council, had done the most to promote chemical science by research. This instruction was not always easy to carry out; but the unanimous decision arrived at on this occasion, to award the medal to Professor Japp, would certainly, he thought, be regarded by the Fellows generally as eminently satisfactory. All who followed the higher development of organic chemistry knew how valuable were the carefully thought-out papers which Professor Japp had communicated to the Society. It was a matter of regret that he was unavoidably prevented attending the meeting to receive the medal in person. The great event of the year had undoubtedly been the celebration of the Jubilee on February 24 and 25; it was the intention of the Council to issue in a separate form a full account of the proceedings on these occasions. With reference to the reception held at Goldsmiths' Hall on the evening of the 24th by the President and Council, the Goldsmiths' Company had not only lent their Hall for the occasion, but with that liberality for which the great City Companies were so noted, "recognizing that the occasion was of quite an exceptional character," had expressed a wish to relieve the Society from the expense attending the preparation and use of the Hall. The suggestion made in his previous address that a subject catalogue of the Journal from its commencement might be published as a fit memorial of the Jubilee had, he thought rightly, been abandoned, as it appeared that the labour and expense involved would be greater than the result would justify. It seemed appropriate to the occasion to briefly chronicle the changes which had occurred in the constitution and government of the Society since its foundation. Little or no alteration of bye-laws or plan of working the Society occurred during the early years. In 1852 the number of Vice-Presidents, which was then four, was increased by adding all past Presidents; but it was not until 1866 that any other change worth recording took place. In that year a new form of nomination paper was introduced, and this seems to be the first indication of any feeling having arisen that undesirable people were seeking and obtaining admission into the Society; this question had from time to time caused more discussion among the Fellows than any other relating to the government of the Society. As chemistry became of more public importance, a very natural impression gained ground that, since all the more distinguished chemists of the day belonged to the Society, therefore every Fellow must be a thorough chemist. This misconception on the part of the public had had a most mischievous effect. In 1867 the matter was very fully discussed, and was ultimately referred by the Council to a committee consisting of Mr. Crookes, Dr. Miller, Dr. Odling, Mr. Wanklyn and Dr. Williamson. The report of this committee was adopted and sent to all the Fellows, and it stated the case so fully that it appeared well to republish it on the present occasion. This committee decided not to recommend "any alteration in the bye-law relating to the election of Fellows which would have the effect of confining the Fellowship of the Society to strictly scientific men." But with a view to increase the security against the election of undesirable candidates, they recommended that the number of signatures attached to a certificate be five instead of three, three instead of one to be from personal knowledge. The recommendations were adopted, and seemed to have met the requirements of the case, as the agitation ceased. In 1877 another similar outbreak took place, but on that occasion the feeling that it was practically impossible for the Society to insist on all its Fellows being trained and competent chemists became so strong that ultimately it was decided to found the present Institute of Chemistry. Now, after the lapse of fourteen years, a discussion was again raised, but the collateral circumstances were very different, as, through the existence of the Institute, all who desired to be stamped as educated chemists had the opportunity of obtaining such recognition. It was, however, necessary to arrive at a clear understanding as to whom it was desired to attract, and whom to exclude from the Society. Speaking for himself, the President said he should wish to see the entrance made easy for all who have any real interest in our science, even if they be only amateur chemists, provided that socially there were no objection to their admission; he would entirely abandon the idea that amount of chemical knowledge was to determine the suitability of a candidate. It was practically impossible by any hard-and-fast rules to exclude undesirable persons, and the history of the Society went to show that the only effective method was for the Fellows themselves to realize that it rested with them to recommend only proper persons. What had been the history of the Society during the past fourteen years as showing whether the means at disposal had been effective in securing the prosperity of the Society? Without a doubt the Society never stood so high both in the scientific and external world as at the present time; his experience during the past two years had shown him how widely the Society was known, and in how favourable a light it was regarded at home and abroad. If the feeling were cultivated and generally acknowledged that the body of Fellows expect and require that all should act honestly and honourably towards one another, there would be very few improper persons gaining admission. On learning that any Fellow is acting in any way wrongly or dishonourably towards the Society, the first thing in future would be to ascertain, by reference to the Proceedings, who are the five Fellows who certified that the said Fellow was a proper person to join the Society. Nothing was more powerful than public opinion, and if it were felt that such a spirit should guide all elections, far more good would accrue to the Society than any law could effect which could be invented or enforced.

Dr. Gilbert proposed a vote of thanks to the President, coupled with the request that he allow his address to be printed; the motion was seconded by Mr. Carteighe. Both speakers referred in most appreciative terms to Dr. Russell's services to the Society, especially on the occasion of the Jubilee celebration.

Dr. Teed supported the motion, which was carried by acclamation.

The President, having acknowledged the vote,

Professor Thorpe, the Treasurer, gave an account of the financial position of the Society. The receipts from fellows had been £3459 16*s*. 0*d*.; from sale of the Journal £383 9*s*. 4*d*.; and by dividends on invested capital £363 0*s*. 6*d*. The expenses on account of the Journal had been £2724 0*s*. 10*d*.; on account of the Library, £300 18*s*. 9*d*.; on account of the Proceedings, £183 7*s*. 10*d*.—the total expenditure being £3790 4*s*. 9*d*. The balance at the bank was £1798 17*s*. 7*d*.; and £600 had been invested in Metropolitan Board of Works 3½ per cent. stock.

Professor Attfield proposed that the thanks of the Fellows be tendered to the Treasurer.

Dr. Atkinson, in seconding the vote, lamented the loss of income during the year, and referred to the smaller expenditure out of the Research Fund, and the excessive balance at the bank.

Dr. Stevenson advocated a larger expenditure on the Library.

Mr. Friswell followed Dr. Atkinson, in lamenting the diminution in income and its cause, and also referred to the disproportion borne by the life composition fee to the annual subscription.

Mr. Cassall asked that increased facilities of using the Library might be granted to Fellows.

The President said that every effort was made by the Library Committee to obtain books, and that if Dr. Stevenson and others who complained of deficiencies would point out what was required, the Library Committee would most certainly pay the utmost attention to their recommendations. The Library would be open at any reasonable and rational time. [Dr. Thorne subsequently stated that the statistics of attendance on evenings other than those when meetings took place in the buildings were such as to indicate that there was no great desire to use the Library in the evenings.] It so happened that a considerable sum had been voted out of the Research Fund at a time just outside the financial year, so that actually the expenditure was greater than appeared.

The Treasurer, in acknowledging the vote of thanks, said that the large balance would very soon disappear, as a number of heavy payments had to be made. He took occasion to gratefully acknowledge the service which Mr. Tutton had rendered him in keeping the Society's accounts, and finally proposed that thanks be given to the Auditors, Messrs. H. Crompton, R. H. Davies and B. Dyer.

This proposal was seconded by Dr. Collie and adopted.

Mr. Dyer having replied,

Professor Ramsay moved a vote of thanks to the Officers and Council, which was seconded by Mr. Friswell, and acknowledged by Dr. Armstrong.

Mr. Warington finally proposed that thanks be tendered to the Editor, Sub-Editor, Abstractors and Librarian.

Dr. Clowes seconded the motion.

Mr. Groves and Dr. Thorne replied.

Scrutators having been appointed, a ballot was taken, and as result the following were declared elected as Officers and Council for the ensuing session.

President: Dr. A. Crum Brown, F.R.S.

Vice-Presidents who have filled the office of President: Sir F. A. Abel, K.C.B., D.C.L., F.R.S.; W. Crookes, F.R.S.; E. Frankland, D.C.L., F.R.S.; J. H. Gilbert, Ph.D., F.R.S.; J. H. Gladstone, Ph.D., F.R.S.; A. W. Hofmann, D.C.L., F.R.S.; H. Müller, Ph.D., F.R.S.; W. Odling, M.B., F.R.S.; W. H. Perkin, Ph.D., F.R.S.; Sir Lyon Playfair, Ph.D., K.C.B., F.R.S.; Sir H. E. Roscoe, LL.D., F.R.S.; W. J. Russell, Ph.D., F.R.S.; A. W. Williamson, LL.D., F.R.S.

Vice-Presidents: G. Carey Foster, F.R.S.; W. N. Hartley, F.R.S.; John Pattinson; J. Emerson Reynolds, M.D., F.R.S.; William A. Tilden, F.R.S.; Robert Warington, F.R.S.

Secretaries: H. E. Armstrong, Ph.D., F.R.S.; J. Millar Thomson, F.R.S.E.

Foreign Secretary: Raphael Meldola, F.R.S.

Treasurer: T. E. Thorpe, B.Sc., F.R.S.

Ordinary Members of Council: E. Atkinson, Ph.D.; Henry Bassett; Norman Collie, Ph.D.; John Ferguson, M.A.; E. Kinch; M. M. P. Muir; F. J. M. Page; W. H. Perkin, jun., F.R.S.; S. U. Pickering, M.A.; Boverton Redwood; Thomas Purdie, B.Sc.; John A. Voelcker, Ph.D.

The meeting then proceeded to consider the alterations in the bye-laws proposed by the Council. The first alteration having been read to the meeting, after a few remarks from other speakers, a vote was taken, and the following alteration in the bye-laws was carried, there being only five dissentients:—"That in the case of candidates resident abroad unable to obtain the before-mentioned number (five) of signatures, the Council shall have power to accept a certificate, signed from personal knowledge by one Fellow of the Society, and to recommend its presentation for ballot."

Subsequently the following were also put to the meeting and carried all but unanimously. 2. That the following notice be printed at the head of the form of recommendation:—"The attention of the candidate in whose favour this certificate is made out is specially directed to the fact that, if elected, he will be required to sign the following obligation prior to his admission into the Society:—Obligation.—I, the undersigned, do hereby engage that I will endeavour to promote the interests and welfare of the Chemical Society, that I will observe its laws, and to the utmost of my power maintain its dignity, as long as I shall continue a Fellow thereof." 3. That Bye-law XII. be altered so that it read as follows:—"An annual general meeting of the Society shall be held on the 30th day of March, or on some day in March near that time, and at such an hour as the Council may determine, for the election of Officers, etc."

ROYAL INSTITUTION.

MAGNETIC ROCKS.

On Friday evening, April 17, a discourse on Magnetic Rocks was delivered at the Royal Institution by Professor A. W. Rücker. The lecturer said that three observations were required to determine the earth's magnetic influence at any given point, viz., the declination and dip of a magnetic needle and the horizontal force. The determination of these constants at several points constituted a magnetic survey. Such magnetic surveys are being undertaken at the present time in Japan, Brazil, the United States, Russia, Holland, Germany, France and the United Kingdom in order to obtain experimental data for the study of terrestrial magnetism, but in the meantime the investigators have been brought face to face with another interesting problem, though not of such general importance. Professor Rücker did not therefore in his lecture deal with the larger subject of the cause of the earth's magnetism and its irregular distribution, but confined his remarks to matters of more local interest. He pointed out that the lines joining places on the earth's surface at which the magnetic needle shows the same deviation are not straight, but more or less curved. Three lines are represented on charts as joining places at which the needle points due north, the one passing through West America, West Indies, and the Eastern parts of Brazil, the second through Eastern Europe, West Asia, and West Australia, whilst the third constitutes the so-called "Siberian oval." As the lines have, however, been drawn from observations taken at a comparatively small number of stations, considerable interest has been attached to the question as to whether more minute investigations will tend to increase or to destroy the regularity of the isomagnetic lines. Magnetic surveys have been the task of recent years, and have been most diligently prosecuted in Great Britain. The first magnetic chart was delineated in 1837 from the observations of Professor Savin and Colonel Fox at very irregularly scattered stations. In 1857 Mr. Welsh, of Kew, undertook a survey in Scotland that resulted in the addition of about forty stations, but the lecturer in conjunction with Dr. Thorpe has within recent years perfected a series of observations at numerous stations, approximately equidistant, throughout the British Isles. The features of the three charts obtained from these results bear some resemblance between themselves, but all uniformity in declination, inclination, and force lines has entirely disappeared. The force lines, for instance, instead of regularly diminishing with decreasing latitude, acquire a maximum value of about seventeen C.G.S. units south of Skye and north of Mull, and a disturbance of regularity in this quarter can also be discerned on the other charts. It is also found that, among other erratic lines on the declination chart, that joining stations at which a declination of 8° 20′ has been observed passes first southwards between Kew and Windsor, then northwards between Windsor and Reading, again southwards between Reading and Swindon, and finally passing east of Salisbury, continues a comparatively direct course to the Channel. A corresponding excess of the horizontal and vertical forces over the calculated value is also appreciable in the neighbourhood of Windsor and Reading. The cause of these irregularities must evidently be sought for in the existence of local magnetic forces, which obtain either from the presence of masses of magnetic matter, or from the occurrence of earth-currents. Investigation has not yet yielded results that, according to Professor Rücker, warrant the final adoption of either of these hypotheses as correct, but the arguments at present are distinctly in favour of the influence of magnetic masses. In the island of Canna, to the south of Skye, the basaltic columns considerably affect the compass reading and cause a deviation of 25–30° upon Compass Hill, though no effect is perceptible on a yacht about two hundred yards from the base of the hill. The influence of the magnetic masses on the island is not therefore extensive and is indistinguishable at a short distance, but in some positions within the magnetic limits the north pole, at others the south pole, of a vertical needle is attracted. The upper and lower ends of the columns have also, in some instances, been determined to be oppositely magnetized, so that there is little doubt that the rocks are either permanent magnets or are magnetized by the inductive action of the earth. The same inferences have been deduced from observations made in the United States in 1846 by Mr. Locke, who found that at the basaltic rocks at Patterson and Snake Hill, N.J., the north end of the magnet pointed upwards near the bottom of the hill and downwards at the top. The presence of a definite mass of magnetic rock has also been detected in the Malvern Hills, from observations taken at Mathon and Colwall Green on the west side and at Great Malvern and Malvern Wells on the east side, stations about two miles apart. The geological section shows a central core of igneous rock with old red sandstone and red marl on either side, whilst the centres of magnetic influence appear to be in the neighbourhood of the Worcestershire and the Herefordshire Beacons. A more extensive ridge of magnetic rock, fifty to sixty miles in length, has also been observed in the West of Scotland, and again in Antrim in the neighbourhood of the Giant's Causeway, as well as in the vicinity of Snowdon. Observations made on islands in the northern and southern hemispheres show that at the six northern stations the north end of the magnet is attracted, and at the four southern stations the north end is repelled, results that correspond exactly with the behaviour of magnetic matter subject to the earth's force. If the hypothesis of currents be applied to the explanation of these latter instances, the somewhat absurd proposition must be accepted that in all recorded instances the currents must circulate in the direction of the hands of a watch in the northern hemisphere and in the reverse direction in the southern hemisphere. Even the supposition that earth currents are recognizable in the vicinity of igneous rocks owing to their better conductivity, cannot be maintained when discussed in detail. An interesting feature of the subject is the magnetic influence apparently exerted by rocks below the surface. Recently a notice was issued to mariners by the Admiralty that in a certain position off the west coast of Australia the compass is deflected to the extent of 55°. More careful observations show that at the centre of the disturbance the water is nine fathoms deep, but that no effect is produced outside of a radius of two miles, and the position corresponds to a headland of basaltic character on the opposite coast that probably stretches out along the sandy bottom. An analogous instance is furnished on the west coast of Scotland, where the centre of disturbance was located by Balfour Stewart from the data obtained by Welsh in Islay, Iona and Tyree, as south of Mull. Recent careful observations by Thorpe, however, indicate a spot ten or fifteen miles south of the southernmost point of the Hebrides. On the continent neither the number of stations nor the number of observations enable similar conclusions to be drawn, but in North Germany and Holstein the data obtained indicate a tendency for the needle to be attracted towards certain igneous rocks. Another consideration dealt with by Professor Rücker in his lecture was the question as to whether the rocks in this country are magnetic enough to produce the observed effects. For the elucidation of this point a number of specimens of magnetic rocks have been examined and their magnetic properties measured, the figures showing that the observed forces could easily result therefrom. Surveys in Russia indicate, however, that the forces encountered there are of far greater magnitude than those that obtain in the United Kingdom. Assuming that the increase of temperature observed with increasing depth in the earth's crust is regular, and that consequently no matter below twelve miles in depth can possess magnetic properties, it has been calculated that large masses of nearly pure magnetite must occur in some districts of Russia. As a final argument against the disturbing influence of earth currents, Professor Rücker mentioned that from experiments instituted at the instance of the Post Office authorities at Melton Mowbray, it appears that although currents have been detected flowing outwards in all directions from that centre, they are extremely small and in the opposite direction to that required to produce the observed effects on magnets. Indeed the disturbances already referred to in the vicinity of Reading appear to be part of an extensive system corresponding to a paleozoic ridge stretching from Milford Haven to Dover, a fold of older rocks in which the South Wales coal-measures are imbedded. In the main ridge the presence of magnetic rocks is indicated and a spur has been discovered to stretch from Reading to Chichester and trend towards the coast. The existence of a corresponding system on the opposite side of the channel, in the direction of Fécamp, Elbeuf and Ramboullet, has recently been discovered, and its course further southward is being investigated. Thus, although the change in position of the earth's magnetic poles cannot well be explained by changes in rocks, the arguments lead to the hypothesis that most disturbing influences in the United Kingdom are due to magnetic rocks. In conclusion Professor Rücker pointed out that in the pursuit of this subject investigators were mapping out the position of a substratum of igneous rock, which forms the basis of sedimentary rocks.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The annual meeting was held at University College, Bristol, on Tuesday, April 21. Mr. J. W. White (President) occupied the chair.

The routine business, which included the Treasurer's report and the election of the members of the Council for the current year having been concluded, the Chairman requested Mr. Schacht to proceed with his promised "Discussion and Illustration of certain recent Suggestions in Water Analysis."

Mr. Schacht said the subject of the analysis of well-waters was of course far too large for proper consideration in one evening, but he would like (in drawing the attention of practical pharmacists as he was about to do to one point in that subject) to take the opportunity of pointing out how very useful it might be found in the practice of their business to be able to pronounce with something like confidence upon the purity or unwholesomeness of any sample of water brought to them by a doctor or customer. He strongly recommended the subject as one both of scientific interest and of promising business advantage.

The special point he had that evening to talk about was a recent suggestion to employ a "couple" of aluminium and mercury for the evolution of the hydrogen in the well-known process for the estimation of the nitrogen existing as nitrates and nitrites in the sample.

Messrs. Ormandy and Cohen had published this suggestion, and their paper had appeared in the *Journal of the Chemical Society* for September of last year.

He had taken some pains to assure himself of the accuracy of the method, and, with the modifications to which he would presently refer, it became so easy of execution that he recommended its adoption with confidence.

Mr. Schacht then proceeded to show the process in detail and to describe it thus:—

Measure 100 c.c. of the sample into a plain, upright glass vessel, of capacity equal to about 150 c.c. Take a strip of aluminium foil (about 3 inches of ordinary ribbon = 0·4 gram), clean both surfaces by rubbing with tow dipped in liquor sodæ, wash thoroughly and dip it into a solution of mercuric chloride (half a saturated solution and half water) for one minute. A deposit of mercury takes place upon the aluminium and a "couple" is formed. Wash it well under the tap, put it at once into the 100 c.c. of sample and cover the glass vessel loosely. Let these react until the metals become a deposit, and no more gas is evolved. Gently stir the mixture and allow the deposit to subside.

Take 10 c.c. of the clear supernatant liquid, dilute with 90 c.c. of pure water, and add 1 c.c. of Nessler's solution. Note the colour. Perform a comparison experiment in the usual way with standard solution of muriate of ammonia 0·0001 gram of NH_3 to each c.c. Thus, x being the number of c.c. of sol. am. mer. required, $0·0001 \times x \times 10 \times 700 =$ grains per gallon of ammonia, and this figure multiplied by $0·823 =$ grains per gallon of nitrogen.

In experiments which aim for exact results, it is better to close the mouth of the vessel with an india-rubber stopper, through which passes a glass tube, bent so as to allow the gases to pass through a small quantity of water, which should be mixed with the sample before the final stirring.

In illustration of the accuracy of the process, Mr. Schacht presented a table of a series of experiments made with definite solutions of potassium nitrate.

Exp.	Quantity of N. used as Pot. Nit.	Quantity of N. found as NH_3.
1.	0·001 gram.	0·00096 gram.
2.	0·001 „	0·00098 „
3.	0·001 „	0·00091 „
4.	0·001 „	0·001 „
5.	0·002 „	0·00182 „
6.	0·003 „	0·003 „
7.	0·003 „	0·003 „
8.	Pure water only.	0·00000

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The annual meeting of the Leicester and Leicestershire Chemists' Association was held on the 22nd inst., in the Old Town Hall, the President, Mr. J. G. F. Richardson, F.C.S., presiding.

The Treasurer's report showed a balance in hand of £6 10*s*. 8*d*. The Secretary's report was as follows:—Your Committee have pleasure in presenting the annual report of the work of the Association. During the summer months of 1890, a practical botany class was held at the Abbey Park Botanical Gardens, under the superintendence of Mr. S. F. Burford, to whom the thanks of the Association are due. The members are again indebted to Mr. J. Burn for his kindness in permitting specimens to be gathered. A practical chemistry class was held in the Technical School Laboratory under the direction of Mr. H. Evans, to whom our thanks are due. We are again indebted to Rev. J. Went, M.A., for the use of this laboratory. Classes for the study of botany, elementary chemistry and materia medica, have also been held at the Association rooms, and the thanks of the Association are due to Messrs. G. A. Weall, F. A. Beall, B. Lewitt and A. E. Eldred for the time and attention they have given to these classes. A ball was held in the County Assembly Rooms, the gathering was a brilliant success. A meeting was held to discuss the Pharmacy Act Amendment Bill. Several members have been successful in passing the examinations of the Pharmaceutical Society. Gifts of books, periodicals, etc., have been presented to the Association, and your Committee thank the donors."

The President made an urgent appeal to the associates to avail themselves of the favourable opportunities offered to them, especially as regards the laboratory of the Wyggeston School. Regular systematic study during apprenticeship was urged as being the best preparation for after study and for laying the foundation of a sound pharmaceutical education.

Votes of thanks were given to the retiring officers, the teachers, and to the Rev. J. Went, M.A., Mr. Mansell, B.A., Mr. Burns and Mr. Burton, for services rendered to the Association. Several members testified to the benefits they had derived as past students.

A ballot for the election of officers for the ensuing year resulted as follows:—President, Mr. J. G. F. Richardson, F.C.S.; Vice-Presidents, Messrs. E. H. Butler and W. Thirlby; Treasurer, Mr. W. Rowe; Hon. Sec., Mr. S. F. Burford, Messrs. Beall, Brod, Davy, Evans and Ward.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The last lecture of the present session was given by Professor Arnold on the "Micro-spectroscopic Recognition of Blood-stains." The lecturer first dwelt on elementary optics, then treated on the property coloured solutions have of absorbing certain colours of the spectrum, showing black bands on the spectroscope. Lantern slides were then shown, illustrating the difference between fresh and dried blood and cochineal and blood. The lecturer pointed out that the former was mistaken for the latter unless care was taken.

The lecture was thoroughly enjoyed, and on the motion of Mr. Job Preston, seconded by Mr. W. Ward, a hearty vote of thanks was accorded the Professor.

The Secretary then reminded the meeting that the Treasurer, Mr. G. T. W. Newsholme, was again a candidate for the Pharmaceutical Council, and hoped that the members and associates would do their utmost to return him to the position he has held with so much credit.

The President, Mr. J. H. Bradwall, said Mr. Newsholme thoroughly deserved to be re-elected, as he had the best interests of the trade at heart.

Mr. Preston regretted the subject had been brought up in the manner it had, thinking it better that votes should be given, not to any particular individual, but to the party that supported the object named by the Secretary (the curriculum portion of the Pharmacy Bill).

Mr. W. Ward heartily agreed with the remarks of the Secretary, and reminded Mr. Preston that at this year's election there was no particular party.

The subject dropped and the meeting terminated.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual general meeting of the above Association was held in the rooms, 74, Commercial Street, on Thursday, April 16, Mr. William Edwards in the chair.

The Secretary's report was read showing a favourable balance for the Association.

The following were then elected office-bearers for next session—Hon. President, Mr. Charles Kerr, Ph. Ch.; Hon. Vice-Presidents, Mr. David H. Ferrier, Mr. J. H. Thompson, and Mr. John Forsyth; President, Mr. Jas. A. Kinnear; Vice-President, Mr. Charles T. Duncan; Secretary, Mr. Wm. Mair; Assistant Secretary, Mr. H. J. Flint; Committee, Mr. Jas. Davidson, Mr. George Young, Mr. Henry G. Wilson, and Mr. William Adams.

It was arranged (should the half-holiday become general) to have a few excursions on the Wednesday afternoons during June, July, and August.

Obituary.

Notice has been received of the death of the following:—

On the 29th of March, Mr. Elias Charles Cooper Whittle, Chemist and Druggist, High Barnet. Mr. Whittle had been a member of the Pharmaceutical Society since 1869.

On the 14th of April, Mr. Thomas Williams, Chemist and Druggist, late of Chester. Aged 45 years.

On the 24th of April, Mr. Edwin Yearsley, Chemist and Druggist, Ross. Aged 72 years.

On the 26th of April, Mr. John Ranken, Chemist and Druggist, East High Street, Forfar, N.B. Aged 44 years. Mr. Ranken was an Associate in Business of the Pharmaceutical Society.

On the 27th of April, Mr. Maurice Seccombe, of Tavistock. Mr. Seccombe, who was a Registered Apprentice of the Society, was to have presented himself for the Minor examination on the 23rd of April, but was excused on account of his illness.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PRELIMINARY EXAMINATION.

Sir,—A few months ago I experienced good evidence of the insufficiency of the Preliminary examination. A youth who desired to become a chemist and druggist was placed with me for a month on trial previous to becoming apprenticed. During the first week he was questioned in history, arithmetic, geography, etc., and his ignorance of the most prominent events in English history, as the Invasion, number of Henry VIII's wives, etc., was deplorable. He was in happy (?) ignorance of the capitals of Russia, Spain, Germany, etc., and stuck at the most elementary questions.

Needless to say the month's trial was not completed. However, within a few weeks the youth presents himself for the Preliminary examination, having been under a "coach" for the three subjects required, and passes, and is I understand serving an apprenticeship at the present time.

It seems monstrous that a lad may become a registered student with such a meagre education as the present Preliminary requires. Certainly St. Petersburg, Madrid, Berlin, William and Henry have little to do with pharmacy of to-day, but the pupil's mind, when in ignorance of such items, shows evidence of incomplete fitness for higher studies, and lack of training which is not conducive to the making of pharmacists.

30, *High Street, Oldham.* C. GRANVILLE WOOD.

THE PRELIMINARY EXAMINATION.

Sir,—I have been amusingly interested at the various opinions and criticisms expressed through the columns of your ever welcome Journal, in reference to J. E. Saul's Failure Cure for the Preliminary examination.

It has always appeared to me an anomaly to have to take such a leap from the educational knowledge of the Preliminary to the scientific knowledge of the Minor, and, with all respect, in a calling both professional and commercial like our own we require a higher maximum of educational ability to surmount and overcome easily all difficulties pertaining to our future pharmaceutical career.

Why not establish an interim examination? For instance, let the young intending apothecary (who, by the by, must not be "deficient in intellectual capacity" but must have a "capable, vigorous mind") pass a Preliminary examination consisting of English, Latin, arithmetic, Euclid and algebra, before entering his term of apprenticeship; then, after having served, say, two or three years, let him pass the interim examination, consisting of elementary chemistry and botany and dispensing. Then when he has reached the age of having to go on his own "hook," let him pass the Minor.

My opinion is that many a young intending pharmacist would retire from the ranks of the advancing pharmaceutical army, if he happened to be unsuccessful at the interim examination, yea, even at the eleventh hour he would retire to some other trade, far more remunerative than our own. CARCER.

Sir,—Mr. Sherlock, whilst taking part in the discussion of the "Preliminary Examination" at the Chemists' Assistants' Association on the 16th ult., said that "The majority of Chemists in small town where (*sic*) minor men who would never pass the Major, and they might go in for selling Epsom salts and senna, and a superior grocer's business, whilst the select—which I presume Mr. Sherlock would be one where (*sic*) he in business—would find employment in other ways, particularly in chemical analysis, the investigation and preparation of new remedies," and so on. I suppose the select "Pharmaceutical Chemists" would not keep such things as Epsom salts and senna in their shop. I no doubt Mr. Sherlock would find, "if he cared to take the trouble" that chemists even in small town as capable of conducting analysis or investigation and preparation of new remedies as some of the select bodies, and why should not a "Minor Man," who is possessed of any business ability at all, conduct a business in a small town as well as a "Major Man," remembering all chemists could not live in London or large towns, and if it was not for the small towns in the United Kingdom I do not suppose there would be much investigating and preparation of new remedies required. A. P. S.

Sir,—I have been very much interested in the articles on the Preliminary examination which have appeared of late in the *Pharmaceutical Journal*, and think it would be a great boon to the trade if all intending to enter the trade should pass some examination before they were allowed to become apprentices. But, Sir, on the other hand, do you not think that apprentices are, as a rule, treated more like warehousemen or porters than pupils? Do you not think they are imposed upon to a very great extent when they are made do nearly all the dirty work of the establishment? When instead of being sent to the chemist to do all his dirty work for him they are sent as pupils to learn "the art and trade of a chemist and druggist." Do you not think that after the parents or guardians have paid a premium, and that in many cases a large one, that it is an injustice to them, as well as to the apprentice himself, to make him like a warehouseman? I do not think that master chemists are fully awake to their part of the agreement. I am an apprentice, bound for four years, and have nearly completed that term, and I can assure you that the instruction I have received from my "master" would not have taken any ordinary man one hour to teach me, and not that alone, but I have been made to do all the work of a warehouseman, and have been fool enough to do it! I am sure you will agree with me that this state of things is not what it ought to be, and if we are to pass examinations before we are allowed to enter the trade let our education be continued when we become apprentices, and not driven out of us by doing work which is not our duty to do.

AN INDIGNANT APPRENTICE.

"WHAT'S IN A NAME?"

Sir,—If fair Juliet were now living amongst us, instead of having died tragically in Verona to furnish cause for sentimental tears, she would not ask the banal question, "What's in a name?" The name, as all moderns know, is everything. Our elders must have partly realized this, when they discovered that to give a bad name to a dog was enough to hang the most virtuous of the race, and, *e converso*, a good name has cloaked many a shabby action. It is unfortunate that the pharmaceutical profession have not yet found a good name. The phrase might almost stand in its ethical application, and it may be that its double signification has some connection, worth more than a passing thought. "Pharmaceutical chemist" is not a phrase for everyday use. The public will not have it; they do not use it; and therefore they have not learnt and they will be long in learning to appreciate it. A people brought up to such homely phrases as "the woolsack" for the seat next the throne, and to the lowly designation of "the bench" for the highest object of ambition to the profession called *par excellence* "learned," does not take kindly to high-falutin appellatives. The anxious mother cannot be expected to waste time and breath in bidding Mary go to "the nearest pharmaceutical chemist" for a pennyworth of castor oil for baby's colic; and no synonym yet proposed has hit the popular fancy or taken root in our rugged Saxon speech. Such exotics as "pharmacien," "pharmacist," and "pharmaceutist" have been tried, but they are exotics still. Is it possible, in this year of jubilee, to find a better name? to find one that will really incorporate with our homely but forcible vernacular? I think it is possible, although the word I shall suggest is open to all sorts of objections from those who only care to see one side of a question. They will call it rough, cacophonous, barbarous. What matter! The same may be said of half the words we use daily without being conscious of these defects; and amongst these are numerous analogues of the name that I shall propose tentatively, but hopefully, to the sneers, jeers, and better judgment of my friends.

Chemist, druggist, and all their derivatives and combinations are out of the question. They are inappropriate, inexpressive, and they are already relegated to a secondary rank, whereas we want a name adapted to the highest rank, one which may become a power to stimulate a higher ambition. It must be cognate to our corporate title as a "Pharmaceutical Society," and is thus limited to some derivative from the root φαρμακ, which we soften in our adopted word "pharmacy." What we want is to wed "pharmac" to an English termination expressive of a personal function or vocation, such as we find in "malster" and many analogues. Thus it seems the range of our choice is strictly defined. If we were to begin *de novo* to construct upon an English model a word to express the man who practises the vocation of pharmacy, we should probably in our earliest trials arrive at the form "pharmacister," from which uncouth product the existing un-English word "pharmacist" has undoubtedly been evolved. But "pharmacister" might, with equal consideration for the rules that govern abbreviations, have been shortened into "pharmister" (or, preferably, into "pharmaster," but that euphony and analogy seem to turn the scale against it). "Pharmister," then, is the name I would propose as the future style of the fully qualified practitioners of the art and science of pharmacy. It will, no doubt, be called ugly. Ugliness is a matter of taste, concerning which it is useless to argue. It is more a matter of habitude, like crinolines and other feminine fashions. What appears ugly to us of to-day may (and certainly will if it becomes adopted) become familiar and acceptable to the next generation. We are not without guidance in this matter. Could anything be less elegant than the expansion of "bar" into "barrister?" Yet this clumsy word has established itself and is even considered pretty by some. It has the greater recommendation of being pure English. We cannot make a pure English word out of a Greek root, but it wears an English dress in the guise of "pharmister." May it live!

NOMEN CLATURE.

APOCODEINE.

Sir,—The letters of Dr. Murrell and Mr. Martindale leave no doubt that the apocodeine used in the experiments of the former was prepared in the manner described by Matthiessen and Burnside ('Proc. Roy. Soc.,' xix., 71), *i.e.*, by the action of zinc chloride at higher temperatures on codeine. The manufacturer is quite justified in preparing and supplying that substance as apocodeine, as it is presumably what is required. At the same time, I think all the evidence goes to show that the substance so prepared is merely a mixture. Both the supposed base and its hydrochloride are obtained as coloured amorphous bodies, the ultimate analysis of which would in itself be of very limited value.

I think there is good reason to believe that the action of zinc chloride on codeine is very similar to that of hydrochloride, the products varying according to temperature, pressure, duration of action and other circumstances. The principal products are probably an amorphous modification of codeine, polymerized bases, chlorocodeide and apomorphine. The physiological results appear to harmonize with this view.

Edinburgh. D. B. DOTT.

TINCTURE OF COLCHICUM SEEDS.

Sir,—In regard to Messrs. Farr and Wright's paper on the above (p. 959), it is said the medicinal properties of the drug are contained in the testa, or at least in the exterior portion of the seed, so much so that the late Mr. T. Wharton Jones (a most careful observer) preferred the tincture prepared from the unbruised seed. He said it then contained all the antiarthritic properties of the drug. If made from the bruised seed he said it possessed properties (due to the fat?) which were disadvantageous to its use. A little oil separates on mixing the latter with water, which is not the case with the tincture of the unbruised seed.

10, *New Cavendish Street.* WM. MARTINDALE.

NOTICES OF MEETINGS.

Society of Chemical Industry (London Section).—Monday, May 4, "An Improved Process of Softening and Clarifying Water," by Messrs. Archbutt and Deeley; "The Chemistry of Whiskey and Allied Products," by Mr. A. H. Allen.

Chemists' Assistants' Association.—Thursday, May 7.—Annual Meeting.

Chemical Society.—Thursday, May 7, at 8 p.m.—"The Action of Alkalis on the Nitro-compounds of the Paraffin Series," by Professor Dunstan and Mr. T. S. Dymond; "The Addition of the Elements of Alcohol to the Ethereal Salts of Unsaturated Acids," by Professor Purdie and W. Marshall; "On some New Addition Compounds of Thiocarbamide," by Professor Emerson Reynolds; "On the Action of Acetic Anhydride on Substituted Thiocarbamides, and an Improved Method of Preparing Aromatic Mustard Oils."

Royal Institution.—Tuesday, May 5, at 3 p.m.—"Bacteria," by Dr. Klein.——Thursday, May 7, at 3 p.m.—"Recent Spectroscopic Investigations," by Professor Dewar.——Friday, May 8, at 8 p.m.—"Liquids and Gases," by Professor W. Ramsay.——Saturday, May 9.—"The Artificial Production of Cold," by Mr. H. G. Harris.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Burt, Hesse, Farr, Maxwell, Andrews.

THE ACTION OF ALKALIS ON THE NITRO-COMPOUNDS OF THE PARAFFIN SERIES.*

BY PROFESSOR WYNDHAM R. DUNSTAN AND T. S. DYMOND.

[*From the Research Laboratory of the Pharmaceutical Society*].

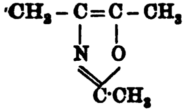
In the course of their investigation of the modes of preparation and properties of pure ethyl nitrite (*Pharm. Journ.*, [3], xviii., 861), the authors produced some quantity of this compound by acting on silver nitrite with ethyl iodide, when there was also formed the isomeric nitroethane. After the whole of the ethyl nitrite had been obtained by fractional distillation, the nitroethane was dried and distilled from potassium carbonate. Besides the nitro-compound a small quantity of an oily aromatic compound (b. p. 171°) having feebly basic properties was obtained, and it was found that the residue in the flask contained potassium nitrite. Subsequent experiments proved that the oily substance corresponded in its composition with the formula C_6H_9NO, and that it resulted from the action of aqueous potassium carbonate on nitroethane, potassium nitrite being simultaneously formed. The reaction is in many respects a remarkable one, since the nitro-compounds are not usually supposed to yield nitrite under these conditions.

The authors have fully investigated the conditions and products of the change, and have ascertained the nature of the new compound (C_6H_9NO) and have also succeeded in effecting its synthesis. Nitroethane was found to be capable of attacking the alkali carbonates in the cold, with the formation of carbon dioxide and the corresponding alkali derivative of the nitro-compound; but no further change, apparently, occurs until the mixture is heated. Potash, soda and ammonia act similarly. In addition to the new compound and a nitrite, cetonitrile is formed. The reaction may be expressed by the equation $4C_2H_5NO_2 = C_6H_9NO + CH_3CN + 2HNO_2 + 3H_2O$.

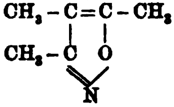
The compound C_6H_9NO is remarkable for its reat stability. It is virtually unaffected by heating rith strong acids or alkalis, and is only reduced rith difficulty. On oxidation with permanganate, t is entirely converted into acetic acid, whilst itric acid oxidizes it to acetic and oxalic acids. By reduction in moist ethereal solution at a low emperature with metallic sodium a dihydro-compound is formed, which is hydrolysed by water with he production of ammonium acetate and methyl thyl ketone. $C_6H_{11}NO + 2H_2O = CH_3CO{\cdot}ONH_4 + CH_3{\cdot}CO{\cdot}C_2H_5$.

From these reactions the authors inferred that he compound contained as its nucleus a "ring" nsisting of atoms of carbon, nitrogen and oxygen, nd must therefore be represented by one of the ro following formulæ :—

I.



II.



he circumstance that ammonia is formed by the duction of the compound points to the second formula as being probably the correct one. To decide this question the authors synthetically prepared the two compounds corresponding to these formulæ.

The first, trimethyl oxazole, was obtained by the reaction of bromethyl methyl ketone with acetamide: $CH_3CO{\cdot}CHBrCH_3 + CH_3CONH_2 = H_2O + HBr + C_6H_9NO$. This compound, although possessing some properties in common with the original substance was distinctly different from it.

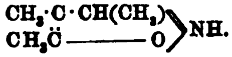
The second compound, trimethyl isoxazole, was obtained by acting on the β-di-ketone, methyl acetyl acetone, with hydroxylamine:

$$CH_3CO{\cdot}CH(CH_3){\cdot}COCH_3 + NH_2OH = C_6H_9NO + 2H_2O.$$

Acetonitrile was simultaneously formed. The compound thus prepared was found to be in every respect identical with the nitroethane derivative, which is therefore proved to be trimethyl isoxazole.

The following is a summary of the principal physical properties and chemical reactions of the compound :—

Modes of Formation: By the action of alkalis on nitroethane and of hydroxyalmine on methyl-acetylacetone.
Boiling point: 171° (cor.).
Freezing point: 3·5° (cor.).
Relative density: ·985 15°/15°
Rotatory power: None.
Magnetic rotation: 6·792
Molecular refraction: 50·8.
Molecular dispersion: 2·92.
Mercuro-chloride: $C_6H_9NO,HgCl_2$.
Gold chloride compound: $C_6H_9NO,AuCl_3$.
Chlorides: $C_6H_9NOCl_2$; $C_6H_9NOCl_4$ (?)
Bromide: $C_6H_9NOBr_2$.
Chloro and bromo derivatives: C_6H_8ClNO; C_6H_8BrNO.
Oxidation product (by permanganate): Acetic acid.
Oxidation products (by nitric acid): Acetic and oxalic acids.
Reduction products (by amalgamated aluminium) Ammonia, acetic acid, secondary butyl alcohol.
Reduction product (by heated zinc): Aceto nitrile, methane, ethane.
Product of Hydrogenation (by sodium and water): Dihydro-trimethylisoxazole—



$$\left.\begin{array}{l} CH_3{\cdot}C{\cdot}CH(CH_3) \\ CH_3\ddot{C} \text{———} O \end{array}\right\rangle NH.$$

Product of Hydrolysis of Dihydro-trimethylisoxazole Ammonium acetate, methylethyl ketone.

A similar reaction is induced by alkalis in nitromethane, and also in nitro-propane, which yields triethyl isoxazole, propionitrile and alkali nitrite.

Triethyl isoxazole boils at 214° (corr.), and its relative density is ·9382 15°/15°. On oxidation with nitric acid propionic acid is formed. It differs from trimethyl isoxazole in not combining with mercuric chloride or gold chloride, and in certain other respects.

Secondary nitro-compounds do not form isoxazoles when acted on by alkalis.

The investigation of the physiological action of the isoxazoles obtained in the course of this inquiry has been undertaken by Dr. Lauder Brunton, F.R.S. They are of pharmacological interest on account of their chemical relationships to antipyrin. The expenses connected with the present research have been defrayed by a grant made by the Royal Society.

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* The substance of a communication made to the Chemi Society on May 7.

ANNUAL REPORT OF THE COUNCIL,

To be presented at the Fiftieth Annual General Meeting of the Pharmaceutical Society of Great Britain.

The Council, in presenting the Fiftieth Annual Report and Financial Statement for 1890, has to record that the income from subscriptions and examination fees has exceeded that of the previous year. The interest from investments is less, consequent upon the sale of stock for the completion of the new premises, 15 and 16, Bloomsbury Square. The amount of stock sold for that purpose during the financial year was £6500, producing a nett sum of £6193 0*s*. 6*d*. The house, No. 15, Bloomsbury Square, has now been completed and let at an annual rental of £230, and this sum will in future years form part of the interest on investments. Apart from the special expenditure on the new buildings there has been a considerable outlay in alterations to adapt the old premises to existing requirements, in furniture, and in the septennial payment of the premium on fire insurance.

During the year, 1157 candidates presented themselves for the Minor examination, being an increase of 144 as compared with 1889. The entries for the Major examination were less numerous than in the previous year, 105 having been examined. Eight candidates also presented themselves for the Modified examination under section 4 of the Pharmacy Act, 1868. For the Preliminary examination there were rather more candidates than last year, the numbers being 1392 as against 1351, whilst in each of the examinations the percentage of rejections still remains very high; in the case of the Minor examination it reaches nearly 60 per cent.

The report of Dr. Stevenson, the Government Visitor, on the examinations held in London during the past year, which has been already published, deserves the thoughtful consideration of every one responsible for the training of apprentices and pupils. While expressing his sense of the thorough and careful manner in which the examiners carry out the important duties entrusted to them, Dr. Stevenson states in regard to the Minor examination:—

> "In chemistry the lack of systematic training and manipulative experience is patent. Indeed, too often, it is manifest that the candidates have had neither proper teaching in the theory of the science, nor laboratory instruction.
>
> "So long as no course of instruction is obligatory, this state of things may be expected to continue. I trust, however, that at no distant date pharmacists will recognize that the interests of their business will not be in conflict with public opinion, that the accurate study of the sciences bearing on pharmacy is indispensable.
>
> "The large number of failures in prescriptions and in dispensing is significant, these being the two branches of examination which are most practical and most important in the interests of the public. The ability to read and properly interpret prescriptions, and accuracy and care in the dispensing of medicines, are rightly deemed all important. I have observed that a considerable number of failures are brought about by mistakes as to quantities of potent drugs and poisons. Such errors are inexcusable, and rightly lead to rejection."

His observations on the large number of failures in the Preliminary examination are also significant:—

> "Notwithstanding the large proportion of rejections the examination is by no means a severe one; nor is the standard of the examiners high. Elementary arithmetic, a knowledge of the mother tongue such as may be acquired in a Board School and quite rudimentary Latin, are indispensable attainments for those who aspire to qualify as chemists and druggists."

Finally, he concludes as follows:—

> "If my criticisms seem severe, they are directed rather to the defects in the training of candidates than to the examinations themselves."

This report recognizes the necessity which exists for that improved system of training of the young pharmacist, which the Council has been for some years seeking powers to enforce.

More ample accommodation for the constantly increasing number of books in the Library in London has been provided during the year, the change of Council room from the old to the new building having afforded the desired opportunity. The Library now consists of the three large rooms on the first floor, extending the entire length of the Great Russell Street side of the old building. This extension will not only give room for the continual accession of new periodicals and other works, but will offer an opportunity for quieter study than is possible in the ordinary reading room, where the business portion of the Library routine is carried on. The number of attendances in this department during the year has been well kept up, though a small decrease in the circulation of books is shown. About 230 books and pamphlets have been added during the year.

The donations to the Museums and Herbarium of the Society during the past year, which have been both numerous and important, indicate in a satisfactory manner the coutinued interest that is taken in them both at home and abroad. Frequent applications have been made for the loan of specimens to illustrate lectures and papers by members of the Society. The attendance in the Museum has been very satisfactory, and has on certain days of the week taxed the accommodation for study which the Museum is capable of supplying. The total number of persons using the Museum during the past year was 6,237.

The papers read at the Evening Meetings in London and Edinburgh have been not less interesting or less valuable from a pharmaceutical point of view than in past years. A noteworthy feature is the co-operation of medical and scientific men with the Society in this phase of its work.

The forth-ninth session of the Society's School of Pharmacy was inaugurated by an interesting address by Sir E. H. Sieveking, Physician in Ordinary to the Queen. The address was delivered to a large and representative audience, which expressed its appreciation of Sir Edward's remarks.

The Council has to report the completion of the rebuilding of the two houses, Nos. 15 and 16, Bloomsbury Square. No. 16 has been set apart for official purposes, and comprises offices for the Secretary and his staff, the Council Room, and Committee rooms. The present arrangement is greatly superior to the old in point of convenience, and at the same time permits a much needed extension of accommodation in the old building for the Library and the School. As previously mentioned, the house No. 15 has been let on lease at an annual rent of £230.

The report of the Executive of the North British Branch is of a satisfactory nature, and records an increasing interest among pharmacists resident in Scotland for the work of the Society. The development of the Library is demonstrated by the necessity for additional shelf space, and the numbers using both the Library and Museum may be taken as in some degree indicating the appreciation of the efforts of the Society to make these departments as efficient factors in pharmaceutical education as possible.

As was anticipated, the alteration of the time of nomination of local secretaries from May to October, has been attended with good results. The nomination papers received in October last were more numerous than in any former year, and in many cases the selection of a nominee was made the occasion of a local meeting of chemists. The Council is sensible of the help rendered to the Society by Local and Divisional Secretaries during the year, and takes this opportunity of expressing its indebtedness to one and all of them for their valuable services.

During the year numerous cases of infringement have been reported to the Registrar, and proceedings have been taken in all cases in which compliance with the law could not otherwise be obtained.

The Pharmacy Acts Amendment Bill, the draft of which the Council approved in February, was read a first time in the House of Commons on the 20th March. The Bill is introduced by Sir Henry Roscoe and bears the names of Dr. Farquharson, Sir Trevor Lawrence, Sir Guyer Hunter and Mr. H. S. King. The Council has received many resolutions of approval with promises of support from various Chemists' Associations and Conferences in London and the provinces.

The Council points with much pleasure to the part taken by the Society in assisting in the preparation of the Addendum to the Pharmacopœia, 1885. On the invitation of Sir Richard Quain, Bart., Chairman of the Pharmacopœia Committee of the Medical Council, a Committee was appointed to advise and assist the Pharmacopœia Committee of the Medical Council as to the manner of preparing and defining the medicines and compounds which the Medical Council had in 1890 named as additions to the British Pharmacopœia, 1885. The Committee of the Society communicated the result of its labours to the Chairman of the Pharmacopœia Committee of the Medical Council, who thereupon addressed to the President of this Society an expression of the high appreciation with which the communication was regarded, and also referred to a resolution to that effect passed by the Medical Council. The Council feels that the Society is much indebted to Professor Attfield for his services in promoting this union of medical and pharmaceutical authorities in Pharmacopœia revision.

A grant of £20 was made during the year to the Nottingham Chemists' Association, in aid of the educational work of that Association.

The changes in the constitution of the Council have not been numerous. Mr. J. Robbins, who had filled the office of Treasurer of the Society for ten years, did not offer himself for re-election in May last, and Mr. D. Storrar was the only newly elected member of Council. At the June Council meeting Mr. R. Hampson was elected Treasurer. Mr. N. H. Martin, of Newcastle, has since resigned on account of pressure of business, and Mr. W. Warren has been elected in his place.

Mr. S. Gale having retired from the London Board of Examiners after twenty-six years' service, the Council has elected Mr. W. M. Holmes to fill the vacancy thus caused.

In August last, a new Schedule of subjects for examination in the Major and Minor, drafted by the two Boards of Examiners, was approved by the Council and ordered to come into force one year after approval. It has long been felt that the published syllabus of the examination in most of the subjects was too general and condensed to afford adequate information to candidates as to the amount of knowledge required. Moreover, the sciences of chemistry and physics, as well as of botany, have of late years been so much widened and extended that some defined limit in the range of these subjects in the Schedule seemed necessary for the guidance of the examiners as well as candidates. The Council believes that the new Schedule will be a useful guide to teachers and a real help to candidates.

The Council has had under consideration the desirability of modifying and altering the existing Bye-laws, and a copy of the proposed new Bye-laws has already been published in the Journal and sent to each member and associate. They will be considered and submitted for the approval of the Society at a special general meeting to be held at the conclusion of the business of the annual meeting. Most of the alterations have already been considered by the Society. Omitting verbal alterations, which though numerous are not fundamental, the principal changes proposed are as follows :—

The reduction of the restoration fee of members, associates and apprentices to the nominal sum of one shilling.

The abolition of the entrance fee required on election as members from chemists and druggists in business prior to the passing of the Pharmacy Act, 1868.

The creation of a class of "corresponding members."

The reduction of the composition fee for mem-

Receipts.

GENERAL FUND—FINANCIAL

	£	s.	d.	£	s.	d.
Balance January 1st, 1890:—In Treasurer's hands	1493	19	10			
In Secretary's hands	30	18	8			
In hands of Chairman of Executive (Scotland)	100	15	9			
				1625	9	
Life Members' Fund—Interest				56	19	
Interest on Investments				299	3	
Subscriptions:—1457 Members, Pharmaceutical Chemists	1529	17	0			
582 " Chemists and Druggists	611	2	0			
1266 Associates in Business	1329	6	0			
869 Associates not in Business	456	4	6			
885 Apprentices or Students	464	12	6			
18 Entrance Fees	27	6	0			
	4418	8	0			
Fees paid upon restoration to the Society	25	14	6			
				4444	2	6
Examination Fees:—1448 Preliminary Examination	2571	15	0			
9 Modified "	9	9	0			
1192 Minor "	3250	7	0			
108 Major "	464	3	0			
				6295	14	
Registration Fees:—20 Fees for Restoration to the Register	21	0	0			
7 Registration Fees as Chemists and Druggists	36	15	0			
				57	15	0
Journal:—Advertisements	4062	1	4			
Sales	289	1	10			
				4351	3	2
Register:—Sales to the Government	147	10	0			
Sundry Sales	14	0	0			
				161	10	
Calendar:—Sundry Sales				26	14	
Penalties and Costs for infringements of the Pharmacy Act				302	9	
Rent of Stable in rear of 36, York Place, Edinburgh				18	16	
Sale of £6500 Stock				6198	9	
				£23,838	17	1

STATEMENT FOR 1890.

Expenditure.

	England and Wales.	Scotland.	£ s. d.	£ s. d.
Annuities:—Professor Redwood				100 0 0
Mr. Elias Bremridge				400 0 0
Carriage of Books, and other Parcels				16 15 7
Certificates of Death				18 15 8
Conversazione at the Society's House			273 5 9	
Evening and other Meetings			59 9 0	
				332 14 9
Examiners, Boards of—				
Fees to Examiners	1581 6 0	589 1 0		
Fees to Superintendents—Preliminary Examination	215 15 6	29 18 6		
Hire of rooms for conducting Preliminary Examination	71 17 6	6 15 9		
Travelling Expenses	170 1 6	32 7 2		
Refreshments for Examiners	94 6 3	28 2 11		
Apparatus, Drugs, and Chemicals for Examinations and sundry charges in connection therewith	117 6 7	22 3 0		
	2250 18 4	708 8 4		
(England and Wales)		2250 18 4		
			2959 1 8	
Fees to the College of Preceptors			181 7 0	
				3140 8 8
Fixtures and Fittings				48 8 11
Furniture				138 14 4
House Expenses:—Gas, Water, Coal, Cleaning Materials, etc.				304 0 8
House Servants' Wages				215 9 0
Journal:—Editor and Sub-Editor's Salaries			750 0 0	
Paper			760 2 5	
Printing			1982 13 0	
Publishers' Commission			497 11 9	
Contributions and Engraving			322 18 11	
Reporting			148 12 6	
Attending Conference and other Meetings			26 14 0	
Parliamentary Papers and Sundry Charges			62 15 0	
				4546 7 7
School of Pharmacy:—Emeritus Professors				200 0 0
Endowment of the Chairs of Practical Chemistry, Chemistry, and Botany			450 0 0	
Teacher of Practical Pharmacy			50 0 0	
Subscription to Royal Botanic Gardens			21 0 0	
Lecturers' Assistants			90 6 0	
Apparatus, Chemicals, & Specimens for Lecture Classes, Prize Medals, Certificates, etc.			46 7 1	
Printing and posting prospectuses			31 13 1	
				689 6 2
Law Costs				598 4 0
Library:—Librarian's Salary			240 0 0	
Purchase and Binding of Books			75 2 4	
Attending Meeting of the Library Association at Reading			10 10 0	
				325 12 4
Museum:—Curator's Salary			350 0 0	
Assistant's Wages			52 0 0	
Glass Bottles			71 0 3	
Specimens and Sundries			36 10 11	
				509 11 2
Expenses in Scotland:—Assistant Secretary—Salary			150 0 0	
Taxes			33 19 6	
Travelling Expenses—Members of Executive			21 14 3	
Fuel, Light, Water, Cleaning, Service and Miscellaneous Expenses			171 15 2	
				377 8 11
Postage:—General			247 14 1	
Journal (Cost of transmission to Members, Associates and Apprentices)			680 7 7	
				928 1 8
Grant to the Nottingham and Notts Chemists' Association for educational purposes				20 0 0
Register, Printing and Publication				164 14 2
Repairs and Alterations (largely in connection with adapting the old premises to present requirements)				715 18 4
Rent and Taxes			601 12 1	
Fire Insurance—seven years' premium—and Insurance of Plate Glass			272 9 6	
				874 1 7
Stationery, Engraving, Printing, and Office Expenses			293 3 9	
Calendar—Printing and Publication			117 4 4	
				410 8 1
Salaries:—Secretary and Registrar			450 0 0	
Clerks			790 15 0	
				1240 15 0
Research Laboratory				346 16 0
Cost of Materials supplied to the Jacob Bell Scholars				10 0 0
Herbarium and Council Medals				6 4 0
Expenses of Local and Divisional Secretaries in promoting opposition to Customs and Inland Revenue Bill				9 1 8
Sundries				4 1 1
New Premises:—Galen Place—Enlarging the Dispensing Examination Room			238 0 0	
15 and 16, Bloomsbury Square—Kirk and Randall, Builders			5185 0 0	
Architects' Fees			800 0 0	
Strode & Co., Gas and Electric Light Fittings			200 0 0	
Campbell Smith & Co., Decorators			120 3 6	
Howlett—Fixtures and Fittings			184 15 3	
Clerk of the Works, Wages, etc.			81 2 9	
				6804 1 6
Travelling Expenses—Council and Committees				467 3 5
Refreshments for Council				39 16 6
Balance, December 31, 1890:—In Treasurer's hands			286 17 9	
In Secretary's hands			76 12 7	
In hands of Chairman of Executive (Scotland)			21 6 11	
				384 17 3
				£23,832 17 1

BENEVOLENT FUND, 1890.

CURRENT ACCOUNT.

Receipts.

	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1890	472	11	2
Balance in Secretary's hands, Jan. 1st, 1890	8	12	5
Interest on Invested Capital and Ground Rents . .	886	2	0
Subscriptions	1527	18	6
	£2,895	**4**	**1**

Expenditure.

				£	s.	d.	£	s.	d.
		Annuitants.							
36	at £35	per annum	. . . .	1260	0	0			
6	at £30	ditto	. . . .	180	0	0			
4	at £35	ditto	(1 quarter) . . .	35	0	0			
1	at £35	ditto	(2 quarters). . -	17	10	0			
1	at £35	ditto	(3 quarters) - - -	26	5	0			
1	at £30	ditto	(2 quarters) - - -	15	0	0			
1	at £30	ditto	(3 quarters) - - -	22	10	0	1556	5	0
50									

Casual Grants.

	£	s.	d.	£	s.	d.
Members and Associates of the Society and Registered Chemists and Druggists (16).	135	0	0			
Widows of ditto (23)	197	0	0			
Orphan of Registered Chemist and Druggist	15	0	0	347	0	0
Grant to the Secretary's Casual Fund . .				10	0	0
Payment from the Robbins' Fund				5	0	0
Printing, Stationery and Postage				42	19	5
Balance in Treasurer's hands, Dec. 31, 1890				928	6	8
Balance in Secretary's hands, Dec. 31, 1890				5	13	0
				£2,895	**4**	**1**

DONATION ACCOUNT.

	£	s.	d.		£	s.	d.
Balance in Treasurer's hands, Jan. 31, 1890	35	2	0	Balance in Treasurer's hands, Dec. 31, 1890	136	14	0
Donations and Legacies	101	12	0				
	£136	**14**	**0**		**£136**	**14**	**0**

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society of Great Britain as presented in the Financial Statement and Benevolent Fund Accounts, and find them correct. We have inspected the Deeds relating to the House Property and Ground Rents named below, and also find that the undermentioned Stocks were standing to the account of the Society at the Bank of England, and in the hands of the Society's Bankers, on the 31st December, 1890, viz.:—

		£	s.	d.	£	s.	d.
General Fund	2½ per cent. Consols	3,500	0	0			
	Freehold Ground Rents at Paddington Green, London, W., cost.	5,551	5	6			
	House in Edinburgh, cost	1,931	10	0			
	New Premises:—Galen Place, cost . .	10,442	16	8			
	„ 15 & 16, Bloomsbury Sq.	9,382	19	6	30,758	11	8
Benevolent Fund	2¾ per cent. Consols	2,950	0	0			
	Freehold Ground Rents at Strawberry Hill, cost.	1,020	12	6			
	Freehold Ground Rents at Battersea, cost.	12,213	0	0			
	Freehold Ground Rents at Broomwood Park Estate, Wandsworth, cost.	7,454	7	10	23,638	0	4
do. (Robbins Fund)	Gas Light and Coke Co. 4 % perpetual Debenture Stock.				125	0	0
Secretary's Casual Relief Fund	2¾ per cent. Consols	105	0	0			
Pereira Memorial Fund . .		100	0	0			
Bell Memorial Fund . . .		2,050	0	0			
Hanbury Memorial Fund . .		400	0	0	2,655	0	0
Redwood Memorial Fund . .	Great Indian Peninsula Railway Stock				400	0	0
Hills Prize Fund	Russian Bonds				316	8	0

F. HARWOOD LESCHER,
S. LLOYD STACEY,
CHARLES UMNEY,
W. MANNING WATTS,
FRANCIS YATES.
} *Auditors.*

March 17, 1891.

bers and associates in business from twenty to ten guineas.

The alteration of the examination fees of the Minor from 3 to 5 guineas and the reduction of the Major fee from 5 to 3 guineas.

The addition to the subjects of the Minor examination of "a knowledge of the law relating to the sale of poisons."

The suggestion made at the last annual meeting by Mr. Balkwill that it would be conducive to a better feeling in the Society itself, and would promote a clearer understanding among those outside of the objects aimed at by the Council in promoting further legislation, if some of the officers and Council were to visit a few of the principal cities and hold meetings open to the entire trade, has been acted upon. The President, Vice-President and Mr. Allen have visited Exeter and Plymouth. The President also has been present at meetings in Manchester, Liverpool, Birmingham, Cardiff, Hull, Leeds, Carlisle and Brighton, as well as in Aberdeen, Dundee, Glasgow, Edinburgh and Dumfries. At Liverpool he was supported by his colleague, Mr. Abraham; at Birmingham, by Mr. Southall, and also by the Treasurer Mr. Hampson, and Mr. Cross; at Cardiff by Mr. Gwillym Evans; at Carlisle by Mr. Martindale; at Brighton by Mr. Marshall Leigh; at Leeds by Mr. Newsholme; and in Dundee and Edinburgh by his Scottish colleague, Mr. Storrar. The result of these meetings has undoubtedly been to produce a better understanding of the powers and duties of the Society under existing Acts, and the importance of having an united body if further powers are to be obtained has been clearly recognized.

Meetings for the discussion of trade matters have also been organized in various parts of the metropolis by some of the Divisional Secretaries for London, and the President with one or other of his colleagues has attended several such meetings. As a result of these conferences local Associations have in some districts been formed, which should do much to induce a spirit of fraternity and unity among those practising pharmacy in the metropolis.

The Council at its meeting in April affixed the Seal of the Society to a deed founding the Manchester Pharmaceutical Association Scholarship, the funds for which had been placed in the President's hands by a member of that Association, who did not wish to have his name disclosed. The Scholarship will be of the annual value of about £30, and the competition is limited to assistants and apprentices residing in Lancashire or in certain adjoining parts of Derbyshire. The scholar is to be at liberty to carry on his studies in the School of the Society or in any provincial school approved by the Council.

The report of the Research Committee on the results of the three years' work carried out in the Research Laboratory, with suggestions for its future management and continuance, was presented to the Council in February, and considered in March. The recommendations of the Committee were approved by the Council and the directorship was made part of the duty of the professor of chemistry. The Council has decided to place the management of the Laboratory on a definite and permanent basis, in view of the work already done and of the effect this work has had, and future investigations will doubtless have, in extending the influence of the Society amongst those in official positions capable of assisting the Council in its efforts to extend its powers. Moreover, the educational advantages thus obtained by the advanced students admitted as workers into the Laboratory have been of the highest value in promoting the advancement of true practical pharmacy.

Mr. Henry George Greenish was in June appointed by the Council to undertake the demonstrations in materia medica, which Mr. Holmes felt unable to continue, owing to its interference with his important duties as Curator of the Museums. By his training in the School of the Society and at the University of Dorpat Mr. Greenish is specially fitted for the appointment.

The official celebration of the Jubilee of the Society, to which ladies are invited, has been fixed for May 26, the evening preceding the annual meeting, at which this Report will be presented. It will be held in the Society's premises. After the official business, there will be a réunion in the Examination Hall, and in other parts of the Society's premises some objects of interest will be exhibited.

The sixth Hanbury Medal has been awarded to Dr. Julius Oswald Hesse, of Feuerbach, near Stuttgart, for his distinguished services in the prosecution of researches in the chemistry and natural history of drugs. It is hoped that Dr. Hesse will be present at the Jubilee meeting to receive the medal in person.

The income of the Benevolent Fund from subscriptions shows a slight increase over that received for the past two years, having reached the sum of £1527 18*s*. 6*d*. against £1477 in 1889 and £1500 in 1888. On the Donation Account nearly 50 guineas were received, which will be added to the invested capital of the Fund. The expenditure on account of casual grants was £362, and the amount paid to annuitants reached the large total of £1556. There is still a very large number of registered chemists who do not support the Fund, and the Council would ask each member of the Society again to urge the claims of the Fund upon his non-subscribing colleagues.

Among the losses by death sustained by the Society during the past year must be specially mentioned that of Henry Bowman Brady, F.R.S., a past member of Council and of the Board of Examiners for England and Wales, and one of the founders and past Presidents of the British Pharmaceutical Conference. Mr. Brady was not only an accomplished pharmacist, but in the special branch of biological science which he cultivated with so much success, he was regarded by the scientific world as an authority.

In the death of Henry Groves, also, the Society loses a distinguished and active member, and the scientific world an earnest worker. His reputation as a botanist was unique, and he was held in the greatest social respect both in Italy and England.

The Council has also to record the death of Wm. Hodgkinson (for some time an *Auditor*), W. Hibbert, J. R. Battle and W. Ashton (*Founders*), George Young Sharpe (who has left a legacy of fifty guineas to the Benevolent Fund), and the following Local Secretaries:—E. W. Martin (Guildford), P. Havill (Tiverton), D. Wallworth (Maldon), J. Ranken (Forfar), J. M. Horsfield (Rotherham).

The Pharmaceutical Journal.

SATURDAY, MAY 9, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE COUNCIL MEETING.

THE Council meeting last Wednesday was attended by eighteen members, and at the commencement of the business the PRESIDENT announced that he had received a telegram from the TREASURER stating that he was too ill to attend the meeting. Nineteen pharmaceutical chemists and two chemists and druggists were elected members of the Society. One hundred and sixty-eight persons were elected associates and thirty-eight persons were elected apprentices or students of the Society. On the motion of the PRESIDENT, seconded by the VICE-PRESIDENT, Brigade-Surgeon J. E. T. AITCHISON, C.I.E, F.R.S., LL.D., M.D., etc., was unanimously elected an honorary member of the Society in recognition of the services he has rendered to botanical science in the course of his travels. Dr. AITCHISON is about to extend his travels and hopes to be able to collect specimens of many plants yielding medicinal substances and to identify others of which the names and habitats are still involved in obscurity.

The report of the Finance Committee stated that as is usually the case in April the receipts from the payment of subscriptions had been considerable, and that the examinations having been unusually heavy, the amount of fees received was also large. Besides the usual monthly payments, the balance of the architect's fees and of the account for alteration of premises had been paid. The Committee recommended that eight hundred pounds from the Benevolent Fund current account should be placed on deposit, as it was not desirable to make a permanent investment until it was found that the money would not be required for grants or to pay annuities; and the report was unanimously adopted.

On the recommendation of the Benevolent Fund Committee one grant of fifteen pounds, three of ten pounds, one of seven pounds, and two of five pounds each were ordered to be paid. The SECRETARY reported the death of an annuitant, and the VICE-PRESIDENT mentioned, in reference to the grants, that the cases were of the usual character. A large number of votes for the Royal Masonic Benevolent Institution have been received in favour of Mr. How, of Bournemouth, and there is some prospect that with further support his election may be secured this year. Votes for the Watford, and other benevolent institutions, have also been received, and can be obtained by any one desiring to exchange Royal Masonic votes for them. Mr. RICHARDSON expressed a hope that as there is a masonic lodge connected with the craft it might be possible before long to devise a scheme by which votes for the masonic charities could be collected from all parts of the country for cases connected with pharmacy.

The report of the Library, etc., Committee recommended that part of the old Council room, which is now to be added to the Library, should be fitted with bookcases, and this was agreed to. On the recommendation of the Committee Mr. DYMOND was appointed assistant lecturer in chemistry.

The Report of the General Purposes Committee included the reports of the school staff on the prize examinations with the names of the successful competitors, which will be found at page 1011; also the solicitor's report stating the progress made with the cases in his hands. Two defendants have submitted to judgment, two others have paid the penalties claimed, and in one case judgment has been obtained for four penalties and costs. Proceedings were authorized in another case on the recommendation of the Committee.

The report of the Executive of the North British Branch of the Society was presented, giving a *résumé* of the proceedings for the past year ending March, 1891. From that report it appears that the examinations in Scotland show a considerable increase in the number of candidates, and a slight improvement in the percentage of passes. The evening meetings in Edinburgh have been continued with success, but difficulty is experienced in obtaining suitable communications. Additions have been made to the Library by purchase and donation and by the fitting up of new bookcases, and advantage has been largely taken of this part of the Society's establishment in Scotland. The Museum has been enriched by donations of valuable specimens and by duplicates from the Museum in London, and it continues to be made use of by members of the University teaching staff, medical practitioners, etc. The report was adopted.

The report of the Government Visitor of the examinations which has already been published in the Journal (page 923), was then laid on the table, and the PRESIDENT announced the adjudication of the Hanbury Medal to Dr. JULIUS OSWALD HESSE, as previously reported in this Journal.

The proposed amended Bye-laws were formally read a third time, and on the motion of the PRESIDENT it was resolved that notice be given of a Special General Meeting to be held on *May 27*, after the conclusion of the Annual Meeting, when the revised Bye-laws will be submitted for the approval of the Society.

The President read a letter from Mr. Gill, the Honorary Secretary of the Nottingham and Notts Chemists' Association, enclosing a resolution passed at a meeting held on the 8th April, expressing approval of the Pharmacy Act Amendment Bill and the opinion that an effort should have been made to reserve the title of chemist and druggist to those qualified by examination and registration, and that the sale of compound preparations of the Pharmacopœia should be restricted to registered persons. The local members have been asked to support the Bill, and the suggestion is made that if it passes a second reading opportunity might offer in committee for inserting clauses on the lines indicated above. Another letter, from the Honorary Secretary of the Stockport Chemists' Association, enclosed a resolution passed at a meeting on the 16th April, urging the necessity of a fuller Preliminary examination, and approving of the suggestions made in Mr. Saul's paper on that subject.

The consideration of the annual report was then proceeded with, and it was ordered to be printed together with the financial statement, and issued to the members of the Society with the voting papers. These documents will be found at p. 998.

At the general monthly meeting of the Royal Institution, held on Monday last, twenty-one eminent scientific men of different nationalities were elected Honorary Members in commemoration of the centenary of the birth of Michael Faraday on the 22nd of September, 1791. The choice fell upon Professors E. Becquerel, M. Berthelot, A. Cornu, E. Mascart, and L. Pasteur, from France; Professors R. W. Bunsen, H. L. F. von Helmholtz, A. W. Hofmann and R. Virchow, from Germany; Professors J. P. Cooke, J. D. Dana, J. W. Gibbs and S. Newcomb, from the United States; Professors S. Cannizzaro and P. Tacchini, from Italy; Professor J. Thomsen, from Denmark; Professor T. R. Thalen, from Sweden; Professor D. Mendeleef, from Russia; Professor J. C. G. de Marignac, from Switzerland; Professor J. D. Van der Waals, from Holland; and Professor J. S. Stas, from Belgium.

* * *

In response to a circular issued by some Yorkshire members of the Society of Chemical Industry a meeting was held on the 1st inst. at the Philosophical Hall, Leeds, to consider the advisability of forming a Yorkshire section of the Society, similar to those already established at Birmingham, Bristol, Cardiff, Glasgow, Edinburgh, Liverpool, London, Manchester, Newcastle-on-Tyne and Nottingham. Mr. Richard Reynolds was voted to the chair, and in opening the proceedings said the advantages to be derived from the formation of a local section of the Society were so obvious as to require no advocacy, and he therefore called upon Professor Smithells to give an account of the proceedings which had led to that meeting. Professor Smithells stated that there was a general feeling that a Yorkshire section should be formed, as there are already about 125 members of the Society resident in Yorkshire. The project met with approval from the Council and had been mooted at Leeds and Bradford. He therefore moved that a Yorkshire section be established. This was seconded by Dr. F. H. Bowman, of Halifax, who suggested that while the headquarters of the section would be at Leeds, it would be desirable to hold meetings at some of the other towns in Yorkshire. The resolution was carried unanimously, and on the motion of the Chairman, seconded by Mr. Thorp Whitaker, of Bradford, Sir James Kitson, Bart., was elected Chairman of the section, Dr. F. H. Bowman was elected Vice-Chairman and Mr. C. H. Bothamley Honorary Secretary and Treasurer. A committee was also elected, consisting of Mr. A. H. Allen (Sheffield), Mr. W. Breffit (Castleford), Mr. T. Fairley, Dr. Hess (Leeds), Mr. R. Holliday (Huddersfield), Professor Hummel, Dr. I. Lewkowitsch (Leeds), Mr. C. Rawson (Bradford), Mr. I. Sharp (Low Moor), Professor Smithells, Mr. G. Ward (Leeds), and Mr. Thorp Whitaker (Bradford). It is hoped that the establishment of a Yorkshire section of the Society of Chemical Industry will lead to a large increase in the membership of the Society in this district among those engaged in industries in which chemistry is applied.

* * *

The first Sessional Meeting of the Institute of Chemistry will be held on Tuesday next, the 12th inst., at 2 p.m., when Dr. Odling will deliver an address on the "Relations of the Chemical Society to Professional Chemistry."

On Wednesday, the 13th inst., there will be meetings at 11 a.m. and 2 p.m, when a paper will be read by Mr. Otto Hehner on the "Analytical Chemist in Relation to the Public, the Profession, and the Institute;" by Dr. C. R. A. Wright on the "Training Requisite for Professional Chemists;" and by Mr. F. I. Lloyd on the "Best Training for an Analytical Chemist."

On the evening of the 12th the Fellows of the Institute will dine together at the Albion Tavern, Aldersgate Street.

* * *

Some months ago Her Majesty's Consul at Christiania reported that British cotton prints have acquired a bad reputation in Norway on account of their containing arsenic. Samples were sent to the Chemical Sectional Committee of the Manchester Chamber of Commerce, and arsenic was found present in such quantity as to be dangerous to the wearer. The committee states that the use of arsenical compounds in printing or dyeing is not necessary and could be avoided. A similar complaint was brought before the Chamber in 1888, and a special circular was then sent to the calico printers and dyers of the Manchester district. As the evil still continues, it has been decided to communicate with the Government respecting further action to put an end to it.

* * *

Information has been received of the death, at the age of 79 years, of Mrs. Elizabeth Jones, an annuitant on the Benevolent Fund. Mrs. Jones had been in the receipt of her annuity for nearly twenty-four years, having been elected in 1867, and she was the last survivor of all the annuitants elected before 1872.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 6, 1891.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Abraham, Allen, Atkins, Cross, Evans, Gostling, Greenish, Harrison, Hills, Leigh, Martindale, Richardson, Schacht, Southall, Warren and Watt.

The minutes of the last meeting were read and confirmed.

The PRESIDENT said he had just received a telegram from the Treasurer, stating that he had been attacked by sudden illness and was not able to attend. All his colleagues would agree with him in the hope that keeping indoors for a short time would prevent any serious or continued illness. Mr. Hampson had been present on the previous day, and said he was considerably better, so that it was with some surprise and a great deal of regret that he had received this telegram.

DIPLOMAS.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Charles, David.
Dalton, Robert.
Dudderidge, Frank Rawlinson.
Fielding, Clement.
Halsted, Arthur Walter.
Hoseason, James Henry.
Lobbett, James Godfrey.
McFall, John Edward Whitley.
Norton, Frank.
Richardson, Hubert Naylor Bardsley.
Riddle, Thomas Edward.
Roper, Henry Arthur.
Shepherd, Alexander Moir.
Silversides, Richard Benjamin Garbutt.
Stewart, James Tennent.
Tweedie, Thomas Shortridge.
Whitehead, Frederick Nathaniel.
Williams, Arthur Harold.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Cain, James Harold	London.
Charles, David	Pembrey.
Dalton, Robert	Wilmslow.
Dudderidge, Frank Rawlinson	Blandford.
Fielding, Clement	Halifax.
Hoseason, James Henry	Edinburgh.
Lobbett, James Godfrey	Ovington.
McFall, John Edwd. Whitley	Sale.
Mackenzie, William Graham	Edinburgh.
Millar, James Herd	London.
Norton, Frank	London.
Richardson, Hubert Naylor B.	Leicester.
Riddle, Thomas Edward	Hexham.
Robbins, Percy John	London.
Silversides, R. Benj. Garbutt	Gateshead-on-Tyne.
Stewart, James Tennent	Edinburgh.
Tweedie, Thomas Shortridge	Annan.
Whitehead, Fredk. Nathaniel	Morecambe.
Williams, Arthur Harold	Chester.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Hardie, George Henry	Harrow.
Price, Edwin	Abertillery.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Adamson, Joseph William	Colwyn Bay.
Arnison, Williamson S.	Newcastle-on-Tyne.
Askew, Frederic	Workington.
Bailey, John Richard	Plymouth.
Baker, Samuel	Chichester.
Barlow, Joseph Alexander	Burnley.
Beauchamp, Frederic Crawley	Wimbledon.
Bingham, Frank	Masborough.
Bridge, George Edward	Bournemouth.
Broad, Henry James	London.
Craske, Thomas Augustus	Holt.
Davidson, James	Gateshead-on-Tyne.
Daws, William Kirk	Hastings.
Dawson, Athol Stancliffe	London.
Edwards, Samuel	Godalming.
Ellis, Clement	London.
Frowde, John James	Douglas.
Galloway, Philip Henry	London.
Gantlett, Henry	Marlborough.
Gartside, Charles	Oldham.
Gatward, Oswald	Yeovil.
Glew, Frederick Harrison	London.
Harley, Thomas	Perth.
Hill, Major	Wisbech.
Holland, Tom	Lincoln.
Holloway, Edwin Arthur	Torquay.
Hubbard, Henry Joseph	London.
Hunt, Herbert George	London.
Hutchins, Edward Coxhead	London.
Jackson, Thomas	Chorley.
Jones, Hugh Kyffin	Liverpool.
Jones, Joshua	Barry Dock.
Knowles, Louis	London.
Lamplough, James William	Leamington.
Lane, Frederic John	Great Yarmouth.
Long, Herbert Henry	London.
Martin, William Lee	London.
Miller, Willliam Gow	Wick.
Murison, John	London.
Palmer, Charles Joseph	Saxmundham.
Parker, James Herbert	Middleton.
Pars, Charles Frederick R.	Stamford.
Perkin, Robert James	Croydon.
Pickard, Samuel Norman	Bradford.
Price, Joseph	Leamington.
Qualtrough, Thomas Stanley	Douglas.
Scott, Walter Carey	Birmingham.
Sleggs, George Milner	Liverpool.
Tweedie, Jonathan Johnstone	East Molesey.
Viggars, George Dan	Tunstall.
Walker, Robert	Royston.
Wells, William	London.
Weston, John Henry	Runcorn.
Whitelaw, Alexander	East Linton.
Wolstenholme, Abel Joseph	Heaton Mersey.
Young, George Herbert	Gainsborough.

Modified.

Huntley, Henry Edwin	London.
Roberts, John Kenn	Swansea.

ASSOCIATES.

The following, having passed the Minor examination, and tendered or paid as "Apprentices or Students" their subscriptions for the current year, were elected "Associates" of the Society:—

Agar, Robert Langbourn	Bridport.
Aitken, John Downie	Southsea.
Allen, Herbert Llewellyn	Basingstoke.
Back, Charles Thomas	London.
Baker, William Herbert	Cosham.
Bamford, William	Rochdale.
Barrett, William Louis	Portsmouth.
Baugh, John Wm. Mahanoora	Boston.
Bell, Charles Bains	Hull.
Bell, John Renwick	Newcastle-on-Tyne.
Bell, William	Southampton.
Bolshaw, Albert Ernest	Crewe.
Brierley, Herbert Charles	Halifax.
Brimson, George Frederick	Frome.
Brooke, Edward	Barking.
Brown, Ernest Ansell	Margate.
Button, Arthur Edward	Lincoln.
Callaway, Alfred James	Salisbury.
Chambers, John Wm. Parsons	Derby.
Cocker, Horace Edward	Ripponden.
Cousins, Alexander	Weston-super-Mare.
Cupit, Alfred Henry	Loughborough.
Davies, Evan James	Cardigan.
Dewhurst, William	Blackburn.
Dickinson, George	Hackney.
Dunn, Robert William	Dundee.
Dyson, John Geo. Peacock	Barnsley.
Eastland, John	Margate.
Eden, William James	Manchester.
Ellis, David	Ellesmere.
Evans, Griffith William	Aberayron.
Field, Ebenezer	Cambridge.
Fillingham, John	Grantham.
Findlay, Alexander Ogilvie	Edinburgh.
Freeman, John	London.
Furnivall, Wm. Heber G.	Cardiff.
Gard, John	Camelford.
Garnett, Henry	Evesham.
Gibbs, Christopher John	Weymouth.
Gillies, William	Manchester.
Goy, William Henry	Stanford.
Green, William Henry	Gargrave.
Harrington, William	St. Bees.
Harris, Edwin Thomas Pile	Bristol.
Harrison, Edward Frank	Holloway.
Hart, John Henry	Strangford.
Heath, Robert Philip	Norwich.
Heath, William	Derby.
Hicks, Joseph	Banbury.
Hiscox, Walter Reeve	Wisbeach.
Hoblyn, Edward Robert	Exeter.
Hoile, William Bonny	Sandgate.
Howell, Treharne	Newport, Mon.
Jeeves, Arthur Thomas	Brighton.
Jobbins, Edwin	London.
Johnson, John Richard	Over Darwen.
Jones, Charles Edward	Liverpool.
Jones, Frederick Pryce	Newtown.
Kempton, Ernest Arthur	Ely.
Kenderdine, Alfred George	Stafford.
Kirkby, John George	Algar Kirk.
Lee, Ernest Harry	London.
Le Seelleur, George	Jersey.
Llewellyn, George Parry	St. Clears.
Long, Frederick Coleman	Norwich.
Martin, William Montagu	Plymouth.
Mason, John Henry	Wirksworth.
Melhuish, Andrew Ralph	Windsor.
Mills, Arthur	Walsall.
Morgan, Henry Brunt	Liverpool.
Morris, David Thomas	Pontardulais.
Newman, George Franklin	Portsmouth.
O'Brien, Albert Christopher	Pembroke Dock.
Padley, Gillies	Boston.
Place, Edward Bland	Pickering.
Plowright, John	Ryde.
Pritchard, Elias Roberts	Aberdaron.
Procter, Benjamin B.	Scarborough.
Puckrin, Thomas Edward	Whitby.
Retallack, William Cyrus	St. Austell.
Richardson, Wm. Nathaniel S.	Warminster
Riches, Frank Fraser	Torquay.
Rigden, Hubert	Faversham.
Ringer, Frank Arthur	Norwich.
Roberts, Frederic Lancelot	London.
Roberts, Walter	Stroud.
Sanders, Basil Stanley	Newport, Mon.
Sant, Ernest	Burslem.
Shakespear, William	Birmingham.
Shearman, John Samuel	Cambridge.
Smith, Edward Charles	London.
Smith, Ernest Alfred Austin	Bristol.
Smith, Harry George	Downham Market.
Smith, Richard Sidney	Dartford.
Smith, Stanley John	Colchester.
Spyer, Arthur Jesse	Watlington.
Street, Herbert	Lincoln.
Sturton, Frederick	Peterborough.
Sturton, Samuel Ainsworth	Framlingham.
Summers, Stanley	London.
Sursham, Frederick Thomas	London.
Taylor, Thomas Morley	Bath.
Thacker, Charles Baildon	Edinburgh.
Thomas, William John	Beaumaris.
Walton, Frederick John	York.
Wilkie, David Thomson	Lichfield.
Williamson, Fredk. Arthur	Ashton-on-Ribble.
Wilson, Arthur	Grimsby.
Wilson, Charles	Louth.
Woodcock, Herbert Hy. Addis	Margate.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Appleyard, Francis Henry	Bradford.
Barrett, Charles Henry	Sydenham.
Beale, Horace Sharman	Cambridge.
Brice, Frederic Grattan	Leicester.
Briggs, Harold	Sutton-in-Ashfield.
Brown, William James	Dover.
Carpenter, Joseph Edmund	Welford.
Carver, Ernest Wing	London.
Chapman, John William	Scarborough.
Clement, Howell E.	Plymouth.
Copp, William Risdon	Southampton.
Corder, John Talwin	Norwich.
Davies, Roger Edward	Corwen.
Davison, John George	Newcastle-on-Tyne
Dukes, Edward Thomas	Penkridge.
Eggleston, George	Alrewas.
Evans, David William	Llansadwrn.
Gillett, Francis John	Hampstead.
Hill, Ernest William	Wisbeach.
Hill, Lawrence	Sheffield.
Hughes, Thomas Henry	Liverpool.
Ingram, Fred.	Wisbeach.
James, Thomas	Llandyssil.
King, Edgar James	Wootton Bassett.
Latreille, Albert	London.
Macey, Thomas	Southampton.
Makepeace, Arthur Benedict	London.
Miles, William Henry	Portishead.
Nesbit, James	Portobello.
Parry, Owen	Cardigan.
Reynolds, Joseph	Trecynon.

Richardson, Joseph	Heversham.
Sinclair, James Pettigrew	East Linton.
Smith, Percy Dolph	Brighton
Spencer, George Herbert	Bawtry.
Stevens, William Goyne	London.
Stevenson, George Miller	Sunderland.
Towers, William L.	Barrow-on-Humber.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

George Clark, 10, Fulham Road, London, S.W.
William Walker Lindley, 57, St. James' Place, Plumstead.

ELECTION OF AN HONORARY MEMBER.

The PRESIDENT moved that—

Brigade Surgeon J. E. T. AITCHISON, C.I.E., F.R.S., LL.D., M.D., etc.,

be elected an honorary member of the Society. He said that in accordance with the bye-laws, Dr. Aitchison's name had been exhibited in the Library during the past month, and it was now for the Council to decide upon his actual election. He had much pleasure in proposing this motion. The roll of honorary members was limited to fifty, and upon it there were the names of many distinguished chemists, physicists, biologists, and men representing the various branches of science appertaining to pharmacy, but he knew of none who in regard to botany and travel, two very important subjects, had done more than the gentleman whose name he had the honour to propose, and he felt that his name would add additional lustre to the already illustrious roll. He might add that Dr. Aitchison was about to extend his travels, and he hoped to collect specimens of many of the plants which yielded medicinal substances, and to identify others of which the names and habitats were still involved in considerable obscurity.

The VICE-PRESIDENT seconded the motion, which was carried unanimously.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee having been read, including a recommendation that £800 be transferred from the Benevolent Fund current account to the deposit account,

The PRESIDENT (as Chairman of the Committee) moved the adoption of the report and recommendations. He said the receipts had been considerable, as they generally were in April, a large number of subscriptions having been paid, and the examinations, both in London and Edinburgh, having been unusually heavy, and the fees consequently large. The expenditure included the usual monthly payments, the balance of the architect's fees, and of the account for alterations in the premises. On the Benevolent Fund account the receipts had been above those of last year, and equal to, if not above the general average. Over £700 had been received in subscriptions, many members—he wished he could say all—sending a subscription to the Benevolent Fund with their subscription to the Society. Having regard to the amount in hand on current account, and to the fact that a considerable portion of it would not be required for some time, the Committee had recommended that £800 be placed on deposit, in order that some interest might be obtained. Of course it was not desirable to make a permanent investment until the Committee was quite sure that the money would not be required for grants or to pay the annuities, because when once invested the interest only could be used for these purposes. The domestic account remained exactly as it was last month.

Mr. EVANS asked if an arrangement could not be made with the bankers, by which interest should be paid on the current account whenever the balance was over a certain amount.

The PRESIDENT did not think such an arrangement could be made in London, although he was aware it was done in the country.

The motion was put and carried unanimously.

REPORT OF THE BENEVOLENT FUND COMMITTEE.

The report of this Committee included a recommendation of the following grants:—

£15 to the widow (age 42) of an associate and subscriber. Applicant had a grant of £10 last year and is supporting herself and seven children by keeping a boarding house. The present grant is to assist in educating two of the children. (London).

£10 to the widow (age 50) of a chemist and druggist who has had two previous grants, in 1886 and 18[illegible]. Is in ill health and unable to do much. (Bath).

£5 to a registered chemist and druggist (age [illegible]) in business for twenty-three years. Has five children, the three youngest being entirely dependent on him. (Swansea).

£5 to the widow (age 50) of a registered chemist and druggist, who has had ten previous grants amounting to £85. (Manchester).

£10 to a registered chemist and druggist (age [illegible]) in business for 30 years, but had to give up in 18[illegible] owing to age and ill health. (Ramsgate).

£7 to a registered chemist and druggist and subscriber (age 77). Has a small weekly allowance which is insufficient to keep him. This grant is made to supplement it. (Lynn).

£10 to the widow of a member (age 45), who has had three previous grants of like amount. She is supporting herself and six children. (Goole).

The Secretary had reported the death of Mrs. Elizabeth Jones, aged 79, who had been an annuitant since 1867.

One case had been deferred for further information and two were not entertained.

The VICE-PRESIDENT, in moving the adoption of the report and recommendations, said the cases were of the usual character. He should like to say in reference to the case he mentioned at the previous meeting, of Mr. How, who was a candidate for the Masonic Benevolent Institution, that thanks to the publicity given to the case he had received votes, which with further effort would make his election a possibility. He had also had votes tendered him in exchange for votes for the Watford and several other benevolent institutions, so that any gentleman desiring votes for those institutions in exchange, could have them by communicating with him.

Mr. RICHARDSON said he gathered from several letters he had received that many members of the trade were not aware that there was a masonic lodge connected with the craft; he hoped before long that a scheme might be promulgated whereby votes for the masonic charities could be collected for cases connected with pharmacy from all parts of the country.

The report and recommendations were unanimously agreed to.

REPORT OF THE LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
March	Day . .	551	38	11	24
	Evening .	224	22	5	12

Circulation of books.	Total.	Town.	Country.	Carriage paid.
March . . .	222	125	97	£1 6*s.* 0*d.*

The undermentioned donations had been received, nd the Committee recommended that the usual tter of thanks be sent to the respective donors:—

For the Library in London—

Medical Register, 1891.
Dentists' Register, 1891.
From the General Medical Council.
Register of Veterinary Surgeons, 1891.
From the Royal College of Veterinary Surgeons.
Durham University Calendar, 1891.
From the University.
Smithsonian Report, 1888. Two vols.
From the Smithsonian Istitution.
Mitteilungen aus der medicinischen Facultät der Kaiserlich-Japanischen Universität, Band 1, No. 4. From the Universität.
Codex der Pharmakopœen, 1844–51, 5 vols.
Ruata, Farmacopea nazionale e generale, 1883.
Ferrand, Aide-mémoire de pharmacie, 1873.
From Dr. T. Lauder Brunton.
Ferrand, Aide-mémoire de pharmacie, 5me éd., 1891. From the Author.
Timehri, new series, vol. 4, part 2.
From the Royal Agricultural and Commercial Society of British Guiana.

For the Library in Edinburgh—

O'Shaughnessy (W. B.), Bengal Dispensatory and Pharmacopœia, 1841.
— Bengal Pharmacopœia, 1844.
Gray's Supplement to the Pharmacopœia, 1847.
From Dr. H. F. C. Cleghorn.

The Committee recommended that the undermen-ioned works be purchased:—

For the Library in London—

Van 't Hoff, Chemistry in Space, 1891.
Ramsay, Inorganic Chemistry, 1891.
Berichte der Pharmaceutischen Gesellschaft zu Berlin.

Museum.

The Curator's report had been received, and included he following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
March	Morning	647	51	11	29
	Evening	95	9	2	4

The following donations had been received, and he Committee recommended that the usual letter of hanks be sent to the respective donors:—

For the Museum in London—

Specimen of the roots of *Ichnocarpus frutescens* and of *Gentiana Kurroo.*
From Dr. W. Dymock.
Specimens of the root of *Ichnocarpus frutescens.*
From Mr. D. Hooper.
Specimens of Chinese drugs. From Dr. A. Henry.
Specimens of inert false *Pareira Brava.*
From Mr. Jenner.
Specimens of *Blumea balsamifera*, and of the roots of *Smilax barbata.*
From Mr. H. N. Ridley.
Specimens of the rhizome of *Phlox Carolina.*
From Professor J. M. Maisch, and Mr. H. G. Greenish.

For the Museum in Edinburgh—

Sodium benzoate, sulphonal, resorcin, aristol, chloralamide, amyl hydride, guaiacol, creolin, sodium nitrite, bark of *Hamamelis virginica*, cocaine hydrochlorate, sparteine sulphate, urethane, monobrom camphor, fuchsine, phenacetin, adeps lanæ hydrosus, apiol, paraldehyde, pilocarpine nitrate, terpene hydrate, cinchona bark (various), sozoidol.
From Messrs. Raimes, Clark and Co.
Crystalline substance from sesame oil.
From Mr. J. F. Tocher.
Mannite from taraxacum root.
From Mr. Thomas Smith.
Pods of *Sterculia acuminata*, Kola.
From Mr. J. C. Pottage.

It was recommended that the west wall of the old Council room be fitted with book cases to match those in the Library.

The staff of the Society's School had attended and reported on their respective classes.

The Committee recommended that Mr. Dymond be appointed assistant lecturer in chemistry.

The draft annual report had been submitted, and at an adjourned meeting approved.

The President, in moving the adoption of the report and recommendations, said the old Council room could not be entirely fitted up as a portion of the library until the walls of the new Council room were in a fit state to receive all the works of art now hung there, but what was proposed would make the room partially available in the meantime. With reference to the proposed appointment of Mr. Dymond, it almost followed from the way in which his name had been received in connection with the report of the Research Committee. Mr. Dymond had been working for some years, and it was felt that an official position of that sort was due to him, as giving him additional dignity and a better standpoint in case he applied for any appointment elsewhere. The annual report would be considered by the Council in Committee later on.

Mr. Watt seconded the motion, which was carried unanimously.

Report of the General Purposes Committee.

The report of this Committee included the reports of the staff of the School as to the prize examinations:—

Practical Chemistry.

Professor Attfield had stated that thirty-two students had competed, being the largest number within his experience.

Chemistry.

In this class there were seventeen candidates, and Professor Dunstan had drawn attention to the unusual merit of the first on the list, notwithstanding that the papers, one in physics and another in chemistry, had been above the average in difficulty. The attendance and diligence of the whole class had been in every way satisfactory.

Botany.

Twenty students had competed for these prizes, and Professor Green had reported favourably on the whole class.

Materia Medica.

Mr. H. G. Greenish had reported that he had examined eighteen students in this subject, and mentioned the number of marks gained by each.

Pharmacy and Practical Pharmacy.

Mr. Ince had examined seventeen candidates in these subjects, seven of whom obtained 75 per cent. of marks or upwards, the highest being 99 per cent.

In accordance with the foregoing reports the Committee recommended that the following awards be made:—

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1890–91.

	Committees held Once a Month or Oftener.				Special Committees.	Total Number of Attendances.
	Finance.	Library, Museum, Laboratory, and House.	Benevolent Fund.	General Purposes.		
Number of Committee Meetings held.	12	13	11	11		
Abraham (*Liverpool*)	6	*	*	6	2	**14**
Allen (*London*)	9	8	*	9	7	**33**
Atkins (*Salisbury*)	*	10	10	10	5	**35**
Bottle (*Dover*)	0	12	11	11	22	**56**
Carteighe (*London*)	11	13	0	10	30	**64**
Cross (*Shrewsbury*)	10	4	*	11	*	**25**
Evans (*Llanelly*)	*	0	4	5	*	**9**
Gostling (*Diss*)	*	*	8	8	1	**17**
Greenish (*London*)	*	7	9	5	10	**31**
Hampson (*London*)	*	11	9	10	7	**37**
Harrison (*Sunderland*)	1	*	*	5	6	**12**
Hills (*London*)	11	12	*	11	11	**45**
Leigh (*Brighton*)	9	*	*	8	*	**17**
Martindale (*London*)	8	11	*	10	10	**39**
Newsholme (*Sheffield*)	*	5	9	10	6	**30**
Richardson (*Leicester*)	*	7	4	3	1	**15**
Schacht (*Clifton*)	9	3	*	9	8	**29**
Southall (*Birmingham*)	*	*	5	7	*	**12**
Storrar (*Kirkcaldy*)	*	*	6	7	5	**18**
†Warren (*London*)	3	2	*	3	1	**9**
Watt (*Haddington*)	*	*	8	8	5	**21**

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1890–91.

Abraham, Alfred Clay	6	Gostling, Thomas Preston	9	Newsholme, G. Thos. Wilkinson	10
Allen, Charles Bowen	11	Greenish, Thomas	10	Richardson, John George Fredk.	9
Atkins, Samuel Ralph	10	Hampson, Robert	9	Schacht, George Frederick	10
Bottle, Alexander	11	Harrison, John	9	Southall, Alfred	9
Carteighe, Michael	11	Hills, Walter	11	Storrar, David	7
Cross, William Gowen	11	Leigh, Marshall	11	†Warren, William	3
Evans, Gwilym	7	Martindale, William	11	Watt, James	9

Number of Meetings during the year, 11.

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* Not appointed on this Committee.

† Elected to the Council, February, 1891, in the place of Mr. N. H. Martin, resigned.

Practical Chemistry.

Bronze Medal..................William Bonny Hoile.

Certificates of Honour...... { Henry Garnett. / James Dunning.

Chemistry and Physics.

Bronze Medal..................Edward Frank Harrison.

Certificates of Honour ... Equal. { Henry Garnett. / William Bonny Hoile.

Botany.

Bronze Medal ....Frank Fraser Riches.

Certificates of Honour...... { Henry Garnett. / Edward Frank Harrison.

Pharmacy and Practical Pharmacy.

Bronze Medal ....William Bonny Hoile.

Materia Medica.

Bronze Medal ....William Bonny Hoile.

Solicitor's Report.

The solicitor had sent the usual letter narrating progress of cases placed in his hands. Two defendants had submitted to judgment; in another case judgment had been obtained for four penalties and costs. Two other offenders had paid the penalties claimed.

One new case had been reported to the Committee and proceedings were recommended.

The former portion of the report having been read, was adopted, and the prize awards specified were authorized. The legal portion was deferred until later in the day, when it was considered in Committee.

On resuming, the report and recommendations were unanimously adopted.

REPORT OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

"The Executive of the North British Branch has now to submit the following report on the work of the year from March, 1890, to March, 1891.

"At a meeting of Executive held on April 16, 1890, it was arranged that the annual election should take place on Wednesday, June 18, 1890; and the present Executive was accordingly elected at a meeting of members and associates in business of the Society, residing in Scotland, held on the above date.

"The Executive has held three meetings during the year. At the first meeting on June 25, 1890, Mr. William Gilmour, Edinburgh, was elected Chairman, and Mr. David Storrar, Kirkcaldy, Vice-Chairman, and the resident members were appointed a General Purposes Committee to attend to business arising in the interval between meetings of the Executive.

"The General Purposes Committee has met four times and has had charge of the evening meetings, the fitting up of new bookcases in the Library, and the execution of repairs on the stable and coach house in Duke Street Lane.

"At the meeting of Executive on November 12, 1890, the following were nominated for election by the Council as the Board of Examiners for Scotland for 1891:—William Inglis Clark, David Brown Dott, Adam Gibson, William Gilmour, Alexander Kinninmont, Thomas Maben, John Nesbit and John Bertram Stephenson.

"The financial statement up to December, 1890, has already been forwarded to the Council.

"The following particulars indicate that the departments connected with the Branch continue in a satisfactory condition:—

"*The Examinations*:—The examinations continue o be conducted as formerly. There has been a coniderable increase in the number of candidates, and a light improvement in the percentage of passes.

"*Evening Meetings.*—The Evening Scientific Meetings ave been continued during the past session. Arrangements for four such meetings had been completed, but, wing to unexpected circumstances, it was only posible to hold three of them. The Executive desires to record its thanks to those gentlemen who gave valuable help by contributing papers to these meetings. The meetings were all well attended, but the Executive has again experienced great difficulty in securing a supply of suitable communications. From this cause no meetings could be held in December or March.

"*Library.*—A number of new and valuable books have again been added to the Library by purchase and donation during the year. The Library continues to be largely taken advantage of both for reference and by circulation, the latter showing a considerable increase, as will be seen from the following statement:—

	1889-90.	1890-91.
	1114	1358
		1114
	Increase	244

"The circulation of books to provincial chemists shows a decided increase as compared with last year. During the twelve months (1889–90) 79 volumes were circulated to readers outside Edinburgh and Leith. During the twelve months (1890-91) 116 volumes were so circulated. This privilege might, however, be much more largely taken advantage of as, although the circulation has increased, the number of readers has not increased in proportion. The recommendation in last year's report that additional bookcases should be fitted up in the Library, having been approved by the Council, has been carried out at a cost of £31 15*s.* 0*d.*, and there is now ample accommodation to serve for some years to come.

"*Museum.*—The Executive has again to record thanks to several donors of valuable specimens received during the year, and the collection has been further enriched by duplicate specimens from the Society's Museum in Bloomsbury Square. The Students' Specimens have been frequently renewed during the year, and are now in good order.

"The attendances at the Society's Library and Museum are shown by the following table:—

Attendance of Visitors during the Year from March, 1890, to March, 1891.

	Day.	Evening.	Total.
	1983	1181	3164
Totals for previous twelve months . .	1864	1162	3026
		Increase . .	138

"The above indicates a slight increase on the previous twelve months.

"The Library and Museum continue to be taken advantage of for reference by members of the University teaching staff, medical practitioners, science teachers, students, etc. The conduct of students continues to give satisfaction.

"*House.*—The whole property and furnishings of the Society in Edinburgh are now in good order. Certain necessary repairs to the drains and flooring of the stable and coach house in Duke Street Lane have been executed at a cost of £13 4*s.* 2*d.* Some building operations on the adjoining property, No. 38, York Place, threatened to affect the property and rights of the Society, but the plans were altered to safeguard these interests, and the work is to be executed to the satisfaction of Mr. Hippolyte J. Blanc, architect, who has been instructed to supervise the operations on behalf of the Society.

"April 15, 1891. "W. GILMOUR, *Chairman.*"

The PRESIDENT, in moving that the report be received and entered on the minutes, said it was eminently satisfactory. Last time he was in Edinburgh he was very glad to find that the Library and Museum were in such good order and condition and were so much used. The last paragraph looked at first sight a little alarming, but with the assistance of Mr. Hippolyte J. Blanc, who was a most able architect, he believed satisfactory arrangements had been made.

Mr. EVANS, referring to the paragraph which mentioned the difficulty in getting papers for the evening meetings, said he hoped that at no distant time arrangements would be made under which professors or lecturers should go about the country and hold classes and give lectures.

The PRESIDENT said that that was rather a different question. The report referred to meetings of members of the Society, for the discussion of pharmaceutical processes and so on.

The motion was then put and carried.

REPORT OF THE GOVERNMENT VISITOR ON THE EXAMINATIONS.

This report, which has been printed at p. 923, was laid on the table.

THE HANBURY MEMORIAL FUND.

The PRESIDENT reported that a meeting of the adjudicators of the Hanbury Medal had been held on April 16, when besides himself, as President of the Pharmaceutical Society, there were present Professor Crum-Brown, President of the Chemical Society, Professor Charles Stewart, President of the Linnean Society, Mr. Martindale, President of the British Pharmaceutical Conference, and Mr. Greenish, the pharmaceutical chemist nominated by himself and Mr. Martindale. At that meeting the Sixth Hanbury Gold Medal was awarded to

Dr. JULIUS OSWALD HESSE, Feuerbach, near Stuttgart.

It was hoped Dr. Hesse would be present at the Jubilee celebration to receive the medal.

THE NEW BYE-LAWS.

The proposed amended Bye-laws were read a third time, and on the motion of the PRESIDENT it was resolved that notice be given of a Special General Meeting to be held on May 27, at the conclusion of the business of the Annual General Meeting, when the revised Bye-laws now read a third time would be submitted for the approval of the Society.

THE PHARMACY ACTS AMENDMENT BILL.

The PRESIDENT read a letter from Mr. Gill, Hon. Secretary of the Nottingham and Notts Chemists' Association, enclosing the following resolution passed unanimously at a meeting held on April 8:—

> "That this meeting heartily supports the Pharmacy Acts Amendment Bill, but is of opinion that a strong effort should have been made to reserve the title of chemist and druggist to those qualified by examination and registration, and also that the sale of the compound preparations of the Pharmacopœia should be restricted to registered persons."

Resolutions had also been passed asking the local members to support the Bill, and it was hoped that if it passed the second reading an opportunity might occur in Committee for inserting clauses on the lines indicated in the above resolution.

THE PRELIMINARY EXAMINATION.

A letter had been received from the Hon. Secretary of the Stockport Chemists' Association, enclosing a resolution, passed at a meeting held on April 16th, urging the necessity of a fuller Preliminary examination and approving the article by Mr. Saul, published in the Journal of April 4.

THE ANNUAL REPORT.

The Council then went into committee to consider the Annual Report.

On resuming, the Report and Financial Statement were adopted, and ordered to be issued to the members with the voting papers. See p. 998.

REPORT OF EXAMINATIONS.—*April*, 1891.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (15th)	6	4	2
„ (16th)	5	2	3
„ (17th)	5	2	3
„ (21st)	4	4	0
„ (22nd)	3	2	1
	— 23	— 14	— [illegible]
Minor (8th)	32	13	19
„ (9th)	32	12	20
„ (10th)	29	11	18
„ (15th)	24	15	9
„ (16th)	28	13	15
„ (17th)	26	10	16
„ (21st)	27	10	17
„ (22nd)	28	13	15
„ (23rd)	30	12	18
„ (24th)	31	15	16
	—287	—124	—[illegible]
Modified (15th) . . .	2	1	1
	312	139	[illegible]

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (21st)	3	2	1
„ (28th)	2	2	0
	— 5	— 4	—1
Minor (16th)	15	5	[illegible]
„ (17th)	15	6	[illegible]
„ (21st)	12	6	[illegible]
„ (22nd)	14	11	[illegible]
„ (23rd)	15	5	[illegible]
„ (24th)	13	7	[illegible]
„ (28th)	12	6	[illegible]
„ (29th)	15	12	[illegible]
„ (30th)	15	7	[illegible]
	—126	—65	—[illegible]
	131	69	[illegible]

Preliminary Examination.

	Candidate Examined.	Passed.	Failed.
(14th)	451	203	[illegible]

Thirty-one certificates by approved examining bodies were received in lieu of the Society's examination.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Tuesday, May 5, 1891.

Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Devereux, Arthur	Beaconsfield.
Howlett, Herbert Arthur	Belvedere.
Oakley, Frank Arthur	Bournemouth.
Tree, John	St. Leonards-on-Sea.

The Report of the College of Preceptors on the Examination held on April 14 was received.

Four hundred and fifty-one candidates had presented themselves for examination, of whom *two hundred and forty-eight* had failed.

The following *two hundred and three* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Adams, George Cuthbert	Glasgow.
Adams, William Wright	Birmingham.
Adamson, William	Boness.
Aitken, Robert	Hawick.
Aitken, William	Edinburgh.
Allen, William John	Cardiff.
Anderson, Frank	Kirton-in-Lindsey.

Angel, Edward Charles	London.
Atkinson, Rowland	Southport.
Barker, Alfred Albert	Barnard Castle.
Barlow, Thomas Oldham	Bowdon.
Barrett, Thomas Edward	Portsmouth.
Barron, James	Cambridge.
Bartley, Frank Giles	London.
Bateson, Alfred Campbell	Kendal.
Batman, John Edwin	York.
Beattie, Alexander Gordon	Aberdeen.
Binley, John Henry	Hempnall.
Birt, Henry	Birmingham.
Black, William Reynolds	York.
Blake, Joseph	Aberdeen.
Blanchflower, George Percy	Great Yarmouth.
Bourdas, Isaiah	London.
Boyle, Thomas	Broughty Ferry.
Brewis, George	Gateshead.
Bridgen, John Edward	Bognor.
Brigham, Edwin Beal	Pocklington.
Broadhurst, Fred	Stockport.
Brown, Charles	Northallerton.
Burgham, Harry Hinsley	London.
Butler, Richard	Drighlington.
Carnes, William	Churwell.
Charles, Gwilym Frederick	Treherbert.
Charnley, Arthur Walker	Blackburn.
Coles, Albert William	Okehampton.
Collins, John Henry	Mansfield
Coop, Henry	Ashton-under-Lyne.
Cooper, Herbert Edward	Kettering.
Coppock, Bernard	Carrington.
Corney, Alfred Ernest	Portsmouth.
Cottingham, Thomas	Market Rasen.
Cranch, Willian John Beck	Barnstaple.
Crow, Sidney	Gorleston.
Cullingford, Edwin Pretty	Henley-on-Thames.
Currie, Archibald	Leith.
Darroll, Thomas Morris	Warminster.
Dawson, Hubert Allen	Louth.
Dickson, John Scott	Newcastle-on-Tyne.
Digweed, George	Portsmouth.
Dorran, James William	Oldham.
Douglas, Andrew	Edinburgh.
Draper, Frederick Louis	Blackburn.
Dunford, Oswald Frederick	Llynclys.
Eakin, James	London.
Egerton, William Leggett	Southsea.
Evans, Joseph Edward	Ammanford.
Fairweather, George	Plymouth.
Felthouse, Arthur George	Rugeley.
Fernley, Albert	Congleton.
Forrester, Alexander Harrow	Dysart.
Fothergill, James	Lancaster.
Frew, Alexander Wilson	Denny.
Garland, Alfred Harry	Blackburn.
George, Willie	Treorkey.
Gilby, Richard	Northampton.
Giles, Lewis John	Folkestone.
Gill, Herbert Edward	Birmingham.
Glover, Henry James	Coventry.
Goodall, Bowyer Gascoyne	Nuneaton.
Goodman, Cornall	Halifax.
Goodwin, Charles	Cropwell Butler.
Gordon, Edward	Aberdeen.
Grassie, William	Aberdeen.
Gray, Herbert	Manchester.
Gray, Matthew	Glasgow.
Gray, William Robert	Newcastle-on-Tyne.
Green, George	Bristol.
Hadley, Ada Millicent	Birmingham.
Hadley, Mary Winifred	Birmingham.
Hale, Vincent	London.
Hall, James	Birmingham.
Hardy, Thomas	Maryport.
Hardy, Thomas	Sutton-in-Ashfield.
Hare, Charles	Thirsk.
Harvey, Joseph Frederick	Birmingham.
Herbert, Alfred Walter	Barton-on-Humber.
Hill, Thomas	Birmingham.
Hodgson, Alfred	Leicester.
Holbrook, Fred. Tucker	Penzance.
Hollingworth, Oliver Albert	Barnsley.
Holt, William	Scunthorpe.
Hooper, Francis William	St. Austell.
Hope, William John	Stockport.
Hughes, Albert Hanmer	Wrexham.
Hughes, David Morgan	Abercarn.
Irving, James	Glasgow.
Jackson, Frederick Charles	Southport.
Jean, Ernest Albert	Jersey.
Jessop, Harry	Birmingham.
Jones, Henry John	Pontypridd.
Jones, Maurice	Oswestry.
Jones, Thomas	Llanybyther.
Lamb, Thomas	Clay Cross.
Langham, Ebenezer	Salisbury.
Law, Harry Arthur	Birmingham.
Lee, Arthur David	Pocklington.
Lee, Harry Lancelot	Bridlington Quay.
Lester, Garnet Louis	Cork.
Lounds, William Beaver	Grantham.
Lovatt, William George	Leek.
McCallum, Robert	Glasgow.
McDonald, Robert, Jun	Inverness.
McEwan, Arthur	Montrose.
Mackenzie, Andrew	Maryport.
Mackie, Alexander	Fraserburgh.
McIntyre, Daniel	Farsley.
McMahon, Ernest Hammond	London.
McRae, Robert	Cullen.
Magnay, William	Wigton.
Markham, Wallace	Horncastle.
Marsh, Ernest	Crewkerne.
Mawer, Frank	Nottingham.
Mercer, Joseph Ignatius	Preston.
Midgley, Archibald	Manchester.
Milburn, Thomas Henry	Maryport.
Milling, John	Birkenhead.
Minet, Noel Joseph Alphonse	Mauritius.
Moffitt, Thomas Henry	Acklington.
Moore, Archibald Livingstone	Tamworth.
Morris, George	Ludlow.
Morton, Henry Rosser	Margate.
Neave, Arthur Reynolds	Bath.
Ness, John Robert	Torquay.
Newton, Clarence Denton	Douglas.
Newton, Thomas Irvin	Sowerby Bridge.
Nicholson, John Charles	Thirsk.
Nicol, James Smart	Kirriemuir.
Noble, Francis Murray	Aberdeen.
Nye, Gerald Launcelot	Sleaford.
Paddon, Samuel	Barnstaple.
Parker, Herbert Thomas	Cambridge.
Parry, Dan Josiah	Blaina.
Paton, Robert Alexander	Prestwick.
Pearce, Seymour Rowland	London.
Pigott, William Edmund	Wadsley.
Pinchbeck, Gerald	Middlesborough.
Pitt, Charles Frederick	Bristol.
Plumstead, Fredc. Geo. Edward	Wymondham.
Pollard, Albert	Maidstone.
Pomfret, Albert	Blackburn.
Potts, George Henry	Cleckheaton.
Prescott, Wilfred Egerton Peter	Birkdale.
Priest, Alexander	Cradley.
Ratsey, William Henry	Oxford.
Roberts, Caswallon Pugh	Criccieth.
Roberts, Henry James	Aylesbury.
Robertson, Alexander Hamilton	Stirling
Robinson, Joseph	Stanley.
Rogers, Stanley	Stourbridge.

Rowland, Herbert Luker .....Weybridge.
Schofield, Herbert William ...Bradford.
Scholefield, William Henry ...Leeds.
Simpson, Alphonse Leon ......London.
Simpson, Bertram ....Castleton.
Simpson, Wilfred Dilke.........Castleton.
Sinclair, James ....Aberdeen.
Sinclair, James D. ....Derby.
Slack, Alfred John..... ....London.
Slater, Harry ....Bury.
Smith, James ....Blackpool.
Sparks, Percy ....Ipswich.
Stanwix, John......................London.
Stewart, Andrew Hare ....Penicuick.
Stones, Arthur John ....Rotherham.
Strong, Alfred Ernest ....Newcastle-on-Tyne.
Taylor, Robert Stanley ....Royston.
Taylor, William Buchanan ...Arbroath.
Thomas, Louis Edwin......... Cilpen.
Thomas, William ....Llandebie.
Thomas, William Sydney ......Taibach.
Thomson, Charles ....New Deer.
Thomson, William John ......Chester.
Tinker, Harold ....Linthwaite.
Underwood, Albert Henry ...Ipswich.
Vallet, Cyril Edwd. Franklin..London.
Veitch, George Hutchison ...Glasgow.
Veitch, William Cuthbert......Bishop Auckland.
Walkerdine, William Alfred...Derby.
Wallace, Hugh Gray ....Lancaster.
Wallis, James Samuel ....Hayle.
Walton, John James ....Middlesborough.
Watt, Frederick John ....Hingham.
White, Nathaniel Stanley......Liverpool.
Whitehead, Arthur Ernest ...Sheffield.
Wickens, Thomas Isaac James..Southsea.
Wilson, Edward Taylor.........Backworth,
Wilson, Thomas ....Stowmarket.
Windridge, Alfred Henry......Birmingham.
Wood, Joseph Wm. Wells......London.
Wright, Robert Edwin ....Redditch.
Wrigley, Arthur ....Keighley.
Yellowlees, John Alexander...Peebles.
Young, Harold Shaw ....Nantwich.

The questions set at this examination were published in the *Pharmaceutical Journal* for April 18, p. 947.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	21	9	12	Jersey	3	1	2
Aberystwith ...	2	0	2	Lancaster	7	3	4
Birmingham ...	29	17	12	Leeds	22	10	12
Brighton	3	1	2	Lincoln	10	5	5
Bristol	13	4	9	Liverpool	14	7	7
Cambridge	7	3	4	London	50	18	32
Canterbury	4	2	2	Manchester	36	19	17
Cardiff	15	7	8	Newcastle-on-T.	12	8	4
Carlisle	11	4	7	Northampton ...	3	2	1
Carmarthen	10	3	7	Norwich	9	8	1
Carnarvon	5	1	4	Nottingham......	17	7	10
Cheltenham......	1	0	1	Oxford	3	1	2
Darlington	8	4	4	Penzance	5	4	1
Douglas...........	2	1	1	Peterborough ...	6	1	5
Dundee	13	4	9	Plymouth.........	3	1	2
Edinburgh	26	10	16	Sheffield	12	6	6
Exeter	8	5	3	Shrewsbury	6	5	1
Glasgow	24	7	17	Southampton ...	13	6	7
Hull	6	3	3	York	10	5	5
Inverness	2	1	1				

EXAMINATIONS IN EDINBURGH.

April 16, 17, 21, 22, 23, 24, 28, 29, *and* 30, 1891.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on the 22nd, 23rd, and 30th, on behalf of the Privy Council.

MAJOR EXAMINATION.

21*st.*—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Shepherd, Alexander Moir ...Aberdeen.
Tweedie, Thomas Shortridge...Annan.

28*th.*—*Two* candidates were examined, and were declared qualified to be registered as Pharmaceutical Chemists:—

Hoseason, James Henry ......Edinburgh.
Stewart, James Tennent ......Dumfries.

MINOR EXAMINATION.

16*th.*—*Fifteen* candidates were examined. *Ten* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:-

Bell, William Brittain ....Edinburgh.
Bingham, Frank..................Masborough.
Bolsover, John Thomas ....Sheffield.
Bryce, James ....Laurieston.
Clarke, William Edward ......Foxholes.

17*th.*—*Fifteen* candidates were examined. *Nine* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Clarkson, John ....Wigan.
Cumming, William...............Edinburgh.
Dewhurst, William...............Blackburn.
Don, Charles........................Aberdeen.
Dugan, Hugh Mathieson ......Aberdeen.
Dyson, William Henry ....Sheffield.

21*st.*—*Twelve* candidates were examined. *Six* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Findlay, Alexander Ogilvie ...Edinburgh.
Fleet, John Thomas ....Chester-le-Street.
Forsyth, Douglas Millar ......Edinburgh.
Gall, Alexander ....Fraserburgh.
Gauld, James ....Huntly.
Greaves, William Thomas......Nottingham.

22*nd.*—*Fourteen* candidates were examined. *Three* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hamilton, Robert ....Edinburgh.
Henderson, Andrew ....Dalkeith.
Holden, James ....Blackburn.
Hudson, Sutherland ....Dumbarton.
Innes, James ....Turriff.
Jackson, George ....Leeds.
Jones, Charles Edward ....Liverpool.
Jones, William Lord ....Crawshawbooth.
Kaye, Alexander...................Perth.
Knight, Angus Arthur ....Bradford.
Williamson, Thomas ....Liverpool.

23*rd.*—*Fifteen* candidates were examined. *Ten* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Lee, Richard Baxter ....High Ackworth.
McConnachie, George ....Aberdeen.
Macdonald, David Mitchell ...Aberdeen.
McKenzie, James ....Dumfries.
May, James ....Musselburgh.

24*th.*—*Thirteen* candidates were examined. *Six* failed. The undermentioned *seven* passed, and were red qualified to be registered as Chemists and gists:—

Milne, Alexander Morrison ...	Aberdeen.
Murray, John	Hawick.
Procter, Benjamin Bake	Scarborough.
Reith, John Reid	Aberdeen.
Robin, Hugh Millar	Perth.
Rose, Alexander Skene	Leith.
Ross, David	London.

th.—*Twelve* candidates were examined. *Six* d. The undermentioned *six* passed, and were ared qualified to be registered as Chemists and ggists:—

Royal, Andrew	Aberdeen.
Scroggie, John Henderson ...	Auchmill.
Scowby, Joseph Newsome......	Sheffield.
Skirrow, Frederick James......	Accrington.
Smith, William Harry	Sheffield.
Thomson, William	Dumfries.

th.—*Fifteen* candidates were examined. *Three* ed. The undermentioned *twelve* passed, and were lared qualified to be registered as Chemists and ggists:—

Fox, Matthew Henry............	Northwich.
Small, George Smith	Brechin.
Spence, George	Gateshead.
Squire, George......................	Barnsley.
Stevenson, Andrew......	Kilmarnock.
Suttie, Robert	Cambuslang.
Swindells, Richard...............	Hyde.
Templeton, John Gow	Kilmarnock.
Thompson, Herbert...............	Manchester.
Thompson, Robert Greig	Buckhaven
Thomson, James..................	Ellon.
Thomson, William	Glasgow.

30th.—*Fifteen* candidates were examined. *Eight* led. The undermentioned *seven* passed, and were clared qualified to be registered as Chemists and uggists:—

Herrod, Matthew	Lincoln.
Waddell, John......................	Glasgow.
Wanless, Frederick Adolphus...	Newcastle-on-Tyne.
Watson, Alexander............	Hatton-by-Carnoustie.
Williams, William Rees.........	Carmarthen.
Williamson, Joseph	Maryport.
Wilson, Alexander Watson ...	Aberdeen.

PRELIMINARY EXAMINATION.

16th.—Certificates of approved examining bodies ere received from the undermentioned in lieu of the ociety's examination.

Nesbit, James	Portobello.
Rae, Robert Byers	Edinburgh.

Proceedings of Societies in London.

SOCIETY OF CHEMICAL INDUSTRY.

London Section.

An ordinary meeting of the section was held on Monay, May 4, Mr. T. Tyrer in the chair.

Mr. Leonard Archbutt read a paper by himself nd Mr. R. M. Deeley with the amended title—

The Treatment of Hard Water.

Just fifty years ago Dr. Clark patented his process or softening water and laid the foundation of innunerable modifications that had been worked with nore or less success from that time to the present. The use of lime as a precipitant was not then however new, Thomas Henry of Manchester (according to Dr. Angus Smith) having suggested it some fifty years before. The essentials of a perfect process were that the simplest and cheapest chemicals and plant should be used and that it should be applicable to all kinds of water. With the attainment of these objects before them the authors had experimented at the Midland Railway Company's works at Derby on a large scale. The apparatus they had adopted was simple and efficient, consisting of a tank to hold the water to be treated, a smaller tank in which to mix the reagents; and a stream trajector to effect the commingling. The trajector was placed at the bottom of a portion of the larger tank divided from the rest and forming a "well," into which the reagents in solution or suspension were introduced, so that they might be at once brought within the range of the trajector. The chemicals used were simple and well-known as adapted for water softening, being merely lime, carbonate of soda and sulphate of alumina. The vigorous stirring brought about by the action of the trajector and the presence of the mud or sludge left from a previous operation were instrumental in clarifying the water with unexpected rapidity. The cost of chemicals would of course vary with the nature of the water treated, but that of the labour was in any case small and might be reckoned at one farthing per thousand gallons. The use of caustic soda was avoided—a considerable advantage, both on account of its cost and of its objectionable action if used in excess by inadvertence or carelessness.

The change effected in the water at Derby by the use of this process is shown by the following analyses:

	Grains per gallon.	
	Before treatment.	After treatment.
Calcium carbonate . .	9·74	2·25
Magnesium carbonate .	2·45	2·18
Sodium carbonate . .	—	0·85
Calcium sulphate . . .	5·64	—
Magnesium sulphate .	1·34	—
Sodium sulphate . . .	3·41	11·33
Sodium chloride . . .	2·81	3·38
Silica	0·34	0·48
	25·74	20·47
Lime	7·78	1·26
Magnesia	1·62	1·02

This excellent result was maintained in ordinary working, similar figures for samples taken at random being quoted.

The organic impurity in the water was also considerably reduced, although that was not the primary object in this case, as the water after treatment was intended for use in locomotive boilers.

Before the process was adopted for softening the whole of the feed water used at Derby, a difficulty was met with and had to be overcome. On heating the water a slight deposit of calcium carbonate and magnesium carbonate and hydrate formed, sufficient to coat the injectors and other portions of the feeding apparatus, as it was at the point of admission to the boiler that the temperature of the water was first considerably raised. By carbonating the treated water by drawing through it the products of combustion of a coke fire this trouble was avoided. Washing the gases by means of a scrubber was unnecessary, the proportion of sulphur which that treatment was designed to remove being insignificant. Such carbonated water would be better for other industrial purposes, such as tanning and dyeing, as well as for ordinary domestic use. Care would, however, have to be taken to avoid over-carbonating the water, lest it should attack the service pipes.

The authors had also experimented on the softening of highly magnesian waters, with a view to ascertain whether such waters could be successfully treated by their process, as discrepant statements were current concerning the possibility of precipitating magnesia by this means. They found that by avoiding excess of lime the magnesia was thrown down together with lime in a crystalline state, and could be readily separated by filtration or subsidence. In the presence of an excess of lime, however, the magnesium appeared first as an opalescent turbidity which passed through the filter, and afterwards as a flocculent precipitate which clogged it and rendered filtration very tedious.

In the discussion which followed the reading of the paper Mr. Allen detailed experiments that he had made tending to show that although magnesium carbonate dissolved in excess of carbonic acid no true bicarbonate was formed.

Mr. W. Thorp feared that the process would cost more for agitation than the authors supposed, and doubted whether the "well" was necessary. He drew attention to the fact that the analysis of the purified water showed a larger percentage of sodium chloride than the untreated water, and asked where the balance came from.

Mr. Harland expressed the opinion that water softening processes, such as that described in the paper, were apt to be costly on account of the space occupied by the precipitating tanks, and thought that the water should be treated in the boiler itself.

Replying, Mr. Archbutt said that he had experiments of his own still incomplete, which bore upon the question of the existence of a true bicarbonate, but would not anticipate their result. As to the excess of sodium chloride, noted by Mr. Thorp, the difference was not large, and might well be due to traces of chlorides in the precipitants used. He dissented from Mr. Harland's opinion that water should be softened in the boiler, on the ground that the process was not well under control, and that it was better to detain the incrusting substances outside, rather than to trust to any apparatus, such as had been from time to time devised, to trap them within.

Mr. Allen then read a paper serving as a sequel to that recently presented to the section on—

THE CHEMISTRY OF WHISKEY AND ALLIED PRODUCTS.

The author said that with regard to the estimation of the ethers by saponification it must be remembered that aldehyde and furfurol are also acted upon. The former yielded aldehyde resin, acetic and formic acids, though the exact reaction was unknown, while the latter was split up in the manner shown below, $2C_5H_4O_2 + KOH = KC_5H_3O_3 + C_5H_6O_2$, giving potassium pyromucate and furfurylic alcohol. By the use of aniline and phosphoric acid both aldehyde and furfurol could be kept back and the difficulty avoided. In the determination of the higher alcohols by oxidation to their corresponding acids chromic acid mixture was preferable to potassium permanganate. The latter body also sometimes contained potassium perchlorate, which being isomorphous with it could not be removed by crystallization. When such a specimen was used perchloric acid passed over with the valeric acid, and a mixture of barium perchlorate and valerate was weighed as valerate. The combining weights of the acids, being nearly the same, caused a similar error if titration instead of direct weighing was resorted to. He had found in working with the valeric acid obtained from whiskey, that ordinary corks absorbed it readily and retained it persistently, giving rise to another source of error. Besides this, cork and also wood shavings had a strong selective action on the constituents of whiskey itself, and withdrew the higher alcohols and the ethers, producing a sort of artificial ageing. That such selective action really occurred was proved by the composition of "grog," as the spirit obtained by steaming old whiskey casks was termed in thd trade, it being rich in fusel oil and similar ingredients.

In the discussion Mr. Holloway confirmed the statement respecting the occasional presence of potassium perchlorate in permanganate, and instanced the use of wood charcoal for purifying raw spirit as corresponding to that of cork or wood shavings mentioned by th author.

Mr. Helmer thought that direct evidence concernin the process of oxidation in the pores of the cask shou be forthcoming, while Mr. Foster wished to learn t usual percentage of aldehyde and furfurol in ordinar whiskey, Mr. Allen replying that with regard to t former no method of estimation was known.

Provincial Transactions.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTAN AND APPRENTICES' ASSOCIATION.

The first excursion of the above Association was h on Wednesday morning (6th inst.) at 6.15 a.m., t object being to see through Messrs. Sowerby and C Eslington Glass Works, Gateshead. There was a lar attendance of members. Mr. Hind, of the above fir made an excellent guide, describing the various pr cesses in an interesting and instructive manner, whi was greatly appreciated by those present.

Obituary.

Notice has been received of the death of the following:—

On the 16th of February, Mr. John Greenwood, Pharmaceutical Chemist, Parliament Street, Harrogate. Aged 69 years. Mr. Greenwood had been a member of the Pharmaceutical Society since 1848.

On the 13th of March, Mr. Frederick Weston, Chemis and Druggist, New Quay, Cornwall. Aged 47 years.

On the 13th of April, Mr. James Heppell, Pharmaceutical Chemist, Haymarket, London. Aged [illegible] years. Mr. Heppell had been a member of the Pharmaceutical Society since 1873.

On the 22nd of April, Mr. John Morell Horsfield, Pharmaceutical Chemist, College Street, Rotherham. Aged 61 years. Mr. Horsfield became a member of the Pharmaceutical Society in 1853, and since 1886 had filled the office of local secretary.

On the 30th of April, Mr. John Smith, Chemist and Druggist, Barnsley. Aged 45 years.

On the 1st of May, Mr. George Waterall, Pharmaceutical Chemist, Chapel Bar, Nottingham. Aged 89 years. Mr. Waterall had been a member of the Pharmaceutical Society since 1853.

On the 3rd of May, Mr. Thomas Dawson, Walton's Parade, Preston. Aged 63 years.

On the 3rd of May, Mr. Abraham Dale Jones, Chemist and Druggist, Sheffield. Aged 51 years.

NOTICES OF MEETINGS.

Institute of Chemistry.—First Sessional Meeting.—Tuesday, May 12, at 2 p.m., and Wednesday, May 13, at 11 a.m., and 2 p.m.

Photographic Society.—Tuesday, May 12.—"Photographic Methods of Obtaining Polychromatic Impressions," by M. Leon Vidal.

Royal Institution.—Tuesday, May 12, at 3 p.m.—"Bacteria," by Dr. E. Klein.——Thursday, May 14, at 3 p.m.—"Recent Spectroscopic Investigations," by Professor Dewar.——Friday, May 15, at 8 p.m.—"Crystallization," by Professor G. D. Liveing.——Saturday, May 16, at 8 p.m.—"The Artificial Production of Cold," by Mr. H. G. Harris.

Erratum.—On p. 995, in the list of office bearers elected by the Dundee Chemists' Assistants' and Apprentices' Association, the name of Mr. H. J. Hunt should appear as Assistant Secretary.

J. Burt.—Your postcard has been forwarded.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Blunt, Sharp, Hooper, Macfarlan and Co., Ingham, Wright, Bindloss, K.

THE MICROSCOPE FOR STUDENTS.

BY JOHN HUMPHREY.

The microscope is now a very familiar instrument, and its use a matter of such everyday occurrence that it appears superfluous to enter into any detailed description of it. At the same time a ew hints as to the chief characteristics of a trustworthy instrument may prove of value to those who have not yet made their choice.

In a student's microscope the chief desiderata are simplicity of construction and compactness of form. There should be freedom from any risk of the various movements being cramped, and the adjustments should work smoothly without the least ateral motion. The coarse adjustment may be obtained by sliding the body in a well fitting tube or it may be worked with rack and pinion, whilst the fine adjustment is best of the improved modern form which moves the entire body of the instrument instead of acting on the nosepiece only, as in the old form, where the distance between the eyepiece and objective is continually varying. The body itself should be of continental length (six nches), but by means of a drawtube this may be readily extended when desired to ten inches. A plain stage of large size (three inches to three-and a-half inches square) is most convenient for ready manipulation of objects, and the under-stage fitting should be adapted to receive a diaphragm and other necessary apparatus.

A reversible minor (with plane and concave sides) is essential, and this is advantageously mounted on a swinging arm, so as to allow light to be thrown obliquely on the object under examination. The stand must be solid to render the nstrument firm and steady when inclined at any angle; the fittings should be of universal size so that extra apparatus by any maker may be adapted as required, and the lenses should be clear and good. A low power eyepiece (A or B) gives the most accurate results, and the one inch and quarter nch objectives are most generally useful. These atter should be well tested and, unless thoroughly achromatic and giving a perfectly flat field, rejected. The former quality is indicated by the absence of coloured rings round the margin of the ield of view or of any objects that may be in focus, whilst flatness is shown by an object remaining equally distinct when moved from any one part of the ield to another. Wipe the eyepiece lenses occasionally with a soft linen handkerchief, but do not touch the object lenses except when absolutely necessary. A double nosepiece will be found extremely convenient for rapidly changing powers and can now be obtained at a low cost.

Amongst the many excellent instruments which are now supplied at a moderate price, it appears omewhat invidious to make distinction, but the ollowing can be recommended as having been ound to give specially satisfactory results in histoogical work :—Beck's "Star," Swift's "College," and Watson's "Histological" or "Edinburgh Student's" microscope. The first named can be obtained at as low a price as two guineas, and all our are adapted to receive additional optical apparatus. This is important, for, as Professor Hillhouse points out in his introduction to Strasburgher's 'Practical Botany,' "it must be borne in mind that accurate observation needs an instrument which is capable of it, and while there is and ought to be every desire to keep the cost within a reasonably small sum, true economy does not consist in purchasing an instrument which may be a constant source of dissatisfaction, and may have to be discarded when the student emerges from his swaddling clothes." At the same time, whilst wisdom suggests that the microscope selected should be capable of receiving any necessary additions, it is inadvisable to purchase these until their need is really felt. Amongst the first should be a stage micrometer, a glass circle ruled in squares to drop into eyepiece, a polariscope, and some form of camera lucida.

Other necessary adjuncts for practical work are a good pocket magnifying lens, a razor ground flat on one side, a fine pair of steel forceps, a few camel-hair brushes of various sizes on handles, a section lifter made from a piece of copper wire flattened at one end, one or two needle points mounted in wooden handles, a spirit lamp, glass slides (3 ins. by 1 in.) and thin circular cover slips, watch glasses with flat bottoms, or, preferably, the white earthenware saucers used for water colour painting if they can be obtained of a diameter not less than 2 inches, some pieces of glass rod drawn to a point, and glass tubes to serve as pipettes, a supply of very soft dispensing corks, two small wash bottles (about 5 or 6 oz. capacity), one for alcohol the other for distilled water, and lastly several empty pomade bottles for pickling specimens, besides a number of narrow necked bottles for staining solutions and reagents. Special bottles holding about half a fluid ounce may now be obtained, in which the stopper is prolonged nearly to the bottom, so that a single drop of the liquid is readily removed. These are rather expensive, however, and their purpose may be served more economically by using 1-ounce squat dispensing vials, fitted with corks, through which pass pointed glass rods. Or in cases where the risk from evaporation and exposure is slight, the cork may be dispensed with and the pointed rod made from the piston of a broken glass syringe, the glass flange on the rod serving the double purpose of suspending the latter in the bottle and forming a loose cap to the neck.

The more generally useful reagents, stains, etc., may be prepared or purchased as follows :—

Iodine Solution.—Dilute *liquor iodi* to the colour of brown sherry.

Iodine in Alcohol.—Dissolve iodine in methylated spirit to a dark sherry colour.

Chlor-zinc-iodine (Schulze's solution).—Dissolve 110 grams of zinc in 300 c.c. of pure HCl, and evaporate to 150 c.c. Then dissolve 12 grms. of KI in as little water as possible, add 0·15 grms. of iodine, and mix solution with first one. This is an important reagent, and should be carefully made. It will have a dark, sherry-brown colour when right.

Aniline Chloride or Sulphate.—Saturated solution in distilled water with a few drops of HCl or H_2SO_4.

Borax-carmine.—Dissolve 3 per cent. good carmine in solution of 4 per cent. borax in distilled water; dilute with an equal volume of 70 per cent. alcohol (78 parts meth. spirit to 22 water), and filter after standing some time.

Methyl-green.—Saturated solution in methylated spirit.

Hæmatoxylin.—Dissolve 0·35 gram of hæmatoxylin in 10 c.c. of water, and add to it a few drops of a solution of alum consisting of 1 gram of alum to 1 c.c. of water.

Alkanet Tincture.—The alcoholic tincture is added to as much water as will prevent resin dissolving in it.

Potash.—Concentrated solution in water.

Glycerine.—Concentrated, and diluted with 50 per cent. of water.

Alcohol.—Methylated spirit and absolute alcohol.

Cloves, Oil of.—For cleaning sections before mounting.

Canada Balsam.—Heat until it becomes brittle on cooling, then dissolve in turpentine or chloroform to consistency of syrup.

Glycerine Jelly.—Best procured from Rimmington of Bradford. A plentiful supply of alcohol (methylated), glycerine and distilled water will be required. Other necessaries will be mentioned as occasion arises for their use.

(*To be continued.*)

THE NATURE OF SOLUTION.

An answer has long been sought to the question "What goes on when a solid substance is dissolved by a liquid?" Those who received their course of didactic instruction a good many years ago were taught that the solid substance was *liquefied.* It was said that the particles of a fusible salt, such as nitre, for instance, could be brought into the liquid condition by one of two methods; the first that of applying heat, heat-energy being used up in the process of liquefaction; the second process being that of submitting the body to the action of water, when the absorption of heat due to liquefaction was shown by the lowering of temperature. This explanation of the process of solution has been long since found unsatisfactory, and in more recent years teachers have preferred to say as little as possible about a process in appearance so simple, but of which the explanation was found to be encompassed with difficulties. Of late, however, the question has assumed another aspect. We have not attained, it is true, to unanimity of opinion as to what goes on in the process of solution, but there is nevertheless a perfectly definite theory of the process now current, which has the strenuous support of a prominent school of continental chemists. A complete account of the new theory has recently appeared in an accessible form in Oswald's 'General Chemistry.' In this work the *pros* rather than the *cons* of the question are dealt with. Exceptions yet remain to be explained, and fundamental experiments will have to be repeated and confirmed by independent workers, before the new theory can be looked upon as firmly established. Whatever may be the final judgment of the chemical world, the adequacy of the new theory to explain the phenomena of solution is undoubtedly one of the great scientific questions of the day.

The following is a short *résumé* of the theory and the data on which it is based.

The particles of a body in solution are not in the liquid but the gaseous condition; that is to say, they obey laws having exactly the same form as the laws of gases. In dilute solutions the conditions are similar to those in a perfect gas; concentrated solutions show deviations from the simple laws which are similar and in the same direction as the deviations from the laws of Boyle and Charles shown by gases near the point of liquefaction. If pure water be poured on the surface of a solution of sugar the particles of sugar rise against the action of gravity and mix with the pure water. There are certain substances with which we can build up a "semi-permeable wall" which will allow the water to pass but not the dissolved substance. A porous earthenware cell in and on which is deposited copper ferrocyanide forms such a wall. Its properties are not the same as those of an animal membrane, such as parchment, which will allow crystalline substances in solution to pass through it. If a cell containing a sugar solution be provided with such a semi-permeable wall and is further connected with a pressure guage, then on immersing the cell in a vessel of pure water, water passes slowly into the cell, the sugar does not pass out, and the particles of the dissolved substance exercise a pressure on the solvent which is registered by the manometer. The maximum pressure is only obtained slowly, but is of considerable magnitude, a one per cent. solution of sugar showing a maximum pressure of about 50 c.m. of mercury. The arrangement described affords us then a means of measuring the pressure exerted on the solvent by the particles of a substance in solution. It is found that this pressure is directly proportioned to the concentration of the sugar solution. All the other substances which have been investigated follow this law—pressure varies as concentration. It will be noticed that this law is of exactly the same form as that of Boyle, which states that the pressure of a gas varies inversely as the volume, *i.e.*, directly as the concentration.

Again, the pressure of the dissolved substance increases as the temperature rises, and for all substances so far investigated the rate of increase is the same as in the case of gases. With gases, if the volume be maintained constant the pressure varies directly as the temperature reckoned from the absolute zero of the air thermometer. This is Charles' law, followed, as has been said, by dissolved substances as by gases. We see then that the general relation of volume, *i.e.* $\frac{1}{\text{concentration}}$, to pressure and temperature is the same for dissolved substances as for gases. For either case we may write :—

Volume varies as pressure × temperature, or

Volume = pressure × temperature × a constant quantity.

The most striking evidence in favour of the view that substances in solution are in the gaseous state is afforded by the fact that this *constant* has the same value for dissolved substances as for gases; in other words, a dissolved substance at a certain temperature and which exercises on the solvent a certain pressure, occupies the same volume as it would if under these conditions of temperature and pressure it were in the form of a gas. An example will make this striking relation clear. At 0° C. and 760 m.m. of mercury pressure, the molecular weight of any gas expressed in grams occupies 22380 c.c. The pressure of 760 m.m. of mercury is 1033 grams per square cm., which number expresses the pressure in absolute units; 0° C. = 273 on the scale of absolute temperature; therefore the value of the constant for a gas is—

$$\frac{1033 \times 22380}{273} = 84700 \text{ approximately.}$$

Now take the case of sugar in solution. The molecular weight expressed by the formula $C_{12}H_{22}O_{11}$ is 342. In a 1 per cent. sugar solution therefore the molecular weight expressed in grams occupies 34200 c.c. At 0° C. the pressure on the solvent is found to be equal to 493 m.m. of mercury, that is to say 671 grams per square centimetre. The *constant* for sugar is therefore—

$$\frac{671 \times 34200}{273} = 84200$$

which agrees to within 6 parts in 1000 with that for gases. As this relation is not special to the case of sugar but is a general relation, it follows that Avogadro's law is obeyed by substances in solution, equal volumes of which, at the same temperature, and exercising the same pressure on the solvent, contain equal numbers of molecules.

It is well known that the abnormal vapour densities of certain bodies which we now know to be *dissociated* in the gaseous state long opposed an obstacle to the acceptance of Avogadro's generalization. The exceptions met with in the case of substances in solution are of exactly parallel character. The deviations from the law are always in one direction, giving too great a volume when the calculation is based on the received molecular weights. This is met by the hypothesis that such exceptional substances are to some extent dissociated in solution. As in the case of gases so also in the case of substances in solution, many bodies occupy a volume twice as great as that calculated from their molecular weight. These are regarded as being completely dissociated into two constituents. The most important classes of substances which behave thus are the strong acids and bases and their salts. A large number of phenomena afford evidence in support of this hypothesis of dissociation in solution, the study of which now constitutes an important field of work connected with the development of the new theory of solution.

GERMS AND DISEASE.

If an infusion of hay or any vegetable substance be kept in a warm place for some days and a drop be then examined under a microscope it will be found to swarm with bodies which, from their power of movement, appear to be endowed with life. An infusion of meat under similar conditions gives the same result. Some of these minute living bodies belong to the animal world, some are classed as plants. All of them owe their origin to "spores" or seeds carried to the infusion by the air, and produced by pre-existing plants or animals of the same species. At one time it was held by some scientists of repute that these organisms were spontaneously generated from the decaying matter in the infusion. The fallacy of the experiments on which this theory was based has, however, been exposed—mainly by the researches of Tyndall and Dallinger.

Chief among the organisms visible in the drop of meat infusion are numbers of rod-shaped bodies vibrating in a most characteristic manner. These are the lowest forms of plant life, being composed of a single cell and reproducing their kind by simple division of their bodies. They are known to naturalists as *bacteria*. Among these microscopic plants we have as much divergence in form and properties as can be found among the higher plants that people our fields and lanes and gardens. The remarkable difference in properties characterizing some of the latter which so closely resemble each other in form as to be placed by botanists in the same order is a fact now generally recognized. Thus, we have such a poisonous plant as *Belladonna*, or "deadly nightshade," belonging to the same order as the potato and scarcely distinguishable from it by the untrained eye; the hemlock, too, claims as close relations the carrot, the parsley, the caraway, and the coriander. The bacteria found in infusions of hay and of meat correspond to the useful plants, for besides being in themselves harmless, they act as nature's scavengers by feeding on and converting into its component elements the putrefying matter among which they live. Corresponding to the poisonous plants, we have the bacteria which are the essential factors in the production of infectious diseases and popularly known as "disease germs."

The "germ theory" of disease is not a product of to-day, but was mooted as long ago as 1675. Since that time it has passed through many phases, and been to all appearances as completely proved as it has afterwards been disproved. The "snow white cube of truth," of which all the theories have been mere vestments, still survives, however, and its recognition has been rendered certain by the more accurate methods of research and the more perfect instruments brought to bear on its numerous manifestations within recent years. Since the discovery by Pasteur—fully twenty years ago—that a disease which caused great ravages among silkworms in France was caused by a micro-organism, progress has been continuous. In 1877 Koch published the result of his researches on the life history of the *bacillus*—a species of *Bacterium*—of splenic fever. His observations were confirmed by Pasteur, who also showed how the bacillus might be weakened or "attenuated," so that inoculation with the attenuated form prevented or mitigated the more virulent disease. These researches laid the foundation for the methods now adopted by Pasteur for the cure of hydrophobia and by Koch for the cure of consumption, methods which are now rivetting the attention of the whole civilized world.

In consideration of the intense interest now being taken in the work going on in Berlin and the centres supplied from it, some explanation of the methods adopted for proving the presence of a disease-producing organism and for checking its ravages may not, it is hoped, be devoid of interest. The chain of evidence on which bacteriologists rely as proof of the presence of disease producing bacteria is as follows:—

1. The organism must be found (by the aid of the microscope) in the blood or tissues of the affected animal.

2. It must be transferred from these to nutrient solutions contained in test tubes (the nutrient materials of these solutions consist of gelatine and other meat products) and cultivated therein. These cultivations must be carried on through successive generations of the organism.

3. A "pure cultivation" obtained in this way must, when introduced into a healthy animal, produce the disease in question.

4. In the inoculated animal the same micro-organism must again be found.

In forging a chain of evidence such as this is, the greatest skill is required and the utmost precautions must be taken to prevent the entrance into the pure cultivations of other bacteria, which are present almost everywhere. All the apparatus used must be "sterilized," and the slightest neglect of details like this leads to hopeless confusion. Bacteriology is, in fact, an art requiring of its workers exceptional qualities and special training.

The methods adopted for curing or preventing diseases which owe their origin to bacteria vary with the disease under treatment, and the principles underlying them are not yet removed from the domain of theory. Pasteur in his famous researches on hydrophobia found that by various methods he could attenuate the virus of rabies so that when injected into a healthy animal it not only did not produce any untoward symptoms, but it actually prevented the most active virus from having any effect. The method he now adopts is that of suspending pieces of the spinal cord of inoculated rabbits in bottles of air, dried by means of potash. After hanging a certain time under such conditions the virulence is found to have diminished. Injections of the virus so attenuated not only confer immunity against rabies, but actually prevent its development even if practised after the disease has been introduced into the system by the bite of a rabid animal. This is rendered possible by the exceptionally long incubation period of rabies.

In the case of *tuberculosis*, or consumption, the method employed is somewhat different, although it is probable that at some not very remote date the principle underlying both methods may be shown to be the same. Koch found in the course of his observations that the bacillus of consumption when injected in cases of consumptive affections of the skin produced increased activity in the regions affected, resulting in the casting off of the affected skin and healing of the scars. By a series of masterly experiments and inductions he showed that it was not the bacillus itself which produced this effect, but a poison secreted by it. This poison he succeeded in extracting from pure cultures of the bacillus by means of a mixture of glycerine and water, and this is the fluid which during the last few months has been creating such a stir throughout the whole world. Whether the remedy will do all that newspaper correspondents have claimed for it is very questionable; but it is beyond doubt that its properties are most remarkable, and that it will be to the physician a most powerful auxiliary in the detection and treatment of some of the most insidious diseases to which flesh is heir.

TRITURATE TABLETS AND HYPODERMIC TABLETS.*

BY EDWIN S. ANDERSON.

A powder is unquestionably the most soluble form in which any solid substance can be administered. It is also the most disagreeable form of medication for the patient to take, and is as well inconvenient for the pharmacist to dispense. Pills are slowly soluble as a class, and in many cases are so insoluble that they pass through the alimentary canal without being disintegrated. Capsules are more soluble than pills as a rule, but do not compare with the tablet triturate, which is for all practical purposes as soluble as a powder. Most well made triturate tablets will disintegrate in less than a minute, while very few require more than two or three minutes. These statements do not apply to compressed tablet triturates, which, while fairly soluble, require much more time than the moulded triturate tablet. When medicine is to be given in small or accurate doses, nothing can compare with the tablet triturate. If ordinary care is used in their manufacture great accuracy may be obtained, without trouble or inconvenience. We sometimes see triturate tablets that have resolved themselves again into a powdered or granular form. This may have led some to believe that triturate tablets are not sufficiently permanent to replace pills or the less soluble compressed tablets. To ascribe this crumbling to any inherent fault in the triturate tablets is an error. The only trouble is that tablets which crumble with ordinary handling are not properly made. With many substances it is difficult to make a tablet that is not too hard nor too slow in disintegrating when placed in water; but the writer has never found any substance adapted to this form which could not be made into tablets that would stand reasonable handling.

While the cost of medicine should be a secondary consideration compared with efficiency, yet it is a matter that always should receive careful attention. A few illustrations will show that in this respect, as in all others, the triturate tablet leaves little to be desired. The following formulas show that, aside from the value of the medicinal portion, the cost of material is only ten cents a thousand—

T. T. Arsenious Acid, 1-100 *gr.*	
10 grs. arsenious acid	$ 00
1500 grs. diluent.	08
1 oz. alcohol	02
Material for 1000 tablets costs . .	10
T, T. Morphine Sulphate, 1-2 *gr.*	
124 grs. morphine sulphate	$ 75
1400 grs. diluent	08
1 oz. alcohol	02
Material for 1000 tablets costs . .	85
Podophyllin, 1-8 *gr.*	
125 grs. podophyllin	$ 08
1400 grs. diluent	08
Water	00
Material for 1000 tablets costs . .	16

The triturate tablet is soluble, accurate, permanent, easily made (at a low cost), dispensed and administered.

Following are given directions for making triturate tablets, but readers should remember that all points and details cannot be transferred to paper, and that some patience and experience are necessary in taking up this new branch of manufacture. For convenience the more common tablets are divided into classes, with special directions for each class, so far as seems necessary. The following directions are applicable to all classes:—

GENERAL DIRECTIONS.

In making triturate tablets, the medicinal ingredients are mixed with some diluent, moistened to form a mass, and moulded in plates to required size. As there are so many different sizes of tablets used, it is not possible to give the amount of diluent needed in each case within the limits of this article. If starting with a new plate, the exact size of which is not known, it is well to make up a lot of tablets with each of the tablet diluents. Dry and weigh these tablets; this will give the weight of diluent necessary to fill the plate; by dividing by the number of tablets the weight of a standard tablet is obtained.

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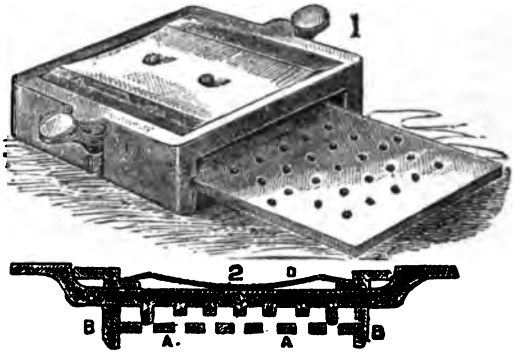
* From the *Pharmaceutical Era.*

In making up a new formula of tablets, weigh out the medicinal ingredient, and on a separate paper weigh out the amount of diluent necessary to fill the plate. If the medicinal ingredient is not in a powder, it should be powdered and placed in a pile on a paper. Remove a portion from the diluent equal in bulk to the bulk of the powdered medicinal ingredient, as nearly as may be—remembering that it is better to remove too much than too little—and note weight of the remainder. The medicinal ingredient, together with the diluent remaining, is approximately near the bulk of material required to fill the holes in the plate. Place the material in a mortar and triturate thoroughly. Then moisten with liquid enough to form a very stiff mass and rub the mixture in the plate, lying on a pill tile, a piece of plate glass or other flat surface. After one side is filled, smooth it and draw the tablet plate off the edge of surface on which it is laid, turn over, fill and smooth the other side. If the tablet plate is lifted instead of being slid off the edge, the tablets are liable to stick to the glass or tile. If there is enough to just fill the plate, the quantities used are correct. If there is not enough to fill all the holes, then perfectly fill as many holes as can be filled with the quantity of material. Count the holes remaining unfilled, and add diluent equal to the number of unfilled holes. Punch out the tablets in the plate, add this additional diluent, mix thoroughly, moisten and refill plate. If none has been wasted, there should be exactly enough to fill all the holes. The weight of extra diluent should be added to the weight of diluent originally mixed with the medicinal portion of the tablets. If the quantity of material originally taken is more than enough to fill the holes in the plate, then after filling the holes punch out the tablets and put the balance into as many holes as it will entirely fill. Count the holes thus filled, and deduct the weight of an equal number of standard tablets from the amount of diluent to use for the formula. In order that the formula may be correct, no mass should be wasted or left clinging to mortar or pestle. After the formula is obtained for any tablet, it should be noted in a book kept for that purpose. In this way a complete set of formulas will soon be obtained, and any kind of tablet can be made in a short time without any preliminary experimenting. Special attention is called to a few points that will aid much in the rapidity of manufacture, and add greatly to the appearance of the finished tablet. Only sufficient liquid is needed to make the material cling together when rubbed into the plate. The beginner is liable to make the mixture too wet. This should be avoided, as the tablets will crack when too wet, or else warp or shrink in drying. If the tablets are two wet, they stick to the punches and will not readily drop on to paper to dry. After the plate is filled, it is well to dust over it a little of the dry tablet mixture, to prevent sticking. If the tablets show liquid on the surface, this powder should be rubbed in to absorb the excess of liquid, then scraped off and more dry powder brushed over to prevent sticking. The amount of moisture used will affect the weight of the finished tablet after drying, as a very wet mass will fill a mould more compactly than a mass moistened only sufficiently to make the tablets hold together. It is desirable to leave the tablets as porous as possible, for on their porosity depends—to a great extent—their solubility. The drying of tablets may be hastened by punching them out on blotting paper to dry, or by placing them on a sieve, which exposes all the surface to a current of air. The latter course will prevent the top of the tablet from being darker coloured than the rest of the surface, when the medicinal ingredients are coloured and are soluble in the liquid. Capillary action carries the dissolved portion to the surface while the tablets are drying, and upon evaporation of the liquid this will be deposited there. If the evaporation is mostly from the top, the tablet will be darker there; if from all sides, the outward appearance will be uniform, while the centre will be lighter in colour. When working the mixture in quantities sufficient to fill more than three or four plates, it is best to wet only enough mixture for two or three plates at a time, adding fresh mixture and liquid as the first is used out. It is always best to save a portion of the mixture in the dry form, even if only one or two plates full are made. Some of the dry mixture is needed to dust over the surface of plates when filled, and if the first lot is made too wet, a part of the dry reserved portion can be added. If all the mixture is in and the mass is made too wet, it is necessary to set it aside until it dries out enough to fill into plates. In making very small quantities it is convenient to use a medicine dropper or minim graduate, that an excess of liquid may not be added. The sugar of milk, powdered sugar, or other diluent, should be 120 fineness. If coarser than 100, it will not give smooth finished tablets. It pays to sift all the material used, as only in this way can fineness be assured. Always use a nickel plated spatula, avoiding iron. In selecting the plates or moulds, it is necessary that they fit perfectly and be accurately made. A poor or imperfect plate is dear at any price. Most of the moulds on the market require the tablets to be left on the tops of punch pins to dry. This necessitates having a large number of machines, or of great loss of time while tablets are drying sufficiently to allow them to be removed from the pins. It requires thirty minutes or more for them to dry so they can be handled. To obviate this difficulty, the writer designed the machine illustrated here.



Triturate-tablet machine.

With this machine the tablets are punched from the plate as soon as it is filled and fall on papers, spread for the purpose, to dry. As they drop less than one-eighth of an inch they are not injured in any way.

In order that all tablets may readily disintegrate and yet possess sufficient cohesive properties to allow handling, the diluent and moistening liquid must be carefully selected with regard to the medicinal constituent or constituents. The following are the more important of the liquids and diluents. All are not used in the formulas given. The others are mentioned for the assistance of those who may wish to conduct further experiments. Not only may the liquids and diluents not used by the writer be tried by others to advantage, but there are many other combinations that are convenient in special cases which are not mentioned here.

MOISTENING LIQUORS.

1. Alcohol, 94 per cent.; 2. Alcohol 22 parts, water 1 part; 3. Water; 4. Absolute alcohol; 5. Alcohol 1

part, benzin 3 parts; 6. Absolute alcohol 1 part, benzin 7 parts; 7. Benzin; 8. Ether; 9. Chloroform.

DILUENTS.

1. Powdered sugar; 2. Powdered sugar milk; 3. Powdered sugar milk 5 parts, powdered sugar 1 part; 4. Precipitated chalk.

SPECIAL FORMULAS.

Class A.

Diluent No. 3. Liquid No. 2.

Arsenious acid, ammonium chloride, antimony comp. (Plummer's), arsenic iodide, atropine sulphate, bismuth subcarbonate, bismuth subnitrate, caffeine, calcium sulphide, capsicum, cerium oxalate, cocaine hydrobromate, cocaine hydrochlorate, codeine, colchicine, colocynthin, coniine hydrobromate, copper arsenite, copper sulphate and opium, digitalin, Dover's powder, elaterin, hydrastine, hyoscyamine, ignatia, ipecac, iron arseniate, iron by hydrogen, iron, arsenic and strychnine; iron and quinine citrate; iron, quinine and strychnine sulphate, iron and strychnine citrate, iron lactate, manganese binoxide, morphine hydrochlorate, morphine sulphate, nitroglycerin, nux vomica, opium, physostigmine salicylate, quinine bisulphate, quinine sulphate, sodium arseniate, sodium salicylate, strychnine sulphate, tartar emetic, veratrine, zinc phosphide.

This is the largest and most important class of the triturate tablets, as well as the easiest class to make. If any of the tablets classed here should seem too hard, a softer tablet can be made according to the direction for Class D.

Class B.

Diluent No. 3. Liquid No. 2.

As these tablets are all affected by contact with metals they should be made on rubber plates, and a bone, horn or celluloid spatula used for filling the plates. The flat plain paper cutters sold at most bookstores answer admirably for this purpose.

Calomel, calomel and ipecac, calomel, ipecac and sodium bicarbonate, calomel and sodium bicarbonate, corrosive sublimate, lithium carbonate, mercury with chalk, mercury biniodide, mercury protiodide, mercury yellow oxide, salicylic acid, salol, santonin and calomel.

Class C.

Diluent No. 3. Liquid No. 1.

Aconite (crystals), ammonium chloride comp. (am. chl. ½ gr., po. cubeb ¼ gr., ext. licorice $\frac{1}{10}$ gr.).

Class D.

Diluent No. 2. Liquid No. 1.

Aconite leaves or root, fl. ex. and tr.; aloin, belladonna and strychnine: baptisia, fl. ex. and tr.; belladonna leaves or root, fl. ex. and tr.; bryonia, fl. ex. and tr.; cannabis indica, ext., fl. ex. and tr.; capsicum, fl. ex. and tr.; chamomile, fl. ex. and tr.; conium, fl. ex. and tr.; ergotin (Bonjean's); foxglove, fl. ex. and tr.; gelsemium, fl. ex. and tr.; henbane, fl. ex. and tr.; ignatia, fl. ex. and tr.; jaborandi, fl. ex. and tr.; leptandrin (concentration); nux vomica, fl. ex. and tr.; pulsatilla, fl. ex. and tr.; stramonium, seed or leaves, fl. ex. and tr.; strophanthus, tr.; veratrum album, fl. ex. and tr.; veratrum viride, fl. ex. and tr.

This class is one of the most important and at the same time the most difficult to make. When tablets are to be made containing solid extracts, the extract should be rubbed with part of the sugar of milk in a mortar until reduced to a powder, then with this powder mix the balance of the diluent, moisten with alcohol, and fill into the plate in the usual way. To make good tablets, the extract should not exceed one-third the weight of the tablet. When the fluid extract or tincture does not exceed 1 or 1½ minims to a 2 grain tablet, it may be thoroughly triturated with all the diluent. The mixture may then be made into tablets in the usual way by the addition of q. s. alcohol to form a mass. If there is much more than the above amount of liquid to a tablet, it is necessary to mix the liquid with a portion of the diluent, dry at low temperature, powder and triturate with the remainder of the diluent. This mixture is then made into tablets with the alcohol. These tablets are to be made containing 4 or 5 minims of tincture. The necessity for waiting for mass to dry may sometimes be avoided by using an equivalent amount of fluid extract. But little, if any, allowance has to be made for the bulk of the extract, fluid extract or tincture in working out a new formula, for they are taken up by the diluent with little or no increase in bulk. It is a good plan to carry in stock some "blank tablets," made from the sugar of milk and alcohol. One or two minim tablets of any tincture or fluid extract can be made in a few minutes, by dropping the required quantity on to the blank tablets and allowing them to dry. If a half or quarter minim tablet is wanted, dilute the tincture or fluid extract with required amount of alcohol, to make one minim equal the required amount. By substituting fluid extract for tincture in the proper proportion, tablets can be made containing a large quantity of the active principle.

Class E.

Diluent No. 2. Liquid No. 3.

Aloin, alein and podophyllin. Podophyllin.

Probably most other resinous substances can be worked best with this class. If alcohol is used it dissolves the resin, and when the tablet dries it is quite insoluble. Though aloin is soluble in water, the tablets made of it with water and sugar of milk are quite soluble, dissolving in one to two minutes.

Class F.

Diluent No. 1. Liquid No. 4.

Pilocarpine hydrochlorate. Pilocarpine nitrate.

These tablets should be very thoroughly dried and tightly bottled.

Class G.

Diluent No. 1. Liquid No. 5.

Corrosive sublimate (antiseptic); (cor. sub. 1¼ grs. citric acid $\frac{37}{100}$ grs.); pepsin.

A hard rubber plate is absolutely necessary in making the antiseptic tablet. As the bulk of the mixture is about one-half corrosive sublimate, great care should be exercised to keep it off the hands of the operator. When many are to be made, rubber gloves should be worn.

HYPODERMIC TABLETS.

Class H.

Diluent No. 1. Liquid No. 1.

Aconitine, atropine sulphate, cocaine hydrochlorate, coniine hydrobromate, colchicine, digitalin, gelsemine hydrochlorate, hyoscine hydrobromate, hyoscyamine, morphine sulphate, morphine and atropine, nitroglycerin, picrotoxin, physostigmine, sodium arseniate, strychnine sulphate.

The cane sugar used in hypodermic tablets should be pure; the best confectioners' sugar is generally all right.

Class I.

Diluent No. 1. Liquid No. 6.

Apomorphine.

Dry thoroughly, bottle tightly and keep in dry place. It is well to use a hard rubber plate on these tablets.

Class J.

Diluent No. 1. Liquid No. 4.

Pilocarpine hydrochlorate, pilocarpine nitrate.

Dry thoroughly, etc.

No doubt many may find occasion to make tablets not found classified in this list. Most fluid extract, tincture and extract tablets can be made into tablets by Class D. Most chemicals can be made into tablets by Class A or B. A reasonable amount of judgment and a little experimenting will enable any competent pharmacist to make with pleasure and profit tablets of any substance that can be dispensed in this form.

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THERAPEUTIC REVOLUTIONS AND RESEARCH.

IN a recent address delivered before the Western Medical Society by Professor GAIRDNER, of Glasgow University, a very timely warning was given as to the necessity for caution in the adoption of new remedies. In this respect useful assistance may be derived from the lesson furnished by the history of remedies which have the advantage of hundreds of years of prescription, such as blood letting, quinine, arsenic, opium and alcohol, all valuable, and some even invaluable, though it is questionable whether it could be honestly affirmed that all or even a majority of the medical profession are quite agreed as to the therapeutic uses of any one of these remedies. Apart from the complication of the question as to therapeutic use caused by the influence of social and moral considerations, it is important to remember that medical opinion and professional convictions have been swayed this way and that under the impulse of plausible theories and great names, not merely during the Dark Ages, but within the present century. Such considerations must inspire some misgiving when approaching the subject of new remedies, and they also serve to enhance the estimate of the utility attaching to the investigation of the claims of new remedies suggested some years since by Dr. WHITLA, and with the assistance of Dr. LAUDER BRUNTON and others undertaken by the Therapeutic Committee of the British Medical Association. While recognizing the importance of individual observation in producing a conviction that any new remedy is to be adopted or discarded, Professor GAIRDNER's remarks tend in favour of the view that co-operative work upon a carefully regulated and scientifically planned basis is the only means of advancing our knowledge of the therapeutic value of new remedies, and hence he looks upon Dr. WHITLA's scheme s likely to prove one of the greatest future adances in therapeutic method. But to arrive at nything like properly verified results these inuiries must extend over a vast area, and while here are not many who, having hospital wards or ut-practice at their disposal, can possibly hope to obtain in one, two or even more years the means of testing thoroughly any one great therapeutic advance, it is still less possible to determine the comparative merits of the scores of new claimants for recognition as antipyretics, hypnotics or analgesics, digestive ferments or solvents, cardiac tonics, gastric or biliary or pancreatic stimulants. To be compelled to undertake a comparative investigation on any one of these lines would, Professor GAIRDNER declares, much more than exhaust the resources at his disposal as a teacher and hospital physician. To undertake the whole would be to court defeat and to incur, with too good reason, the reproach of treating his patients as the mere raw material for crude and rash experiments. In the absence of scientific co-operation there is a probability of being led to adopt quite uncritically the mere attestations in favour of any novelty that a great firm may think worth while or commercially profitable to introduce. Co-operation for commercial purposes would thus gain preponderance over independent judgment, since nothing is easier, when money is in it, than to get up a perfectly delusive appearance of a consensus of professional opinion.

In dealing more especially with the subject of new remedies and with the question whether medicine can claim to be advancing in respect to them on safer and better lines than in the past, Professor GAIRDNER disclaimed any disposition to limit the aspirations or restrict the progress of pharmacology. But while admitting with reference to Dr. LAUDER BRUNTON's address on the connection between chemical constitution and physiological action that an entirely new era has been entered upon in this direction, he considers that the progress of pharmacology is bringing to light an increasing crowd of new remedies that is rather adding to than diminishing the difficulties of the medical practitioner. In this opinion he finds support from the statement of Dr. WHITLA that "the indication at present is not for more new "remedies, but for better and more precise know- "ledge of those already in our hands. It seems as "if one of our very greatest barriers to progress is "to be found in the ever increasing number of new "drugs, which pour in upon us at a rate which pre- "vents that thorough testing of their quality and "actions so necessary before the range of the new "weapons can be accurately determined." As an instance of the mischief that may thus be caused, Professor GAIRDNER mentions a case that occurred in his own practice, when in using for the first time a new antipyretic drug, just then brought into notice, he was horrified and distressed at finding that the very first tangible effect brought about by it was hæmatinuria. Such an experience naturally suggests observance of the principle that in experimenting with new remedies, if any one is to be killed by them, it is better to avoid advising their use. If, on the other hand, in the case of a remedy believed to be innocuous the bolder course of giving it all round be adopted, there is another danger, illustrated by a story that was current some time ago in Edinburgh, to the effect that a lady on inquiring the meaning of something unwonted in her prescription, was assured by the physician's servant that it was "A'richt mem; they're a'gettin that the noo."

In a discourse bearing upon new remedies it would have been impossible to avoid some allusion to an object lesson in reference to the claims of pharmacological research as a guide to treatment, that is of more serious importance than those above-mentioned, viz., the Koch treatment of phthisis, in regard to which we are now, as Professor Gairdner puts it, "in the very trough of a wave of reaction or rather of discouragement from the hopes and expectations entertained in November last." Professor Gairdner deprecates the *ex post facto* sagacity of those who find the present a suitable occasion for deriding Koch and his work; but while testifying to the high integrity and ability of Koch he points to the present "contemplative, profoundly sceptical and even pitiful state of discouragement," compared with "the wild rush at Christmas, and for some time thereafter, in search of immediate salvation at Berlin," as furnishing a lesson that pharmacology—or the experimental investigation of new remedial agents in the laboratory—can never have the last word of control or be permitted in any way to supplant that purely clinical work which it has been Dr. Whitla's object to organize by co-operative observation. Though the principle of the "nostrum" is now so condemned and discredited in the medical profession, that it may be considered as definitely abandoned by all honourable men, the evils of morbid individuality do not end with the suppression of the "nostrum," and much that is objectionable may be done in the way of self-advertisement without becoming the proprietor of a secret remedy. It is against this natural tendency, stirred into activity by trade enterprise and modern facilities for converting into a "boom" what may prove in the end a worthless product, that caution should ever be exercised in regard to new remedies. By the adoption of the principle of scientific co-operation there may, in Professor Gairdner's opinion, be found not only a new source of strength, but a permanent defence against too much individuality and too aggressive self-consciousness in the matter of new remedies. He would, however, suggest that in addition to a single committee sitting in London, there should be a multitude of therapeutic committees dispersed over the country. In that way he thinks individual inquirers might be induced to recognize the duty of throwing the results of their researches into a common stock, so as to secure impartial and unbiassed investigation on a broader basis than individual experience of disease can supply. Another advantage to be derived from investigation by such committees, which would be confined to the simplest forms of remedial agent, would be to obviate the growing evil of what may be termed the new polypharmacy—the practice of huge American and English drug houses, who are flooding the country with ready made remedies and cut and dry formulæ for every ache and symptom to which flesh is heir—a practice which Professor Gairdner and Dr. Whitla agree in regarding as "decidedly calculated to retard the progress of the healing art." This opinion is expressed from the point of view of one who, habitually leaning to simplicity of prescription, finds himself unwillingly involved in the toils of these very complex mixtures which many "prescribe as a mere matter of "convenience, but from which it may be safely "affirmed that, whether the patient be benefited or "not, no inquiring mind can ever learn anything as "to the real action of any remedy whatever."

THE QUALIFICATION OF PROFESSIONAL CHEMISTS.

A feeling has gradually been growing up among those who are engaged in practice as professional chemists, that there is need of some ethical regulation of the mode in which that practice should be conducted. With some increase in the demand for the services of professional chemists, there has been a still more rapid increase in the number of those who desire occupation either as analysts or as advisers in regard to matters involving chemical knowledge, and the attempt that has been made by the formation of the Institute of Chemistry to establish a criterion of competence for the performance of such duties is so recent that it may well be doubted whether that can yet be altogether relied upon as furnishing trustworthy evidence of the kind required. In this condition of affairs, and considering the general ignorance of the public in regard to scientific subjects, it is not surprising or altogether unnatural that questionable methods of self-recommendation should have been resorted to by some of those who seek occupation as professional chemists. Among such methods may be mentioned the systematic exhibition of the letters F.C.S. in such a manner as to suggest that the user of them is a competent chemist in virtue of being a Fellow of the Chemical Society. To such an extent has this practice been carried that the public are to a great extent impressed with the belief that Fellowship of the Chemical Society is evidence of competence as a chemist. That this evil exists is admitted, and the question is how it shall be remedied. A certain number of Fellows of the Chemical Society have lately urged that the Council of that body should exercise greater discrimination in admitting candidates for the Fellowship, and it was chiefly in reference to this demand that the Fellows of the Institute of

Chemistry were engaged in discussion at the first sessional meetings held last Tuesday and Wednesday. In an address upon this subject Professor Odling contended that it is no business of the Chemical Society to protect the interests of professional chemists by making admission to its fellowship subject to such an investigation of the chemical competence of candidates as would render fellowship of the Society effective evidence of qualification. Moreover, such a proceeding would unduly restrict the resources by which the Chemical Society, in its way, seeks to promote chemistry. So far the answer to the demands that have been made is complete; but it still remains a question whether the undoubted misuse by some persons of the fellowship of the Chemical Society, and the very general misconception prevailing with the public as to its value and significance, might not well be provided for by the exercise of some control over the conduct of fellows of the Chemical Society by the executive body, or by a court of censors specially appointed for that purpose. There is also good reason for believing that within the ranks of the Institute of Chemistry a similar exercise of control would be wholesome in repressing and preventing practices of a distinctly unprofessional character.

THE MEDICAL PRELIMINARY.

The adoption of an improved system of education is at the present time as much a subject of consideration in regard to the technical training of medical students as it is in regard to the like requirements of pharmaceutical students, and it is of interest to compare the views expressed by medical authorities with those which underlie the efforts that are being made to establish a satisfactory and efficient pharmaceutical curriculum. As our readers are probably aware, the General Medical Council has resolved that the period devoted to medical education is to be extended to five years, and the question now under consideration relates chiefly to the best means of utilizing this extended period of study, and to the arrangement of intermediate examinations that are to be passed before candidates for qualification can present themselves for the final examination. Though it is unnecessary for our purpose to describe the details of the several proposed schemes of curriculum, it may be mentioned that none of them make provision for the fifth year to be spent with a medical practitioner as a pupil, but that in all cases the extra year would be an additional year of ordinary hospital work and hospital study. The *Lancet* in commenting upon the schemes proposed by the Committee of management of the combined examining Board in England, expresses a doubt whether they are fully in accord with the anticipations of the General Medical Council, and our contemporary goes on to point out that the reform most essentially required is in the Preliminary examination. Objection is taken to the reception of a certificate of the College of Preceptors, in the second division in which the subjects of an inferior schoolboy's education can be passed piecemeal, and it is held that many of the Preliminary examinations which allow a student to be registered are not at all better. The great want is to raise the standard of entry into the profession by means of a more efficient Preliminary examination than is required at present. This is in accord with what is demanded by many in regard to pharmaceutical education; and the arguments by which this view is supported agree with those put forward by Mr. Saul and others as to the pharmaceutical Preliminary. In the first place it is urged that the study of science cannot be intelligently approached by ill-educated students, and that it is such students who are rejected again and again by the examiners in science and in medicine, bringing discredit on teachers and, if eventually contriving to become qualified, figuring as blots on a learned profession. Hence it is argued that the Preliminary examination should comprise elementary physics, mechanics, chemistry and biology, and that until an examination has been passed in those subjects a student should not be permitted to enter upon his medical career. If he could not pass this examination when young enough to readily change his plans for the future, that would be the period when he should be definitely stopped, before his parents or guardians expend money upon his professional education, and he is thus led to continue in a career for which he is unfitted. Our contemporary considers it to be very important that there should be a clear statement of the general principles on which the education of a well-instructed medical practitioner must rest, and it will be seen that those principles are quite in harmony with the views which have instigated the efforts to establish a uniform system of pharmaceutical education.

In connection with the annual dinner of the members of the Pharmaceutical Society and their friends, which is to take place at the Criterion Restaurant, on Wednesday, the 27th inst., we would emphasize the notice given by the Committee that in order to facilitate the arrangements necessary for ensuring the comfort of the guests, Saturday, the 23rd inst., has been fixed as the last day for obtaining tickets.

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According to some preliminary telegrams in the *Pharmaceutical Record* and *American Druggist*, the meeting of the American Pharmaceutical Association, which commenced on the 27th ult. in New Orleans, was attended by about three hundred members. The choice for President in the ensuing year fell on Mr. A. K. Finlay, of Louisiana, whilst Mr. George J. Seabury, of New York, was elected first Vice-President. It was decided to hold the 1892 meeting at Cresson Springs, in the Allegheny mountains, Pa., in the early part of September. After some discussion, a committee was appointed to arrange the sending out of invitations to an International Pharmaceutical Congress to be held in Chicago in 1893.

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In referring recently to the additions to the Commission of Peace for the Borough of Lymington, the first name should have been given as Mr. Adam Underwood Allen, pharmaceutical chemist.

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Information has been received of the death, at the age of eighty-two, of Mr. C. F. Hollinworth, who was elected an annuitant on the Benevolent Fund in 1879.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 6th inst., at No. 11, Harcourt Street, Dublin, at 3 o'clock.

The President, Mr. Charles Evans, in the chair. The other members of the Council present were the Vice-President, Mr. Wells and Messrs. Beggs, Baxter, Stewart, Robinson, McCormack, Gibson, Shaw, Rankin, Doran, Professor Tichborne, Grindley, Dr. Burnes, McNeight, Merrin, Simpson, Hayes, Johnston, Montgomery, Hodgson, Lyons and Boyd.

Before the minutes were signed,

Mr. Shaw complained that they did not notice a protest which he had made at the last meeting against the passing of a resolution in reference to the form of certificate to be adopted for chemists and druggists.

The President pointed out that according to the bye-law on the subject only the transactions of each meeting, and not the opinions or protests of individual members could be recorded.

Resignation of the President.

The Vice-President having taken the chair,

The Registrar, Mr. Ferrall, read the following letter from Mr. Charles Evans:—

"49, Dawson Street, Dublin, April 24th, 1891.

"To the Council of the Pharmaceutical Society of Ireland.

"Gentlemen,—In fulfilment of my expressed intention at last Council meeting I resign my position as your President, and would take this opportunity of thanking you for the honour conferred on me, and for your continued kindness and support during my term of office, which will always remain an eventful period in my life. With every good wish for the prosperity of the Society,

"I remain,
"Yours faithfully and obliged,
"CHARLES EVANS."

The Vice-President said there would be no use in asking Mr. Evans to reconsider his decision, because he only accepted office at the last election because he was unwilling to embarrass the Council by resigning in the middle of the work in which they were then engaged. That work was now pretty well done and therefore they could only accept Mr. Evans' resignation.

The resignation was accepted accordingly.

Election of Mr. Hayes as President.

The Vice-President: Our next duty is to elect a successor in the chair to Mr. Evans. Has any one anybody to propose?

Professor Tichborne said they all regretted having to elect a new President, but they had passed over their hard work and he believed the Society was now going to run along very smoothly and, as it were, with oiled wheels. They had now only to elect a good man in Mr. Evans's place; and he begged to propose a gentleman who, he believed, would be the right man in the right place, Mr. William Hayes. Mr. Hayes had been fairly in accord with both sides in the recent transactions. He had very friendly relations with the chemists and druggists, and the members of the Pharmaceutical Society had also great confidence in him. He was one of the original members of the Society, and had had thorough knowledge of its work from the commencement.

Mr. Grindley: I have great pleasure in seconding the motion. I think we could not have a better man.

The Vice-President said that before putting the motion he desired to support it. They would have a thoroughly good President in Mr. Hayes. He had given them a great deal of assistance during the last couple of years, and he was now willing to devote his time to the performance of the duties of the office of President, and therefore it was their duty to confer upon him the honour of placing him in the chair.

Mr. Robinson said he was sure he spoke the sentiments of a great many members of the Council when he said they would have gladly elected Mr. Wells to the office of President as the only honour they could bestow on him in order to show their appreciation of his efforts for the Society. The members had marked his conduct whilst he had been in the vice-chair with the greatest satisfaction.

Professor Tichborne: It is only just to the Vice-President to say that we all have that view. The reason we do not propose him is that he refused to accept the position.

The Vice-President: I thank Mr. Robinson for his kind words. Certainly a great many asked me to take the chair, it being usual in other societies for whoever is Vice-President to do so under similar circumstances; but I felt that I could not give time sufficient to do the work in a faithful manner. Mr. Hayes himself was one of those who asked me. I am sure no one will understand me as implying that the Society would rather have me in the presidential chair than Mr. Hayes. I have now to declare Mr. Hayes duly elected President of the Society until the annual meeting in October next.

Mr. Hayes then took the chair as President and said that office had been entirely unsought by him. He had been disinclined to accept it for many reasons, not the least of which was that he felt unfit for the office [cries of "no"] as compared with those who had preceded him, more especially their late President. He felt that coming after Mr. Evans he occupied a position which it would be very difficult for him to fill. However, for the short period that he would be able to occupy the post it would give him the greatest pleasure to discharge the duties to the best of his ability and to forward the interests of the Society in every possible way. It was his intention and would be his endeavour to act with equal justice towards the two branches of the Society, although he should have a difficult task coming after Mr. Evans, whose control of temper and untiring kindness to all were so remarkable. His first duty now was to ask them to pass a vote of thanks to their late President. The amount of work that that gentleman got through during the last eighteen months between parliamentary matters and the work that succeeded the passing of the Amendment Act had been much greater than perhaps any member present could form any idea of; and he had done it in such a way as to deserve the thanks not only of the Council but of the Society at large. If they only knew the trouble that he had undergone, the difficulties that he had overcome, and the amount of self-sacrifice that he had exhibited in discharging the duties of his office they would understand how well deserving he was of the vote of thanks that they were now invited to pass. Considerate to everyone, he had shown himself to be not only in every way a perfect gentleman, but a man above most men.

Dr. Burnes said if it was necessary to second the motion he would be very pleased to do so.

Mr. Boyd: On behalf of the druggists I beg to say that we always experienced the greatest courtesy from Mr. Evans. We are thoroughly pleased and satisfied with his rulings, and we cordially join in the vote of thanks that has been proposed and seconded.

The motion having been carried unanimously,

Mr. Evans said he could not find words to express his thanks for their kind vote, and also for the kind terms in which his efforts had been spoken of.

A letter was received from Dr. Falkner, one of the examiners, asking leave to take pupils for the medical examinations. He would undertake not to teach any young men who were reading for the Pharmaceutical Society's examinations.

On the motion of Professor Tichborne, seconded by Mr. Baxter, the matter was referred to the School Committee.

A letter was received from J. McClelland, asking that an apprentice who was not quite sixteen years of age should be admitted to the Preliminary examination.

The President: We have but one answer to give to that, namely, that it cannot be done.

The Registrar submitted a copy of evidence relating to an application made by Mr. Sweeny to be registered as a druggist who had been in business prior to 1875.

On the motion of Dr. Burnes it was ordered that Mr. Sweeny should not be registered until he had passed the prescribed examination.

A letter was received from the Honorary Secretaries of the Society of Chemical Industry, inviting the co-operation of the Pharmaceutical Society in connection with the annual meeting to be held in Dublin on the 7th, 8th and 9th of July next. The letter, which was addressed to the President, asked him to allow his name to be added to the Reception Committee.

Mr. Boyd said he was one of the Honorary Secretaries of the Society in question, which was the largest chemical society in the world. It had nearly three thousand members, and the most distinguished chemists had occupied its presidential chair.

Mr. Hodgson said he did not see any objection to the President of the Pharmaceutical Society taking the position that he was invited to accept on the Reception Committee mentioned; but he failed to see what the Pharmaceutical Society had to do with chemical industries.

Dr. Burnes thought that the President of the Society should take an interest in everything that was calculated to develop the education of the country. He thought they might even subscribe £10 towards the reception of the Society in question.

Donations were received from the Smithsonian Institution of copies of their report for 1888 and their report relating to the U.S. National Museum for the same year.

On the motion of Dr. Burnes, seconded by Mr. McCormack, thanks were voted to the donors.

A draft of regulations for the druggists' examination was referred to the School Committee.

Mr. Boyd and Mr. Robinson were appointed visitors for the druggists' examination, to be held in Dublin in June, and Mr. Montgomery and Mr. Gibson were appointed visitors to the druggists' examination, to be held at the same time in Belfast.

Mr. Charles Evans moved that notices be sent to the Inspectors of Weights and Measures throughout Ireland informing them that, according to section 15 of the Pharmacy Amendment Act, 1890, chemists or druggists who have been selling poisons prior to August, 1890, cannot be prosecuted on account of not being registered, provided they fulfil the requirements of the Poisons Act, until after January 1, 1892.

The Vice-President seconded the motion, which was agreed to.

The Vice-President moved that the School Committee be instructed to draw up regulations for an examination for assistants to pharmaceutical chemists under clause 19 of the Pharmacy Amendment Act, 890, and to submit a report of same to the meeting of he Council to be held in June. There was a want of qualified assistants, which it would take a good many ears to supply, and a great many pharmaceutical hemists were anxious to have an examination of the kind which he proposed established. It should be a good searching examination in practical dispensing and pharmacy generally. It would merely entitle hose who should pass it to be assistants, and would not give them the privilege of opening or managing shops. At present a good deal was being said on this subject in the English journals, which were agitating for an extension of the Preliminary examination of the English Society, and there was some talk of having only one examination for assistants and pharmaceutical Preliminary candidates.

Mr. Gibson: Have you any authority to charge fees for such an examination as you propose?

The Vice-President: We have power to do everything necessary for the carrying out of what the Act authorizes.

Mr. Beggs seconded the motion, which was unanimously agreed to.

Mr. S. P. Boyd, M.A., moved a resolution declaring that the proposed druggists' certificate, printed on paper, was unworthy of the Society, and that there should be substituted for it a certificate on parchment bearing the name of the Society, and designed so as not to be likely to be confounded with the certificate of a pharmaceutical chemist. He submitted that this subject should be dealt with by the Council without heat and in a conciliatory manner. There was a great deal of dissatisfaction amongst druggists in reference to the certificate which was proposed to be given to them, and which was approved of at the last Council meeting at a time when very few members were present. He considered that it was discreditable to the Society. It was clumsily drawn up, was printed on paper, and it did not bear the name of the Pharmaceutical Society on any part of it except under the Registrar's name. There was some ground for making as much distinction as possible between the druggist's certificate and that of the pharmaceutical chemist; and he would be the last to suggest that any certificate should be given to the former which could be mistaken for that of the latter. But he thought it quite possible that a certificate could be devised for the druggists which would be at once satisfactory to them, creditable to the Society, and not likely to be mistaken for that of the higher grade. No doubt the present form of certificate had been approved of by the Privy Council; but that would not be an insuperable difficulty in the way of a better one if there was a disposition on the part of gentlemen to meet the wishes of the druggists. He had learned from the Registrar that the cost of printing the certificates on parchment would be about £7, whilst the price of the paper ones was but 30*s.* for 500 copies. It seemed to him that where an important body like the druggists, who were contributing an enormous sum to that Council, had a desire for a better form of certificate, it was not an unreasonable thing on their part to ask that they should be given something that they could hang up in their shops and not be ashamed of. He was quite prepared to leave the drawing up of a certificate to a committee.

Mr. Gibson in seconding the motion said the present form of certificate was paltry and unbecoming the Society.

Dr. Burnes said the certificate formerly granted to pharmaceutical chemists was on paper, and it was just about as poverty-stricken a looking article as the form of certificate now objected to.

Mr. Beggs: Mine was similar to Dr. Burnes's, and I was getting my place newly done up, and being rather ashamed of it I took it down.

Mr. Baxter supported the motion.

The Vice-President said he thought the objections made to this form of certificate rather imaginary. The pharmaceutical chemist's certificate which he got was on no better paper, and he had had it hanging up for the last thirteen years. The cost of the document did not enter into the consideration of the Committee at all. The one thing that did very largely enter into their consideration was the evidence they had before them that chemists and druggists in the country were to a large extent dispensing prescriptions at the present moment.

Mr. Boyd: Oh, very few.

The Vice-President: Allow me. I say that what I state is a fact. If anybody doubts it those who have been examining the certificates can satisfy him. We have had certificates from medical men certifying that "So and so is fully competent to carry on the business of a chemist and druggist, as he has been preparing my prescriptions for years." Therefore it was necessary that the certificate to be given should not be one calculated to mislead. If it were headed "Pharmaceutical Society of Ireland" the public would be simply blinded. The Minor certificate of England had not the signatures of either the President or the Registrar of the English Society or the Society's seal and yet the holder of it could dispense prescriptions.

Mr. Rankin said they had nothing to do with what chemists and druggists might be doing throughout the country. He thought the certificate in question should bear the name of the Society at the top. The matter ought to have been left undecided until the representatives of the chemists and druggists had seats on the Council.

Mr. McNeight said the druggists throughout the country had a very low opinion of this certificate.

Mr. Gibson said that people in Belfast were not law breakers, but the spirit in which this matter had been met tempted them to break the law. He and the other northern members had come there prepared loyally to support everything that was for their own welfare and for that of the pharmaceutical chemists in the country.

Mr. Charles Evans said he thought the placing of the words "Pharmaceutical Society" at the head of the certificate would be misleading.

Mr. Boyd withdrew his motion, and

Dr. Burnes moved that the question of the certificates be referred to a committee.

Mr. McNeight seconded the motion.

The President: We ought to try and meet one another's views if possible. If the certificate be not pleasing to some gentlemen, and if no matter of principle be involved, we ought to make a concession on the subject. It would certainly be an expense to get 500 new certificates printed, but for the sake of our all working together that would be a small matter.

Mr. Robinson moved in amendment that the form of the present druggists' certificate be adhered to, but that it be printed on parchment.

Mr. Doran seconded the amendment, which was put and carried by 14 votes to 7.

A member said that if a proper certificate were not given to the druggists they would get up one for themselves and it would be a decent one.

Mr. Boyd: I dissociate myself entirely from any movement of that sort.

The President: It is very painful to hear that those who should support the law are endeavouring to break it.

Reports were read from the Examiners at the Pharmaceutical, Preliminary, and Licence examinations, and also from the Examiners at the druggists' examinations held in Dublin and Belfast. It appeared that there were twenty-three candidates at the Preliminary examination, of whom fourteen passed; six at the Licence examination, of whom four passed; twenty-five candidates at the druggists' examination in Dublin; and twenty-five at the druggists' examination in Belfast.

Letters from Messrs. P. J. Lyons and J. S. Gibson on the subject of the examinations were referred to the School Committee.

A draft of a letter intended to be sent to the Privy Council in reference to Dr. Duffey's report was submitted by the School Committee.

The Vice-President said that copies of the *Pharmaceutical Journal* of the 4th and 11th April ought to be sent along with the letter in order to show the Privy Council what was the opinion in England as regarded the standard to be aimed at for the Preliminary examination. The draft was approved of.

The following were accepted for registration as chemists and druggists who had been in business prior to 1875:—Messrs. John Breen, Danescastle, Wexford; Michael Bowden, Urlingford, Co. Kilkenny; Kate Chapman, Aughnacloy, Co. Tyrone; Mary Anne Crampton, Barrisokave, Co. Tipperary; John J. Eccles, Keady, Co. Armagh; Patrick Gribben, Magherafelt, Co. Derry; Thomas Hamilton, Raphal, Co. Donegal; William Hanna, Bangor, Co. Down; Richard Kain, Shrule, Co. Mayo; Alexander T. Kerr, Mountmelleck, Queen's Co.; James Mahony, Templemore, Co. Tipperary; Richard C. Marshall, Dungannon; James M. Moore, Lurgan; John S. Moore, Dunginan, Co. Derry; T. Erskine Moore, Letterkenny, Co. Donegal; Andrew M. Bean, Gilford, Co. Down; T. L. O'Callaghan, Killnean, Co. Westmeath; John O'Laughlin, Dublin; Anne Williams, Maryborough; John Riordan, senr., Glin, Co. Limerick; T. Saul, Rathdrum, Co. Wicklow; James Selkirk, Cork, and John Sweeny, Aughrua, Co. Galway.

Some other business having been disposed of the Council adjourned.

Proceedings of Societies in London.

THE INSTITUTE OF CHEMISTRY.

FIRST SESSIONAL MEETING.

The Institute of Chemistry, in pursuance of a plan foreshadowed in the retiring President's address at the last annual meeting, held a conference on Tuesday and Wednesday last, which was the first of a series designed to allow the discussion of all matters of interest to the profession as a whole.

Agreeably with this intention a paper was read on Tuesday, May 12, at 2 p.m., by Dr. Odling, F.R.S., entitled "On the Relations of the Chemical Society to Professional Chemistry," before a somewhat scanty audience, the President, Professor W. A. Tilden, F.R.S., being in the chair. Opening with a reference to the evident dissatisfaction of a certain section of the Fellows of the Chemical Society with the conduct of its affairs, and particularly with the method of nomination and election of candidates for the fellowship at present in use, Dr. Odling pointed out that the form of nomination was recommendatory, and that except at certain periods of turbulence the election of candidates thus recommended was almost certain. It had been alleged that this system caused the admission of unqualified persons, whose presence was objectionable on the grounds that it was derogatory to the Society and inimical to the best interests of chemical science. The latter allegation he regarded as unworthy of serious refutation. It carried the stamp of its insincerity on its face, and while never urged by those chemists most entitled to respect, might well serve as a banner for a belligerent contingent. With regard to the former there was a more substantial basis, but in order to appreciate it properly must be previously divested of sham. When St. Paul was at Ephesus he aroused enmity among the silversmiths of the place, who gathered together complaining that his teaching was dangerous to the cult of the goddess *Diana*, and added as a rider that it was also detrimental to their craft by which they made great gain.

For the evil that admittedly existed various remedies had been proposed. Their practicability was best judged by consideration of the present method by which the Society was governed and its interests conserved. On looking back, as had recently been done at the Jubilee of the Chemical Society, to its early years and tracing its development to the present day, one was struck by the continuity of existence and policy that had characterized its Council. The fresh blood introduced year by year into the Council was mall in amount and unlikely to cause any radical change in its views or actions. What was theoretically a free election became practically a system of co-optation, and in consequence the Council as a body was remarkably unanimous. He would also draw attention to the preponderance of young men upon the Council, contrasting vividly with the condition of hings attaining in the governing bodies of other Societies, and forming a guarantee that its collective attitude would not be unduly conservative.

This being the constitution of the Council, what were its works? In his opinion they had the justificaion of success; not only were the routine affairs of he Society well managed, but when occasion arose, as at the recent Jubilee, the Council proved equal to upholding its well won reputation.

Turning to that part of his discourse bearing on the Institute he was addressing, Dr. Odling said that t was important to ascertain the attitude that the Council of the Chemical Society, which he had endeavoured to show might be taken as representing the views of the majority of private fellows, held towards professional chemists (using that term to indicate those practising as consulting and analytical chemists) both individually and corporately.

Individually a thoroughly friendly attitude existed, because a large proportion of those whom he might call professorial chemists were directly interested in professional chemistry. He did not believe in the distinction that had been drawn between the fees received from students and those paid in return for analytical work; few would be so foolish as to boast that their fingers were unsullied, or but rarely sullied with the latter. As a matter of fact, some of the most distinguished professorial chemists had practised at one period of their career as professional chemists, and in view of these and other well-known facts he would not subscribe to the fallacy that clients' fees were soul-destroying while students' fees were noted for their elevating effect upon the moral character.

Again the Chemical Society and its Council in their corporate capacity were not antagonistic to the interests of professional chemists, but he would point out that if they were the Institute could only bring about an alteration by persuading the Council by bringing before them arguments of weight.

With regard to the alleged introduction of unsuitable men into the Chemical Society he would ask what harm it effected even if admitted to take place. Bid t keep out men of eminence, interfere with the comfort of the meetings, prevent the contribution of good papers, militate against the proper use of the Library or prove detrimental to the production of the Journal? All these questions must be answered in the negative. Under these circumstances the free admission of candidates, even if *dilettanti*, provided they were otherwise unobjectionable, must commend itself to all. The financial position of the Chemical Society added a powerful argument in favour of this course. An inspection of the last balance sheet would show that the expenditure of the Society last year exceeded its income by some £300, which deficit would only be made good by drawing on the reserve fund. This unsound situation was due to the exclusion of inoffensive candidates by reckless blackballing. It was ridiculous to ask the Chemical Society to limit the increase of its members when by so doing it thus curtailed its sphere of activity and usefulness.

The real evil, and the one which all were agreed to combat, was the obtainment by persons possessed of unworthy motives of the letters F.C.S. as a sort of qualification on which they might trade. Of the remedies that had been suggested he would mention a few.

A proposal has been made that the Chemical Society should advertise the fact that fellowship in it implied no qualification whatever. This he characterized as preposterous and utterly impracticable; the Chemical Society could not be expected to gratify the Institute of Chemistry by such self-abnegation. Secondly, it had been suggested that the Council should take a greater part of the responsibility of recommending a candidate. This he considered to be altogether on the wrong lines. The qualification that would then be conferred would lead to rivalry between the Chemical Society and the Institute of Chemistry as diploma-conferring bodies, which would be entirely evil.

The third remedy had been put forward by the late President of the Chemical Society (Dr. Russell) and consisted essentially in augmenting the sense of responsibility of both candidates and their nominators, in the hope that such a course would cause both to hesitate before committing themselves to a dishonourable line of action. This method commended itself most to the reader of the paper, who contained by saying that the drastic employment of blackballing was in every way to be deprecated, being the illegitimate use of a power that should be normally dormant and held in reserve as a final weapon.

A proposition had been made that the Council should take upon itself the scrutiny of nomination forms, and should supplement the information they contained either by application to the nominators or by utilizing other sources of information concerning the qualifications of the candidate, but this he thought out of the question. In conclusion, he was of opinion that the only legitimate method of obtaining reform was by the issue of a circular to the Fellows of the Chemical Society stating the pros and cons, calling a special meeting to consider them, and passing such resolutions as might seem fit, the minority acquiescing in the decision, however it might eventuate.

On the conclusion of Dr. Odling's paper, Mr. Grant Hooper rose and began to advance a suggestion concerning the conduct of the discussion that was to follow, when the President, Dr. Tilden, interposed and intimated that he, as Chairman of the meeting, had the prerogative of addressing it. He then invited Dr. Russell to give his views on the matter in hand.

Dr. Russell in response to this invitation said that his views had been given so recently that repetition was needless.

Mr. Cassal said that Dr. Odling appeared to have had some difficulty in obtaining proper subject for discussion, when he had found it necessary to go so far afield as Ephesus and to so venerable a personage as Diana. He was of opinion that the foundation of an ideal Chemical Society with several branches would have made the formation of the Institute of Chemistry superfluous. The qualification bogus as it was conferred by the Chemical Society was sufficiently recognized in certain quarters to cause Sir Lyon Playfair, when questioning witnesses before the Committee of the House of Commons recently appointed to inquire into the subject of spirits, to ask, "Are you a Fellow of the Chemical Society?" and on the reply being given in the affirmative to proceed to ascertain the witness's opinion on the best method for determining fusel oil in whiskey. Such procedure showed that the title F.C.S. was regarded as a diploma. In the event of the Chemical Society continuing its present course it would be engaged in breaking down the structure difficultly reared by the Institute of Chemistry.

Mr. Allen remarked, that had anyone less eminent than Dr. Odling ventured to read a paper of the character of that to which the meeting had listened, he would have been ruled out of order. He believed that the most essential means of qualification for the position of a barrister consisted in the consumption of a certain number of dinners. Much the same process appeared to be necessary to attain prominence in the Chemical Society.

Mr. Hehner said that the abolition of the use of the letters F.C.S. would do no good; the full title "Fellow of the Chemical Society" would be used as heretofore by all kinds of quacks.

Mr. Bertram Blount said that as the joint author of the suggestion that the Chemical Society should remove the stigma cast upon it, viz., that it conferred a bogus qualification, by advertising the fact that F.C.S. meant nothing—a course which Dr. Odling had characterized as preposterous—he ventured to suggest that, should the Chemical Society unwisely persist in a course of action detrimental to the members of the Institute of Chemistry, it would be open to that body to itself make known the worthlessness of these three letters, a proceeding which would be found damaging enough.

Mr. Grant Hooper suggested that an intermediate course might be adopted, and associateship or its equivalent conferred on *dilettanti* who sought membership in the Chemical Society.

Mr. Kith combated the idea that fellowship in the Chemical Society was esteemed highly by the public, his personal experience pointing the other way.

Mr. Lloyd contended that as it had been shown that an unofficial committee was quite competent to weed out undesirable candidates, therefore, *a fortiori* the Council of the Chemical Society could do so.

Mr. Carteighe deprecated the assumption of an aggressive attitude which some members had thought proper to take. He recommended more diplomatic measures, and argued that the *suaviter in modo* was at least as effective as the *fortiter in re*.

The Chairman, Dr. Tilden, before calling on Dr. Odling to reply, pointed out that a great and eminently successful association, the Chemical Society of Berlin to wit, granted membership freely to all serious applicants without attempting to scrutinize their professional qualifications, and with excellent results.

Dr. Odling, in reply, endorsed Mr. Carteighe's views, and thought Mr. Allen's contention irrelevant. He had failed to catch Mr. Hehner's remarks, and therefore did not feel competent to deal with them at length. The committee Mr. Lloyd had mentioned were successful because irresponsible. In conclusion, he would say that all those present had common interests to maintain, that they must at all hazards exclude persons who desired the title F.C.S. merely in order to trade upon it, and that though self-abnegation by the Chemical Society was not to be thought of, yet that a little more self-assertion on the part of the Institute of Chemistry would do no harm.

At 11 a.m. on Wednesday, May 13, in the presence of a very small audience, the absentees including the Secretary, Mr. E. C. Groves, and all the Vice-Presidents, Mr. Hehner read a paper on "The Analytical Chemist in relation to the Public, the Profession and the Institute."

The author began by dividing those who made a livelihood from the practice of chemistry in one form or another into three classes, manufacturing, analytical and scholastic chemists. Of these the first was the largest and the second that with which alone the Institute of Chemistry was directly concerned. The profession of analytical and consulting chemistry was a young one, only eleven names appearing in the London Directory for 1854, twenty in 1855 and ninety-eight in 1891. The chief period of increase was between 1875 and 1881, and was attributed to the effect of the Food and Drugs Act. Incompetent men then seized the opportunity to practice as analysts, but these had since been crowded out. The chief advances in analysis as far as it concerned industrial products, had been made by professional chemists as distinct from professorial chemists, and the author contended the skill and accuracy necessary for the success of a professional chemist were at least as great as those required in so-called scientific chemistry. That their professorial friends were afflicted with incompetent members even as they was shown by the facts that one more or less distinguished member of the teaching fraternity had warned a pupil against the probable presence of lead in a filtrate which had passed through a paper on which was a pencil mark, and another had expressed his wonder when looking at the dissolution of iron in an acid that so small a quantity of metal should contain so much hydrogen. The preponderance of professorial chemists on the Council of the Institute was altogether anomalous, and the forced collegiate training which was the keynote of the charter, prevented that free acceptance of all who could produce evidence of adequate knowledge which should be their ideal. The suggestion that had been made that the Institute should seek compulsory powers appeared to him not wholly wise, while the dumb discontent of members outside the Council should be considered by that body lest drastic measures should become unavoidable.

The President said that no distinction was practicable between professorial and professional chemists as many of the former practised as the latter. The prosecution of technical chemistry was not neglected at colleges if the body whose chair he held (Mason's College) could be taken as a type.

Mr. Lloyd commented on the vicious system of touting and underselling practised by some analysts and on the deplorable contradictions uttered by expert witnesses.

Mr. Bertram Blount, referring to the remarks of the last speaker, said that officers called censors existed, and should endeavour to suppress malpractices of the kind that had just been mentioned.

Mr. Allen, after alluding to the fact that Dr. Tilden was unsupported by the Vice-Presidents and Secretary, whose duty it was to be there, complained that most pecuniary damage to the profession was done by pharmaceutical chemists practising as analysts, and charging fees altogether inadequate. In his personal experience he had known of a case where 7s. 6d. had been charged for the analysis of two samples of olive oil, which it was alleged "had been examined by all known methods."

After the disposal of an accusation made by Mr. Allen against Dr. Bell, in connection with the analysis of water being undertaken by the latter contrary to the ruling of the Food and Drugs Act, Mr. Cassal said that in the event of compulsory powers being obtained the admission of those practising at the time was not necessary, as they could simply be registered, as was done under the Pharmacy Act.

In the afternoon of the same day at 2 o'clock, Dr. Alder Wright and Mr. Lloyd discoursed on the training proper for analytical chemists. Though differing on many points they agreed that the present curriculum laid down by the Institute was urgently in need of revision, a view which was also taken by most of the speakers in the subsequent discussion.

Mr. Allen endeavoured to move a resolution condemning the existing scheme, but was ruled out of order by Dr. Bell, who was then Chairman. In deference to the evident feeling of the meeting, Dr. Bell, however, consented to convey their views to the Council with the view of some alteration being made.

Though the attendance was small throughout the conference, the interest of those present was great, and the next should be an emphatic success.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting held on Thursday, April 2, Mr. A. Campbell Stark, President, in the chair, a paper was read on—

THE TEETH IN RELATION TO HEALTH.

BY W. RUSHTON, L.D.S.

Having been asked by your courteous Secretary to read you a paper upon the teeth, I came to the conclusion that a paper dwelling upon the importance of the teeth in regard to the functions they have to perform in the human economy, and upon the mpairment of health, consequent upon their neglect, would perhaps be both interesting and instructive. I therefore chose for the title of my subject "The Teeth in Relation to Health."

First of all, let us inquire what the teeth are. They consist in the human adult of thirty-two masses of vory-like substance, differing in size and shape, and inserted in the bone of the upper and lower aws (sixteen teeth in each jaw) in the form of lliptical arches. The upper arch is normally larger han the lower, the latter being inside the former when the mouth is closed, especially the incisors. The lower grinding teeth do not close against the corresponding teeth in the upper jaw, tooth for tooth, but a lower tooth fits in between the depressions between two upper teeth, and an upper tooth fits in between the cusps of the two lower teeth, so that when the teeth are closed the cusps are interlocked, and every tooth antagonizes more or less two teeth of the opposite jaw. The importance of bearing this fact in view will be seen later on. The bulk of the individual tooth is composed of a dense ivory-like substance called dentine, which is covered on the root of the tooth by a substance almost identical with hard bone called cementum and covered on the crown by a coating of enamel. Enamel is the hardest tissue in the body, only containing from 3 to 1 per cent. of animal matter, being chiefly composed of carbonate and phosphate of calcium and magnesium, and fluoride of calcium. It is hard enough to strike a spark from steel like a flint.

It would take too long to describe the formation of the teeth, but it may interest you to know that the enamel is derived in the first place from the epithelium or scarf-skin, and is, in fact, modified skin, while the dentine, of which the bulk of the tooth is composed, is derived from the mucous layer below the epithelium. Lime salts are slowly deposited, and the tooth pulp, or "nerve," is the last remains of what was once a pulpy mass of the shape of the future tooth, and even the tooth pulp in old people sometimes gets quite obliterated by calcareous deposits. Of course, as you all know, the thirty-two permanent teeth are preceded by twenty temporary, deciduous, or milk teeth. These are all fully erupted at about two to two and a half years old, and at about six years of age a wonderful process of absorption sets in by which the roots of the temporary teeth are removed to make room for the advancing permanent ones. The crowns of the former having no support become loose and fall away. One would naturally suppose that the advancing permanent tooth was a powerful factor in the absorption of its temporary predecessor, but we have many facts to prove it has no influence whatever; indeed the interesting phenomena of the eruption and succession of teeth are very little understood. I may remark in passing that a child of six who has not yet lost any temporary teeth, has in its jaws, either erupted or non-erupted, no less that fifty-two teeth more or less formed, and the compact and convenient way in which they remain in the jaw ready to come down and take their place in their turn, is very beautiful.

The two great uses of teeth are briefly mastication and articulation. For the former, the grinding back teeth (molars and bicuspids) are used, for the latter, the incisive teeth (incisors and canines) are called into requisition; and these of course are also used for biting or tearing food. In carnivorous animals all the teeth are of an incisive or cutting form, while those of herbivorous or gramnivorous animals are broad and flat; in carnivora the lower teeth close inside the upper ones, and so divide the flesh on which the animal feeds like a pair of scissors. In herbivora, on the other hand, the teeth all the way round close on those of the opposite jaw like one millstone on another, and so give a good grinding surface, cutting teeth not being required. In man we have a combination of both kinds of teeth, which leads us to believe (whatever the vegetarians may say) that man is intended to be an omnivorous animal.

I need not tell you how fearfully prevalent decay of the teeth or dental caries is. I have no doubt most of you have experienced its unpleasant effects in some form or other, and the question naturally arises, "What is it?" We have seen what an extremely hard and seemingly indestructible substance enamel is, but at the present day there is no tissue of the body which so soon falls a prey to disease. Why is this? I will give you the answer in the words of the eminent dentist, Sir John Tomes. "Caries is an effect of external causes in which 'vital' forces play no part. That it is due to the solvent action of acids which have been generated by fermentation going on in the mouth, organisms having no small share in the matter; and when once the disintegrating process is established at some congenitally defective point, the accumulation of food and secretions in the cavity will intensify the mischief by furnishing fresh supplies of acid."

Acid, therefore, is the great enemy of the teeth, and when the enamel is dissolved away sufficiently, bacilli and micrococci, which are always present in the mouth, appear upon the scene, and feed upon the gelatinous matrix of the dentine. Meanwhile in the cavity so formed food is constantly collecting and remaining. You know better than I do the fermentative processes, first the alcoholic and then the acid, which take place in starchy and other food stuffs remaining at blood heat and under other favourable conditions. I daresay you could all give me the equations right off, but I think I have shown you pretty clearly how the mischief takes place. Besides, in many fevers the saliva instead of being alkaline becomes quite acid.

Now the next question that presents itself is, "How is it that dental caries is so prevalent?" In the crypt of Hythe Church there is an interesting collection of the skulls of our early forefathers, and on examining them, the dentist is struck by three peculiarities common to them all; namely (1) the almost total absence of caries; (2) the great wearing away of the teeth which has taken place; and (3) the largeness and firm development of the jaws. Bret Harte in one of his poems asks, "Is civilization a failure?" and I think we must admit that as regards teeth it is; the jaws now-a-days being smaller than those of our ancestors, and the teeth not worn away with use but by disease, and more or less overcrowded and irregular. The causes of this change for the worse are briefly as follows, viz.: The food we eat. Our food now-a-days, by the time it comes to table, is so well cooked that it is half eaten for us, and it is a well known law of nature that when any member is not required to exert itself, it dwindles in proportion to its inactivity; that is one reason why our jaws are smaller. Another reason is natural selection. In choosing our wives, most of us would I think prefer a lady of a refined cast of features rather than one who was heavy jawed and thus coarse looking; her peculiarities in this respect would be more or less transmitted to her offspring, and this again is no doubt another factor in producing smaller jaws. But the jaws being composed of softer tissue than that of the teeth which they contain, changes take place more quickly in them than in the teeth, therefore we have jaws getting smaller and teeth remaining more the same size, the consequence being overcrowding, which is a very active agent in producing caries. Add to these our artificial mode of life, improper food containing far too little bone and teeth-forming elements, excitement and worry of our modern life, and last, but not least, dyspepsia, and you have, I think, sufficient explanation of the cause of tooth deterioration.

The results of caries are, toothache in its many forms, whether from irritation of the dentine, irritation or inflammation of the tooth pulp and of the membrane surrounding the tooth in its socket (which if unchecked lead to abscess at the root of the tooth, with temporary or permanent disfigurement), neuralgia (often at parts of the face and head remote from the offending tooth), loss of teeth (either from decay or extraction), fetid breath, etc.

I think I am right in saying that two of the most common diseases of the present day are neuralgia and indigestion, and although specialists are inclined to think that every malady is closely connected with the disease of which they make a specialty, yet I think you will agree with me that a very large proportion of the two diseases named arise from tooth trouble. To put it roughly I might say, neuralgia when the teeth are in, indigestion when they are out. It is pointed out in a very interesting and able paper, by Dr. MacNaughton Jones, upon "Dental Reflexes," how neuralgia and lesions of the eye, ear and other parts of the head and face are directly attributable to carious teeth, and how in many cases relief and cure have followed extraction, though of course sometimes the mischief is too firmly rooted to be permanently dislodged.

There is far too much apathy shown by the British public about the loss of their teeth, in fact, about the care of their teeth altogether. We must not look upon a tooth as an isolated member, it must be looked upon as a part of a beautiful and symmetrical organization, from which one member cannot be taken without affecting the others, so that when we sit down and have a tooth out and pat ourselves on the back for being very plucky, not one out of a thousand reflects that in having that troublesome grinder out he has deprived himself also of the use of its antagonists, and very often as time goes on, the contiguous teeth to the one extracted tilt over, and instead of having a good grinding surface, we have a bad one or none at all, and again when a tooth has lost its antagonist, the tendency is for it slowly to elongate, loosen and come out. Then when the back teeth are lost, food is improperly masticated by nibbling it, like a rabbit, with the front teeth, which were never made to bear the strain, and which consequently are pushed outwards, or the food is bolted, and indigestion is the natural result. The sufferer often endeavours to cure the disease without remedying the cause, and, of course, fails. All the pepsin and bismuth in the world, will not make up the loss of masticating teeth.

The remedies for the state of things which I have briefly touched upon are, (1) strict personal attention to the teeth, night being the most important time, (2) conservative treatment of the teeth, that is to say, having them preserved by the process of stopping or filling, which consists in removing all the decayed portions of a tooth and filling the cavity so made with some suitable filling. This process of filling teeth is, when efficiently performed, the most successful operation in any branch of surgery, the disease being checked, the injured tissue being replaced, and the tooth made in every respect as useful as before it was attacked by disease. Of course the earlier the stage of decay, the more probable that this state of affairs will ensue; like other diseases it must be nipped in the bud if possible; (3) State control.

The loss of teeth among the children of the poorer classes and also among the men in the army, navy and civil service is very great.

When I was dental assistant at the Evelina Hospital for children in Southwark, I had a pretty thorough insight into the condition of the mouths of the children of the poor; that condition I can only describe as shocking. Their troubles of course commence with teething; their temporary teeth soon decay and are extracted, and the permanent ones very soon follow suit; no attention is paid to them by parents, and of course the teeth quickly take their revenge. For private individuals and institutions to cope with this sort of thing we should want dozens of dental charities where we at present have one. In London there are two purely dental hospitals, and each of the general hospitals and dispensaries have their dental departments, which are more or less complete, but they can do but a very small proportion of the stopping which is actually required; it would take too long, so the condition of things is, firstly, that the patients, as a rule, are those who visit the hospitals not being able to stand their toothache any longer, and have their teeth extracted, and secondly that teeth which could be saved with care, time and attention, are often sacrificed from sheer want of time on the part of the dentist to the institution, or on that of the patient. In the army and navy, again, and the post office, though the possession of sound teeth is one of the requirements for admission into these services, the State takes no pains to see that the youths who seek to enter upon these careers have had their teeth previously attended to, and consequently many otherwise likely lads are debarred. Again, after they have been admitted into these services there are no dentists attached to the services, and the doctors are otherwise engaged, or if their services are requisitioned it is but for the old purpose, extraction. I maintain that the State should provide highly trained dentists to look after the children of our board schools and also dentists attached to our naval and military forces. We admit that the soundness of the teeth is necessary for admission, and after spending large sums on our soldiers and sailors to make them good fighting machines we grudge them the attention to a disease which at the present day causes more direct and indirect suffering than any other in our country, and a man who cannot feed well cannot march well or fight well.

Gentlemen, I thank you for listening so attentively to a paper which owing to many circumstances is crude and somewhat disjointed, but I have briefly endeavoured to show you the relation between the individual and his teeth, how bad health and neglect produce bad teeth, and how bad teeth produce or aggravate bad health. I have also tried to point out the remedy, and trust you will do all in your power to educate and influence others in the care of these important organs which seem to be disappearing so rapidly.

The President said he was greatly obliged to Mr. Rushton for his interesting paper. He was sorry more was not said about tooth-powders and tooth-ache. Was there an infallible remedy for tooth-ache? The remarks on the successive alterations in the jaw of man were very interesting, he himself having seen skulls whose jaws closely resembled those of the anthropoid ape.

Mr. Cooper asked what Mr. Rushton would regard as an ideal tooth powder.

Mr. Rushton in reply said that many substances frequently used for the teeth were decidedly injurious, especially those containing acids. If these substances whitened the teeth it would be at the expense of their soundness. Fine powders were not of much use, something slightly alkaline and moderately rough was preferable. Precipitated chalk was the best basis, and there should be added one to two drachms of finely levigated pumice to the ounce, with a similar proportion of heavy magnesia, perfumed with otto. The best remedy for tooth-ache was to visit the dentist every three months. Tooth-ache arose from a variety of causes, such as irritation of the dentine, the pulp, or the socket, or from hypertrophy of the tooth root, and each of these required a different treatment. An application for the tooth-ache arising from an abscess at the root of the tooth was worse than useless. He would impress upon everyone that the preservation of the teeth was one of the means most conducive to the preservation of health.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first botanical excursion of the present season took place on Wednesday, 13th inst., when a company of twenty-seven assembled at the Royal Botanic Gardens at 6 a.m. About two hours were spent in the gardens, most of the time being occupied examining the large collection of plants in front of the Lecture Theatre. This collection, which was in process of arrangement last year, is now very complete, and offers great facilities for botanical students. The gardens generally have undergone very extensive changes since the last visit of the Association. The large beds of herbaceous plants, among the trees in the central portion of the gardens, have been entirely removed and the ground turfed over. The general opinion seemed to be that this was a doubtful improvement. The plants are now crowded together in one space where there is no shade and consequently many specimens are not so well grown as those to be found formerly in other situations, where the conditions of light and shade were more conducive to full development. The most striking feature of the gardens was the unusual lateness of the season. Deciduous trees were just beginning to open their leaves. Last year, at the corresponding date, *Podophyllum Emodi* was met with in fruit. This year the young shoots were just beginning to appear through the soil. Some fine specimens of *Rheum palmatum* and *Rheum palmatum var. Tanguticum* were met with, giving indication that in a week or two they will be in full bloom. Holly, wild cherry, apple, laburnum, and other trees showed promise of a great wealth of blossom. The birch and other *Amentaceæ* were in full bloom. *Daphne Mezereon*, which had flowered well, was beginning to fruit.

Parliamentary and Law Proceedings.

CHARGE OF USING METHYLATED SPIRIT IN MAKING FRIARS' BALSAM.

At the Shrewsbury Borough Court, on Thursday, May , before Geo. J. Holt (Mayor), E. Parry and W. Hall, Esq., Messrs. Ison and Sons, Limited, chemists and druggists, were summoned by Mr. George Jolliffe, Inland Revenue Supervisor for Shrewsbury District, with two offences against the Spirits Act, 1880, viz., selling on February 27 and March 17, "Friars' Balsam" to be used internally as medicine which contained methylated spirit instead of wine, the penalty for each offence being £100 or under.

Mr. Hughes, in opening, remarked that at the outset of the case he was faced with two difficulties. The one was that one of his principal witnesses was lying seriously ill at Pontesbury. He had, however, asked Mr. Graham, who represented the defendant to admit the facts which this witness would prove. The other difficulty was that on the previous day when making inquiries as to the registration of the company, it was discovered that Messrs. Ison and Sons, Limited, was simply started for the purpose of taking over the business at Wellington, and the prosecution found that the Shrewsbury business had nothing at all to do with the company. The alleged offences were committed in connection with the Shrewsbury business, which belonged to Harry John Ison, and unless their worships could see their way to amend the summonses, he would be compelled to ask for an adjournment.

After some discussion the bench decided that the summons should be amended, and that the name of Harry John Ison should be substituted for that of Ison and Sons, Limited.

Mr. Hughes said the Act of Parliament under which the defendant was charged stated that any person who sold methylated spirit or the derivatives thereof in any article capable of being used internally as a medicine was liable to a fine of £100 for each offence, and the spirit in connection with which the offence was committed would be forfeited. In the first place he wished to point out that there was some considerable duty on spirit of wine, while methylated spirit was free from duty. Spirit of wine played a very important part in the preparation of Friars' balsam, as it was not a tincture or compound containing a small quantity of spirit of wine, because no less than 80 per cent. should be composed of spirit of wine. He considered that the offences with which the defendant was charged was a very grave fraud on the Revenue, and it was also a gross fraud on the public and the defendant's fellow tradesmen. The methylated spirit could be bought for 2*s.* 3*d.* per gallon, while the wholesale price of spirit of wine was 23*s.* per gallon. The facts were that on the 27th of February a quantity of Friars' balsam was bought from the defendant's shop, and it was asked for and sold to be used internally for a cold. That was sent to Somerset House to be analysed, and as a result a further sample was taken on the 17th of March. The second sample was much larger than the first, as it consisted of four ounces. When the report came from the analyst at Somerset House, the supervisor (Mr. Jolliffe), as is usual in such cases, called upon the defendant, and, telling him that an offence had been committed, asked him if he had any explanation to make. Defendant at once said "Yes; methylated spirit was used by mistake. My assistant found the cask of methylated spirit to be leaking, and drew some off into the spirit of wine bottle, and not knowing he had done so I used it by mistake." He added that he had thrown the Friars' balsam away as soon as he discovered the mistake which he had made. It would be for their Worships to judge as to this theory, but he did not think the defendant could seriously ask them to believe it. When the defendant told Mr. Jolliffe about the cask of methylated spirit leaking he was not aware that any sample of Friars' balsam was obtained from his shop on any date except March 17, and he wished particularly to point out that February 27, which was when the first sample was taken, was before the date on which the defendant told Mr. Jolliffe the cask was found leaking, and the contents placed in the spirits of wine jar. He submitted that the offence with which the defendant was charged with was a very serious one, and called for a substantial penalty. He was not instructed to ask for a heavy penalty, but still he must ask for a substantial fine. The evidence of the absent witness, Joseph Lynch, would be to the effect that on February 27 he called at Mr. Ison's and bought some Friars' balsam for a cold. He was supplied with an ounce and paid fourpence for it. He was served by one of Mr. Ison's assistants. Lynch handed the Friars' balsam to Mr. Jolliffe, who forwarded it to Somerset House.

Mr. Thomas Hines, Inland Revenue Officer stationed at Shrewsbury was then called, and proved purchasing four ounces of Friars' balsam from the defendant's shop on the 17th of March, for which he paid fourpence an ounce. It was given him in a bottle, and he handed the bottle and its contents to Mr. Jolliffe almost immediately after he left the shop. He asked the assistant how he was to take the medicine, and he said 15 to 30 drops on a piece of sugar.

Mr. George Jolliffe then gave evidence bearing out Mr. Hughes's opening statement. He also stated that when he saw the defendant, after receiving the report from the analyst at Somerset House, defendant told him that the leakage in the methylated spirit jar was discovered by his assistant on the Thursday fortnight previous. Witness then said "I may as well tell you that there were two cases of purchase," and defendant then said "Well, it was about Thursday fortnight." Defendant then showed witness a jar which he said was supposed to contain spirit of wine, but it contained methylated spirit. He also asked witness if he thought if he approached the board and made them a substantial offer, whether they would allow the matter to be settled without going into court. Witness subsequently received a letter from the defendant, saying he could get affidavits from his assistants, who placed the methylated spirit in the spirit of wine jar. After the summonses were issued witness received a letter on the 25th of April, saying he had received two summonses, and asking witness if he thought if he was to make the Inland Revenue Authorities a substantial offer they would consent to keep the matter out of the court. Witness caused samples to be taken at all the chemists and druggists in the town.

Mr. G. N. Stoker, an analyst connected with the Inland Revenue, deposed to analysing the two samples of balsam sent by Mr. Jolliffe, and finding methylated spirit to be present in considerable quantities—certainly not less than 50 per cent. With regard to the statement made by Mr. Ison that he had made a mistake, witness thought it hardly possible for a chemist to use methylated spirit without knowing it.

Cross-examined: The medicinal quantity of the balsam depended entirely upon the drugs and not upon the methylated spirit, which consisted of about nine parts of rectified spirit and one of wood naphtha. The balsam, as sold by the defendant, would, therefore, only be nasty in taste.

For the defence, Mr. Graham called Thomas Hickinbotham, one of the defendant's apprentices, who distinctly swore that, finding a leakage in the methylated spirit barrel, he placed the contents in the rectified spirit jar, and intended to tell Mr. Ison of what he had done, but forgot to do so, the result being that Mr. Ison used methylated spirit for making Friars' balsam. However, as soon as Mr. Ison discovered the mistake he ordered the balsam to be thrown away. Ernest Gittins, another apprentice, gave similar evidence.

The Bench fined defendant £25, or three months' imprisonment, in each case.

POISONING BY MORPHINE LOZENGES.

On Wednesday Dr. Danford Thomas held an inquest at Islington Coroner's-court touching the death of Joshua Leonard Alderson, aged two years. Mr Alderson, the father, it appeared, suffered from a chest affection and a severe cough, for which he sought advice and treatment at the Royal Hospital for Diseases of the Chest, City Road. He was given a packet containing about eight dozen small lozenges, the only direction as to taking which was conveyed to him by the printed inscription on the outside of the packet, which said, "One to be gradually dissolved in the mouth when the cough is most troublesome." He was not told that the lozenges contained morphia. He placed the packet on one of the lower ledges of the kitchen dresser, and on Friday afternoon when he returned home he was informed by his son, aged five, that he had got at the lozenges when his mother had left the kitchen, and had given the deceased "some;" how many he could not say. The child before this was found to be very drowsy, and an hour and a half after the lozenges had been consumed Dr. Sandiland, a neighbouring practitioner, was called in, who found that deceased was suffering from a narcotic poison. Notwithstanding every effort made to arouse the child and counteract the effects of the poison he died at 3 the next morning. It was found that each lozenge contained $\frac{1}{36}$th of a grain of morphia, and assuming that the child had had only two, $\frac{1}{18}$th of a grain would be an excessive dose for an infant two years old. The jury, in returning a verdict of "Death from misadventure," recommended that when such lozenges were supplied in future "the instructions printed upon the packet should be of a more definite character, and that some caution should be given, seeing that the lozenges contained morphia."

Obituary.

Notice has been received of the death of the following:—

On the 2nd of May, Mr. William Knight, Chemist and Druggist, late of Chichester. Aged 26 years.

On the 4th of May, Mr. John Graham, Chemist and Druggist, Prebend Row, Darlington. Aged 71 years.

On the 6th of May, Mr. William Preston Carter, Chemist and Druggist, High Street, Horncastle. Aged 74 years.

On the 6th of May, Mr. George Muir, Chemist and Druggist, South Cumberland Street, Glasgow. Aged [illegible]

On the 8th of May, Mr. John Wylde, Chemist and Druggist, Chester Road, Macclesfield. Aged 71 years. Mr. Wylde was one of the earlier members of the Pharmaceutical Society, having joined it in 1844 and retired last year.

On the 9th of May, Mr. William Greaves Roper, Chemist and Druggist, Sheffield. Aged 68 years.

On the 10th of May, Mr. Hugh Lamont Cairncross, Chemist and Druggist, Princes Street, Edinburgh. Aged 50 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PRELIMINARY EXAMINATION.

Sir,—Mr. C. G. Wood has struck a true note in the discussion on the Preliminary examination; it is in no sense intended as a preparation for pharmacy proper, but is required as evidence that the mind of the future pharmacist has received such a preliminary training as shall enable him to do justice to the technical education which is to follow, to acquire a true grasp of principles, and such a breadth of mental view as shall embrace a subject in its entirety, and display its parts in due proportion.

In place of this the examiner too often meets with a parrot-like repetition of verbal formulæ, illustrated by two or three stock examples, and even in these the student has frequently failed to recognize for himself the common law, as becomes painfully clear after a few questions.

In short, in the place of real knowledge there is the evanescent result of "cram," a system adopted not so much through indolence and the disinclination to learn, as because the mind is deficient in the power of learning, through want of early education.

THOS. P. BLUNT.

Sir,—I have perused with great interest the letters on this subject that have appeared in the Journal, and fully agree with the opinion expressed by Mr. Saul, that the Preliminary examination should be brought "more into accord with the present conditions of middle-class education." Even thirty years ago, a lad of fourteen educated at an ordinary grammar school would possess an elementary knowledge of geography, arithmetic, Euclid, algebra, Latin and Greek, and, if his parents chose, a smattering at least of French and German also.

At the present time, owing to the introduction of science into schools, there is no difficulty in obtaining, before apprenticeship, an elementary knowledge of chemistry and botany. Of the value of arithmetic, algebra and Euclid to the student of chemistry and physics there can hardly be a question, whilst a knowledge of geography and Greek is essential to the student of materia medica and botany (the majority of scientific terms being derived from Greek), and any chemist or pharmacist who aspires to keep *au courant* with the progress of knowledge in his business can hardly do so unless he is able to read French and German.

Assuming that the apprentice devotes his attention to the acquirement of business habits, and a practical acquaintance with all the details of the art and business of pharmacy, he may have but little time for purely scientific study, and provision should therefore be made for his possessing an elementary knowledge of such branches of classical and scientific education as will serve as an introduction to a thorough course of study at a recognized school of pharmacy at the close of his apprenticeship. If this is not done by the Preliminary examination, two results follow. The first is that the student on commencing the course of pharmaceutical study finds it a much greater tax on his memory and understanding to follow the lectures than it would otherwise have been. The second is that it takes him much longer and frequently necessitates attending two courses of lectures instead of one. There results also great inconvenience to the lecturer, since much time has to be wasted on teaching of a most elementary nature, and his class is of necessity of a mixed character, there always being present a moiety who already possess the necessary elementary knowledge obtained either before apprenticeship or during that period, and there are therefore two classes of students who must of necessity be taught at the same time. The increase of knowledge, especially in chemistry and pharmacognosy, is at least double what it was forty years ago, and yet no more time is allowed for a course of lectures on these various subjects. In other words, the elementary and advanced stages of chemistry and botany, besides physics, practical chemistry, materia medica and pharmacy, have to be taught in one year and several of the subjects simultaneously. The natural sequence should be botany and chemistry the first year, materia medica and pharmacy the second. The only other way to meet the difficulty is to ensure that an elementary knowledge of the subjects treated during the course of study at a school of pharmacy be acquired previous to apprenticeship. It is true that this would diminish the number of those entering the door of pharmacy, but that it would lead to an increase of respect on the part of public for those who practice pharmacy is equally certain.

E. M. HOLMES.

Sir,—As a former junior teacher in the Society's School, and as one who has still many ties to pharmacy I should like to say a few words in support of science for the Preliminary examination, if you do not regard the discussion as now concluded.

Although it is true that the history of science affords abundant instances of excellent observers whose early education had been mainly confined to languages and numbers, separately or in combination, yet we must remember, as Professor Green has already pointed out, that, whatever may be true of the exceptionally able or of those whose home surroundings are calculated to encourage an intelligent interest in natural phenomena, there is a great deal of experience which goes to show that, in the case of the great majority of ordinary lads, a too exclusive devotion to the strictly scholastic training advocated by Mr. Ince not only leaves the faculty of observing more or less deadened, but even in some cases seems to render its exercise somewhat repulsive. Hence, if a revision of the Preliminary examination be undertaken, I would venture to strongly urge the importance of encouraging the introduction of science study into the preliminary education of students in pharmacy to the greatest possible extent that may be consistent with the existing condition of our schools.

But whilst I hold that a proper course of science work at school is, if possible, of greater importance to students of pharmacy than to most others, yet I am compelled to admit that probably a satisfactory school course of science work could not in all cases be secured at present, and that hence the immediate introduction of compulsory science into the Preliminary might do much real harm by encouraging mere cram work. Therefore, I would suggest the adoption of one of the following alternatives: viz., That science should now at least be introduced as a voluntary subject, which may be offered, and which will be allowed to count, if sufficiently good, as a set off to weak work, if not too weak, in one or two of the other subjects. Or, and as I think far better, that the subjects of examination should be divided into two groups; viz., a compulsory group, which would obviously include the elements of English, Latin and mathematics; and a second group which might consist of history, French, German, higher mathematics and science, from which two might be required to be offered. Such a scheme as this latter would, I think, be found to possess several solid advantages. And especially this, that by encouraging each school to teach, and each pupil to study, those subjects which might appear most likely to be intellectually profitable under the circumstances of each case, it would do much to discourage in your students mere "reading to pass," and to encourage that thoroughness of work which I am sure every pharmacist will desire to foster. Whilst at the same time, by helping to raise a demand of good science teaching in schools, it would tend to help on the present movement for the encouragement of better methods of elementary science teaching in such institutions.

Clifton. W. A. SHENSTONE.

Sir,—I have been interested in the general correspondence, and have read with much care your article on the Preliminary examination, and it once more proves the old adage, "As many minds, so many opinions."

Mr. Moss's letter—as was natural, for when he speaks it is usually as one having authority—attracted your attention, but from my own study of his letter I drew quite a different conclusion, so that I am constrained to send a line or two that may help the general discussion of the subject and elicit from him a fuller explanation of his views than even your own remarks will do.

Mr. Moss is evidently at one with all those who consider a more stringent Preliminary examination most desirable, and we may congratulate ourselves that the opinion expressed on this point seems unanimous.

His logic to me appears perfectly sound, and therefore his conclusions correct, viz., that if what the Pharmaceutical Society has done for chemistry, botany and materia medica be the cause of the small number of failures in those subjects such results would naturally follow were the same done for pharmacy and dispensing.

You dispute his premiss by asserting that the results of the examinations do not prove what the Society has done for honest study, but rather what cramming has done to thwart it. If such is the case, is it not time that there was some considerable alteration in the manner of conducting the examinations so that the real knowledge of the candidate could be more fully tested?

I am in full sympathy with the proposed curriculum, but it is not this that will produce good all-round business assistants, and it seems to me a matter of secondary importance whether it is made compulsory or not, provided the examinations are so perfect that practically none but those who have the necessary knowledge can pass. I should like to ask, has not the Society already done for pharmacy and dispensing what Mr. Moss suggests? If not, what is the meaning of the Laboratory and the instruction therein given under the able direction of Mr. Ince?

I do not know whether it is intentionally there, but I think I see in Mr. Moss's letter the thin end of a wedge—the home driving of which should be carefully guarded against. I mean his reference to the at present all too short term of three years' experience in a pharmacy or dispensary. Would he be willing to do away with this? It is quite easy to comprehend young men going through a course of study and series of lectures in all the subjects, and then passing the qualifying examination without ever standing behind a chemist's counter. In addition to the legal qualification there is something else needed to make an assistant of money value to the average chemist and druggist, and this experience can only be best obtained by the first few years of his career being spent in a pharmacy and his there becoming acquainted with the multifarious duties attached to it.

However desirable, at present it is I fear quite utopian to expect to make the passing of the Preliminary a *sine quâ non* before signing indentures, but I presume there would be little difficulty in the Council making a Bye-law that three full years should elapse between passing it and the qualifying examination. This induces me to ask one more question relevant to the subject, and one that I should like to see discussed, viz., what is the duty of the master towards his apprentice during his term of pupilship as regards his tuition? Should he at the end of his time be sufficiently advanced to go up for his examination? What are the best means of bringing about such a result? Perhaps this is where the system generally adopted is at fault, and which might be most easily improved without compulsion, if the matter were well discussed and useful hints thrown out.

Upper Tooting, S.W. JNO. INGHAM.

Sir,—The correspondence on the Preliminary examination provoked by the very able paper of Mr. Saul has no doubt interested most of your readers. I may say at once I agree with the advocates of a higher standard, and would endorse Mr. Giles' recommendation that our present examination be made more efficient as a preliminary step; if a change should be decided upon, then Mr. Green's advocacy for botany as a subject is well worthy of consideration. With Mr. Moss's views on the establishment of dispensing schools I cordially agree, and with all due deference to you, Mr. Editor, I put a very different construction on his letter than you seem to have done by your leader in last week's Journal. I take it that Mr. Moss practically says that the certificate now required from the Minor candidates stating that "he has been engaged in the translation and dispensing of prescriptions for three years" is so misleading as to be practically worthless in the majority of cases, therefore he would substitute for it an attendance at recognized schools for dispensing for a short period, and that certificates of such attendance should be granted and received in lieu of those at present required. There must be obstacles or you would not refer to them, but the failures being so great on this subject surely there should be no lack of students, even if the course were not made a compulsory one.

Lastly, may I ask through your columns, What are the difficulties about which we hear so much, *i.e.*, the compelling men to receive only those youths as apprentices who have passed their Preliminary examination? Surely our legislators who may not be willing to look at a "store clause," would recognize the reasonableness of a clause to this effect, for the want of it is injurious all round, but most of all to the unfortunate apprentice, who is so handicapped in his introductory start in our calling.

Leighton Road, N.W. GEO. F. BINDLOSS.

Sir,—It seems to me that in your leading article of May 2 you have curiously mistaken the spirit and meaning of Mr. Moss's letter or else I have. If there is one thing in that letter plainer than another, I think it is Mr. Moss's opinion that the three years' certificate is valueless as evidence of adequate technical training, and that on that account he makes the extremely practical and sound suggestion that it should be replaced by evidence of adequate technical training obtained in a technical school.

Again, I can find in the letter no ground for imputing to Mr. Moss a feeling adverse to a curriculum. On the contrary the care with which that gentleman repeats his correction that it is not "curriculum because it is curriculum, but the way it is employed that is at fault" (if I may paraphrase his words) rather seems in favour of it.

What he wants, I take it, is that he would like the power we have to be used in a more effective way, and afterwards go on for more powers if required. And I think he is right. His suggestion as to schools for practical dispensing seems to me one of the most important that has for a long time past been made to the pharmaceutical body. I am sure it is worth consideration and discussion.

5, *Pond Street, Hampstead.* JOHN BAILY.

Sir,—In the hope that the discussion on the Preliminary examination will continue until the Council are stirred to action in the matter, I would, with your kind permission, encroach upon your valuable space, to support the broadening of the examination, so ably advocated by Mr. Saul in his article in your issue of the 4th ult.

I am convinced that a not inconsiderable proportion of our real grievances as chemists arise primarily from a ridiculously narrow Preliminary, an examination which, except for the very elementary Latin, would be laughed at by any but the youngest pupils in a preparatory school for boys.

Parents seeing that so few subjects are included in our Preliminary as compared with that of other professions, decide that the dull son shall be a chemist.

No examination need be thought of until the essential Minor must be negotiated, and then the youth or man, who could not pass the higher standards in a board school, gets through our Preliminary, after cramming a little Latin, only to find the next examination an insuperable obstacle to his acquisition of a legitimate chemist's business. Nothing is then left for him but to open a drug store and do as much of the business as the law will allow, or more at his own risk, or to exist on a meagre salary as an unqualified assistant or manager, to the damage of the qualified man in either case.

If it were not for our far too narrow Preliminary we should not nowadays hear so much about the wrongs and rights of an army of unqualified assistants and managers, who, even if through no fault of their own, are the great obstacles to the obtaining of a *quid pro quo* by the qualified man.

I am entirely satisfied with the details of a widened Preliminary as given by Mr. Saul, but in order that a comprehensive Preliminary examination should benefit thoroughly the public, the chemist and the would-be chemist, the examination should not be allowed to remain in abeyance until the desirability of passing the Minor compels the assistant to pass the Preliminary, but it should be compulsory on the candidate for the Minor that he should have passed the Preliminary at least three years, and then with the aid of a curriculum a body of pharmacists will be produced who possessing the training of the continental pharmacist may not unreasonably hope for the State and public recognition awarded to him. R. F. A.

APOCODEINE.

Sir—The impressions formed by the remarks of Mr. Dott on apocodeine, published in the Journal of April 4, are very much modified by his subsequent letter of May 2. We, however, think it necessary to point out that he has produced no evidence to show that the apocodeine of Matthiessen and Burnside has "turned out to be something else or a mixture of things else," and further, that until this is done manufacturers are quite justified in supplying the Matthiessen and Burnside product as apocodeine.

Edinburgh. J. F. MACFARLAN AND CO.

NOTICES OF MEETINGS.

Midland Counties' Chemists' Association.—Thursday, May 21, at 8.30, in the Mason Science College, Birmingham—Annual General Meeting and Election of Council.

Edinburgh Chemists' Assistants and Apprentices' Association.—Thursday, May 21.—Botanical Excursion to Easter Duddingston Lodge. Company to meet at Waverley Station, at 12.30 p.m.

School of Pharmacy Students' Association.—Thursday, May 21.—Papers: "British Wild Flowers," by Mr. J. Plowright; "Modern Ideas on the Constitution of Chemical Compounds," by Mr. C. E. Boucher.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hesse, Hill, Wylde, Bennett, Inquirer, Scipio.

IE SOLVENT ACTION OF ALCOHOL OF IFFERENT DEGREES OF STRENGTH ON OME OF THE DRUGS USED IN MAKING HARMACOPŒIAL TINCTURES.

BY E. H. FARR AND R. WRIGHT.

(*Continued from page* 959.)

NOTE III.—ON TINCTURE OF ACONITE.

For the purposes of our experiments on aconite ot, eleven samples of the drug were obtained om various sources. It was ascertained that nine the samples were of German origin, and the proice of *Aconitum Napellus*; one was described as panese, and as to the source of the remaining ecimen, no definite information could be obtained. ie roots were reduced to No. 40 powder, and a ries of tinctures made from each with alcohol of , 80, 70, 60, and 50 per cent. strength (by lume). In preparing the tinctures, a deviation om the latter part of the instructions in the B.P. as made, percolation being continued until the quired volume of tincture was obtained. It was marked that in the case of several of the 60 and per cent. tinctures percolation proceeded very owly and with difficulty, and the resulting tincures, as first obtained, were distinctly turbid. hen allowed to stand for a day or two they threw wn a deposit of inert matter, and when filtered ey remained clear, with one or two exceptions.

Before deciding upon the process of assay to be llowed, a few tentative experiments were tried, e following processes being employed, and 50 c. of the same sample of tincture being used for ch estimation.

Experiment 1.—The tincture was evaporated ntil all spirit was driven off, 1 c.c. seminormal SO_4 added, and colouring matter removed with loroform. The liquid was then filtered and made kaline with K_2CO_3, the alkaloids shaken out with loroform, the chloroformic solution evaporated d the residue dried at 100° C. until the weight as constant.

Experiment 2.—The tincture was evaporated to soft extract, the alkaloids extracted with acidu- ted water, the resulting solution washed with loroform, K_2CO_3 in slight excess added, and the quid well shaken with three successive 30 c.c. her. From the ethereal solution the alkaloids ere removed by agitation with acidulated water, d were recovered from the latter solution by eans of K_2CO_3 and chloroform, the final residue ing dried at 100° C. till constant.

Experiment 3.—The tincture was evaporated, the tract treated with acidulated water, the alkaloidal lution filtered, K_2CO_3 in slight excess added, the kaloids shaken out with chloroform, the chloro- rmic solution evaporated and the residue dried 100° C. and weighed.

Experiment 4.—The tincture was evaporated to soft extract, the alkaloids extracted with acidu- ted water, the solution washed with ether, and e alkaloids precipitated with K_2CO_3 and shaken t with chloroform. The chloroformic solution as evaporated, the residue dissolved in acidulated ater, excess of K_2CO_3 added, the alkaloids again moved by agitation with chloroform, the chloro- rmic solution being afterwards evaporated, and e residue dried and weighed.

Experiment 5.—The tincture was evaporated until all spirit was driven off, the residual liquor acidified with H_2SO_4, and the alkaloids precipitated with a solution of iodine in potassium iodide. The alkaloidal hydriodates were filtered off, quickly washed with a little distilled water, and dissolved in solution of sodium hyposulphite. The alkaloids were recovered by precipitating with K_2CO_3, and shaking out with chloroform. The chloroformic solution was evaporated, and the residue heated at 100° till constant, and weighed.

The results came out as follows :—

Experiment 1. . .	50 c.c. = ·022	gram alkaloids.
Experiment 2. . .	50 c.c. = ·023	„ „
Experiment 3. . .	50 c.c. = ·030	„ „
Experiment 4. . .	50 c.c. = ·023	„ „
Experiment 5. . .	50 c.c. = ·020	„ „

The alkaloidal residue in experiment 3 was more highly coloured than the others, and was evidently not pure alkaloid.

Confirmatory experiments on another sample of tincture, with processes 1, 2 and 4 yielded the following results :—

No. 1. . .	50 c.c. = ·029	gram alkaloids.
No. 2. . .	50 c.c. = ·030	„ „
No. 4. . .	50 c.c. = ·028	„ „

The observations made during the progress of the above experiments, together with a consideration of the advantages and disadvantages attached to the working of the different processes, led us ultimately to decide upon the following, which was employed for the estimation of all our samples.

Fifty c.c. of the tincture is introduced into a porcelain dish, and evaporated over a water-bath to low bulk, water being added if necessary, until all the spirit is removed. The residual liquid is allowed to cool, and is then acidified by the addition of 1 c.c. semi-normal H_2SO_4. It is then filtered, the dish and filter being rinsed with a little acidulated water and the rinsings added to the filtered liquid. The mixed filtrates are then shaken, first with 15 c.c. and then 10 c.c. chloroform, to remove colouring matter. The chloroform is drawn off and shaken with two successive 5 c.c. acidulated water, to remove traces of alkaloid mechanically carried out by the chloroform. The washings are added to the original alkaloidal solution, which is then treated with K_2CO_3 in slight excess, and the alkaloids extracted by agitation with two successive 15 c.c. chloroform. The chloroformic alkaloidal solution is then washed with a little distilled water, and after separation is drawn off and evaporated over a water-bath, the final residue being dried in a hot air oven at 100° till the weight is constant.

The alkaloids as thus obtained were almost white and presented a vitreous appearance; prolonged exposure at a temperature approaching the boiling point of water caused a slight darkening in colour.

The amount of extractive was ascertained by evaporating 10 c.c. of the tincture over a water-bath and afterwards heating the residue at a temperature of 100° till the weight became constant. The amount thus obtained multiplied by ten gives the required percentage.

The results are shown in Table I.

The behaviour of the tinctures on admixture (1) with water, and (2) with 90 per cent. alcohol was noted and the results are stated in Table II.

A study of Table I. will show that the best re-

Table I.—Showing Quantitative Results of Estimation of Samples of Tincture of Aconite.

No.	Amount of alkaloid in grams from 100 c.c.					Amount of extractive in grams from 100 c.c.				
	90 p. c. tincture.	80 p. c. tincture.	70 p. c. tincture.	60 p. c. tincture.	50 p. c. tincture.	90 p. c. tincture.	80 p. c. tincture.	70 p. c. tincture.	60 p. c. tincture.	50 p. c. tincture.
*1	·044	·047	·073	·064	·055	2·48	2·98	3·26	3·38	3·46
2	·046	·050	·046	·045	·040	2·23	2·71	2·89	3·08	3·25
3	·050	·062	·066	·062	·059	1·78	2·42	2·92	2·72	2·66
4	·038	·048	·050	·047	·036	3·07	3·58	4·08	3·93	3·92
5	·038	·052	·063	·053	·049	2·98	3·42	3·64	3·87	3·97
6	·028	·032	·045	·036	·033	2·34	2·98	3·18	3·49	3·54
7	·060	·064	·070	·060	·052	2·40	3·12	3·28	3·36	[illegible]
8	·068	·084	·086	·076	·072	·96	1·20	1·44	1·64	1·58
9	·076	·075	·082	·078	·074	2·54	2·74	3·40	3·62	3·42
10	·054	·051	·050	·046	·043	2·84	3·40	3·82	3·82	3·82
11	·048	·052	·055	·047	·044	1·76	1·98	2·46	2·58	2·64
Average . .	·050	·056	·062	·055	·050	2·30	2·77	3·12	3·21	[illegible]

Table II.—Showing Result on Admixture. (1) with Water, and (2) with Alcohol.

No.	Result when 1 vol. of tincture is mixed with 2 vols. water.					Result when 1 vol. of tincture is mixed with 3 vols. 90 p. c. alcohol.				
	90 p. c. tincture.	80 p. c. tincture.	70 p. c. tincture.	60 p. c. tincture.	50 p. c. tincture.	90 p. c. tincture.	80 p. c. tincture.	70 p. c. tincture.	60 p. c. tincture.	50 p. c. tincture.
1.	Opal., floc. ppt. on standing.	Opal., floc. ppt. on standing.	Opal., floc. ppt. on standing.	Opalescent.	Opalescent.	Clear.	Clear, very faint ppt. on stand.	Clear, faint gel. ppt. on standing.	Gelatinous ppt.	Gelat. ppt.
2.	Opal., sep. of resin on standing.	Opal., sep. of resin on standing	Opal., sep. of resin on standing.	Opalescent.	Slight opales.	Clear.	Clear, very faint gelat. ppt. on standing.	Slight gelat. ppt.	Slight gel. ppt.	Gelat. ppt.
3.	Cloudy, sep. of res. on stand.	Cloudy, sep. of res. on stand.	Cloudy, sep. of resin.	Opalescent.	Faint opal.	Clear.	Clear.	Slight gelat. ppt.	Gelat. ppt.	Gelat. ppt.
4.	Opal., sep. of resin on standing.	Cl., bulky sep. of res. on stand.	Cl., sep. of resin on standing.	Cl., sep. of resin on standing.	Faint opal.	Clear.	Clear.	Very slight gelat. ppt.	Slight gelat. ppt.	Gelat. ppt.
5.	Opal., floc. sep. on standing.	Opal., floc. sep on standing.	Opal., floc. sep. on standing.	Opalescent.	Slightly opalescent.	Clear.	Clear, very sl gel. ppt. on stand.	Slight gelat. ppt.	Gelat, ppt.	Gelat. ppt.
6.	Cloudy, much resin sep. on standing:	Cloudy, with sep. of resin.	Cl. with sep. of much resin on standing.	Cl., sep. of resin on standing.	Cloudy.	Clear.	Clear.	Very slight gelat. ppt.	Slight gelat. ppt.	Gelat. ppt.
7.	Opal., floc. sep. on standing.	Faint opal, becomes milky on standing.	Very faint opal., slight floc. sep. on standing.	Cl. opal., slight ppt. on stand.	Opalescent.	Clear.	Clear, very slight gel. ppt. on standing.	Clear, traces gel. ppt on standing.	Opal., slight gelat. ppt on standing.	Opal., gelat. ppt. on standing.
8.	Milky opal., floc. sep. on standing.	Milky opal., floc. sep. on standing.	Cl. opal., floc. ppt. on standing.	Cl. opal., floc. sep. on standing.	Opal., becoming cloudy.	Clear.	Clear, very sl. ppt. on standing.	Very faint opal., traces gel. ppt. on standing.	Faint opal., sl gel. ppt. on stand.	Faint opal., gel. ppt. on standing.
9.	Cloudy, with granular sep.	Cloudy opal., with floc. ppt.	Cl. opal., floc. sep. on standing.	Opal., then cl. with floc. sep.	Opal., becoming cloudy.	Clear.	Clear.	Slight opal, traces gelat. ppt.	Slight opal., gelat. ppt.	Slight opal., gelat. ppt.
10.	Milky, floc. sep. on standing.	Cloudy, floc. sep. on standing.	Cloudy opal. with floc. sep.	Opalescent, becoming cloudy.	Opal., becoming cloudy.	Clear.	Clear, faint trace gelat. ppt.	Clear traces gelat. ppt.	Slight cloudiness, gelat. ppt.	Slight cloudiness, gelat. ppt.
11.	Cloudy, opal. with floc. sep.	Cloudy, opal. with floc. sep.	Opalescent, floc. ppt. on standing.	Opal., floc. ppt. on standing.	Opal., cloudy on standing.	Clear.	Clear.	Faint opal., sl gel. ppt. on stand.	Faint opal., gelat. ppt.	Opalescent, gelat. ppt.

Table III.—Showing Results of Experiments on Process.

	Alkaloid per cent.				Extractive per cent.			
	By simple maceration.	By double maceration.	By B.P. process.	By continuous percolation.	By simple maceration.	By double maceration.	By B.P. process.	By continuous percolation.
No. 1. .	·044	·046	·048	·048	3·37	3·36	3·76	3·88
No. 2. .	·052	·054	·054	·058	2·26	2·28	2·46	2·84

* No. 1.—This series was made from the Japanese root.

lts were obtained with a 70 per cent. menstruum; nd in order to ascertain what process was best dapted for securing perfect exhaustion of the rug, a series of four tinctures were prepared by e following processes from the surplus remaining f the drug from which No. 10 and 11 series of actures had been made.

1. One ounce of the powdered drug was maceated in 8 fluid ounces of menstruum for forty-eight ours with occasional agitation, the whole filtered, nd a sufficiency of menstruum poured over the arc to make the filtrate up to 8 fluid ounces.

2. The B.P. process—maceration and percoation—displacing the last portion of the tincure.

3. One ounce of the powdered drug was moisned with 2 fluid drams of menstruum and packed a conical percolator, more menstruum was then lded, and percolation allowed to proceed slowly ut continuously, until 8 fluid ounces of percolate ad been obtained.

4. One ounce of the powdered drug was maceated in 4 fluid ounces of menstruum for forty-ght hours with occasional agitation. The tincture as then strained off and the marc macerated with e remainder of the menstruum for twenty-four ours; the tincture was again strained off and a fficiency of menstruum poured over the contents the strainer to make the volume of the tincture p to 8 fluid ounces.

The tinctures thus made were estimated, with the sults shown in Table III.

It will be noticed that the process of continuous rcolation is better adapted for the exhaustion of onite root than one of maceration or macero-perlation; and that the results thus obtained strikgly confirm those already recorded in our previous tes on conium and colchicum. The increased yield alkaloid and extractive obtained by this process is marked as to leave little doubt in our minds that e process of continuous percolation, as applied to e preparation of pharmaceutical tinctures, is the ocess of the future.

In view of the fact that an investigation upon e subject of the chemistry of aconite and the onite alkaloids by Professor Dunstan and the embers of the Research Laboratory is now in urse of progress, we have refrained from touching on that subject.

We have also abstained from making any referce to the subject of the standardization of the prerations of aconite root, as it is not at all improble that ere long some method may be devised ereby the potent alkaloids in the different varies of aconite root may be readily separated from inactive constituents, and the standardization the tincture and other preparations of aconite t thus be rendered possible with a greater gree of accuracy and precision than is the case present.

SPIROGYRA.

BY E. J. EVANS.

This plant is very interesting, I might say one of most interesting to a student just commencing botanical studies, since it is typical of one form cell and its contents. It is large enough to seen distinctly with the aid of a microscope magnifying about 200 diameters, and much of its life history and development may be made out.

The plants occurs in most pools and ditches as a green mass of slender threads. A small quantity is easily taken by thrusting a twig into the middle of it and placing it in a small vial of water, or a leaf can be used in the absence of a bottle.

An hour or two can be interestingly and profitably spent in noticing the following points. For examination under the microscope a few of the slender filaments should be mounted on a glass slip in a drop of glycerine.

The plant consists of cells placed end to end, and the outside cell-wall is seen to be continuous throughout the whole length of the plant. At certain varying distances a cell-wall common to two cells may be observed dividing the plant into cells.

In each cell may be seen (1) The protoplasm, the greater part of which forms a layer directly beneath the cell-wall (primordial utricle). From the primordial utricle threads of protoplasm pass to the mass of the protoplasm surrounding the nucleus placed near the centre of the cell. These threads are somewhat difficult to discern unless a powerful microscope is used.

(2) The spirally twisted band of chlorophyll in the primordial utricle, in which are numbers of starch grains and globules of oil.

(3) The nucleus, a star-like body lying in the central mass of protoplasm, often indistinct.

(4) The large vacuole internal to the primordial utricle and traversed by the strands of protoplasm passing from the primordial utricle to the nucleus. The vacuole contains colourless cell-sap.

If a few filaments be left in alcohol for a day or two and then placed in a watch glass containing solution of magenta before mounting in glycerine the protoplasm will be stained and rendered more distinct. The nucleus also will be deeply stained and easily discernible. Treatment with solution of iodine stains nucleus, chlorophyll and protoplasm brown, whilst it colours the starch grains blue.

At night, if some spirogyra have been kept in the dark the process of conjugation may generally be seen.

This commences in the formation of protuberances on the sides of cells of two adjacent filaments. These grow until they meet. Then the partition wall between them breaks down so that the two cavities become one. The protoplasm in the original cells shrinks into rounded masses and passage of one of these masses (male) through the channel takes place, to fuse ultimately with the other (female) mass, forming a zygospore.

Lastly, if whilst in an active state of cell division the filaments be treated with weak alcohol, the various stages of the changes undergone by the protoplasm and nucleus in the formation of new cells can be observed. In some the cell-wall will be seen to have bulged inwards at certain points. The nucleus will have assumed a spindle, or in some more advanced cases, a dumb-bell shape; in later stages severance of the nucleus into two will have taken place. When this has happened the bulgings of the cell-walls will be seen to have united in the middle, and thus two cells have been formed in place of one which originally existed. Such cell formation is typical of vegetable cells.

MODERN DERMATOLOGICAL REMEDIES.

The following information respecting some of the newer forms of external remedies used in the clinic of Professor Hebra, Vienna, is published in the *Pharmaceutische Post*:—

Spray Treatment.—Very frequently an ether spray is used as a vehicle for mercuric sublimate (1 to 2 p.c.) and chrysarobin (10 p.c.). It is considered that the spray, besides its anodyne properties presents the advantage of attacking affected parts otherwise difficult to reach, such as those covered with hair. Whilst the mercuric chloride spray does good service principally in affections of the mucous membrane the chrysarobin spray is used in mycosis of the skin. The apparatus used is one combined with a ball blower.

Medicated Soaps.—The super-fatted medicated soaps introduced by Unna, are used in a form as improved by Eichoff. The basis consists preferably of beef tallow, together with liquor sodæ two parts, liquor potassæ one part and some olive oil. The super-fatted soaps employed are the resorcin-salicylic, resorcin-salicylic-sulphur, and the resorcin-salicylic-sulphur-tar soaps. In these forms the resorcin is claimed to develop advantageously its action antagonistic to inflammation; the salicylic acid is said to dissolve the horny layer of the epidermis and to act as a bactericide; the sulphur also lowers the inflammation; while the tar diminishes the itching and favourably influences the dilated vessels.

Glycerinum Saponatum.—This is an ointment basis, containing a large proportion of glycerine, in the preparation of which a small quantity of a neutral cocoa-nut oil soda soap is used. Its composition varies from 80 to 92 per cent. of glycerine and 20 to 8 per cent. of soap. The *glycerinum saponatum* is soluble in cold and warm water, and is said to possess the advantageous property of dissolving a large number of substances, and of holding other insoluble pulverulent substances in suspension. To this class belong:—

A. Ointments with an Acid Basis (80 p. c. glycerine.)—(1) *Glycerinum saponatum* with salicylic acid (5 per cent.), employed especially for the removal of horny epidermal growths; (2) Glyc. sapon. with salycylic acid (5 p. c.) and resorcin (5 p. c.), combines the properties of the preceding with those of resorcin, in diminishing the inflammation, acting as an antiseptic and promoting the regeneration of the epidermis; (3) Glyc. sapon. with salicylic acid (5 p. c.) and creasote (5 p. c.), promotes healing without pain in lupus vulgaris, lepra, etc.; (4) glyc. sap. with salicylic acid (3 p. c.) and tar (10 p.c.), useful in scaly eczema with itching.

B. Ointments with a Neutral Basis (92 p. c.) glycerine.—Glyc. sapon. with zinc oxide (5 p. c.), used for cosmetic purposes and in slight cases of eczema; (2) Glyc. sapon. with sulphur (10 p. c.); (3) Glyc. sapon. with zinc oxide (10 p. c.), used in acne; (4) Glyc. sapon. with iodoform (5, 10, to 50 p.c.), said to be remarkably active, purifying and promoting granular action in wounds, ulcers, buboes, and carbuncles. (5) Glyc. sapon. with chrysarobin (10 p.c.), approved especially in psoriasis; (6) Glyc. sapon. with hydroxylamine (1 p.c.), used in psoriasis of the face and hairy scalp; (7) Glyc. sapon. with ichthyol (5 p.c.), renders good service in violent itching of skin affections and arthritic swelling of the joints; (8) Glyc. sapon. with ichthyol (10 p.c.) and zinc oxide (10 p.c.), as in the preceding and in incipient eczema; (9) Glyc. sapon. with carbolic acid (2 to 3 p.c.) is good for disinfecting the hands and also to relieve itching.

In other cases the vehicle represents a kind of dressing. Among the *Pastes*, the zinc-starch-vaselin paste, with corresponding medication, take a high place. This paste is used with good result in combination with salicylic acid (acid. salicyl., 1-2; zinci oxidi et amyli, aa 25; vaselini, 50). The paste adheres to the face without any bandage; it is also dusted with starch. In the *Traumaticin* treatment, traumaticin (a solution of one part of gutta-percha in ten to fifteen parts of chloroform) is used as a medium for applying different remedies, such as chrysarobin, etc. It forms a pliant coating and surpasses collodion by far in this respect.

Glycero-Gelatine is prepared in three forms: Soft (5 p.c. gelatine added), hard (10 p.c. gelatine and water), and hard (10 p.c. gelatine without water). Before using the preparation is liquefied by heat, and in this condition is spread on to the part affected by means of a brush and covered with mull.

In the preparation of Ointment and Plaster Mulls Unna's recommendation is followed to substitute lard by mutton fat, which renders unnecessary additions of paraffin or wax. The dressings are dipped into the melted mass, dried and rolled up. The gutta percha mull is considered to present many advantages.

A new kind of dermatological plaster has been introduced, the basis of which consists of purified india-rubber and anhydrous lanolin worked up together to a remarkably adhesive mass. The mixture is medicated with various substances and spread upon linen and is then known as Collemplastrum. Among the advantages claimed for this kind of plaster are its low cost, that the mass does not separate from the linen, that while possessing the adhesive properties of india-rubber plaster the lanolin favours the absorption of the added medicament, and that the plaster can be readily removed without leaving portions adherent to the skin. Besides the simple collemplastrum adhesivum, others are used containing respectively 10 to [illegible] p. c. salicylic acid, 30 p. c. pyrogallic acid, 60 p. c. mercury, 60 p. c. mercury and 5 p. c. carbolic acid, 5 p. c. thiol, 40 p. c. zinc oxide, 10 p. c. liquid pitch, etc. etc.

METHODS FOR TAKING SPECIFIC GRAVITIES.*

BY JOHN F. LIVERSEEGE, A.I.C., M.P.S.

The principle upon which the determination of specific gravities is based was discovered by Archimedes. The King of Syracuse had given a workman some gold to make into a crown. On the work being done the crown was of the right weight, but the king suspected some of the noble metal had been replaced by copper, so requested Archimedes to find out if his suspicions were correct. After some thought, the philosopher finding that a lump of gold of the same weight lost less when weighed in water than the crown, come to the conclusion that it was not all gold. As this happened some 200 years B.C. one cannot but wonder at the cuteness of the old philosopher who adopted a similar course to that which would be taken by a modern chemist. I may illustrate his experiment by this apparatus. Attached to one pan of the balance is a hollow brass bucket and suspended to it a brass cylinder which just fits the bucket. These are exactly balanced by weights in the other pan. On immersing the cylinder in water it loses weight, but equilibrium is restored by filling the bucket with water. The brass cylinder loses weight equal to its volume of water, and on putting this volume of water into the bucket this loss of weight is compensated. Probably the oldest tables of specific gravity extant are those of Francis Bacon, published in 1741. Robert Boyle, in 1690, published a book, entitled "Medicina Hydrostatica, or Hydrostatics applied to Materia Medica, showing how by the weight that divers bodies used in physic have n water, one may discover whether they be genuine or dulterated.”

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* Paper read at a meeting of the Midland Counties Chemists' Association, April 21.

For pharmaceutical purposes I think specific gravity nay be defined as the weight of a substance divided y the weight of an equal volume of water at 60° F., nd unless something else is specified that is what I hall mean in this paper. The British Pharmacopœia s not very definite, merely saying that all specific ravities are to be taken at 60° F., but from the emarks of commentators I think the above definition s justified.

Outside the Pharmacopœia all is uncertainty, for the erm specific gravity may mean any of certain things. For instance, if a substance is said to have a specific ravity of ·8 at a stated temperature, it means that 8 arts by weight of a substance at the stated temperature will have the same volume as 10 parts by weight f water at a certain temperature. This certain, or ather uncertain, temperature may be 0°, 4°, 15°, 15·5°, 16·5°, 17·5° C. or 100° F., or possibly 99° or 100° C. Further, this may or may not be corrected for the weight f air displaced by the weights and substance during weighing. This very unsatisfactory state of things will nly be remedied when all specific gravities are compared with water at one standard temperature, or when each observer of specific gravities states in each paper what temperature the water is with which he compares the substance (see Tilden, *Chemical News*, xxxviii., 300). An example of a simple and definite way of stating the specific gravity of beeswax is S. 16·5/4 = ·9156, which means that ·9156 parts by weight at 16·5° have the same volume as 1 part by weight of water at 4° C. Similarly alcohol S. 0/4 = ·832.

The term density is sometimes used as synonymous with specific gravity, but the following definitions will make clear the distinction.

“The density of a substance at any temperature is the mass of a unit of volume of the substance at that temperature.” The actual figure varies with the units used: thus the density of water at 4° C. is one gram per cubic centimeter, or 252·769 grains per cubic inch.

“The specific gravity of a substance at any temperature is the ratio of the mass of the body to the mass of an equal volume of some standard substance.” This is independent of the unit used being a ratio. Sometimes density is described as absolute density and specific gravity as relative density.

Generally in specific gravity determinations the awkward quantity is the volume of the substance. The weight is readily obtained, so practically what I have to do is to describe the methods for obtaining the volume. Then sp. gr. equals weight divided by volume, which you will please understand to be the final term in each method. If the sp. gr. is obtained when the water is at the same temperature as the substance, and the sp. gr. is required, compared with water at 4° C., multiplying the former sp. gr. by the density of water will give it. In one case I shall detail the corrections required for temperature and the weight of he air, for other cases I must refer you to “Stewart nd Gee's Practical Physics,” Volume I.

Whenever a solid is weighed in water or liquid care nust be taken to remove all air bubbles which stick o its surface. In many cases simple brushing with a amel hair pencil will remove them, in other cases the olid may be boiled in the water, or the air pump sed.

I. Methods Suitable for Solids or Liquids.

1. *The Hydrostatic Balance.*—By this method a solid s first weighed in air and then suspended by a fine latinum wire, silk thread, or horse hair in water. The irst weighing will obviously give its weight, and a ittle consideration will show that when a substance s immersed in water it must lose a weight equal to the weight of an equal bulk of water. Sp. gr. will therefore equal the weight in air divided by loss of weight in water.

Suppose an alloy weighed 40 grams in air and 35 grams when immersed in distilled water, the sp. gr. would be 8·00. This may be accurate to about ·25 per cent. Greater accuracy may be obtained by correcting for the temperature of the water. To illustrate this source of error I have here a piece of lead in cold water suspended from one arm of the balance, and weights to counterpoise in the other pan. On heating the water you will observe the lead sinks. The volume of water displaced by the lead weighs more when cold than when heated, owing to the expansion of the water, and so the lead being less supported sank. Suppose the water was at 15° C. then the sp. gr. would have to be multiplied by ·999, the density of water at 15° giving a gravity of 7·992; this would be correct to about ·1 per cent. Our corrections are not yet finished. The air around possesses weight, and when the body was weighed in it, the brass weights lost weight equal to their bulk of air, and the alloy lost weight equal to its bulk of air; as the alloy has a sp. gr. (8·0) nearly equal to that of brass weights (8·4) these weights are practically the same, and so the correction is negligible. The second weighing is different, the alloy is not in air, but the weights are, and the true weight in water is obtained by subtracting from the apparent weight, the apparent weight multiplied by ·0012 and divided by 8·4; ·0012 is the weight of 1 c.c. of air and 8·4 the sp. gr. of brass weights. This makes the true sp. gr. 7·793. We may then state that the sp. gr. of our alloy *in vacuo* is 7·793 compared with water at 4° C. A correction may be also made for the loss of weight of the suspending wire in water.

We have supposed the solid is heavier than water. If it is lighter a similar course is adopted. A sinker is required to which the light substance may be attached. For waxes and similar bodies a convenient form is a brass disc with a spindle through it, having an eye at one end and a point at the other. The light body is weighed in air, let the weight equal W. The sinker is stuck into or tied to the light body, and the weight of the combination obtained (= W2). The weight of the sinker alone in water (= W1) is also taken. Then the volume equals W + W1 − W2.

Another method which may at times be more convenient is to put the liquid in the balance, and suspend the solid from a fixed support.

Symons (*Pharm. Journ.*, [3], xix., 206) attaches an inverted funnel under the scale pan, puts a 10 gram weight in it, and balances. The weighed solid is then put in water, bubbles are removed, and the wax, etc., put under the funnel; the weight lost will be the volume of the solid.

If the solid is in pieces its sp. gr. may be taken by a light glass bucket attached by wire to the balance. The solid is weighed in air (= W), it is boiled in water in the bucket, when cold weighed in water ($= W_1$), and then the empty bucket weighed in water ($= W_2$). Then $W + W_2 - W_1$ = volume.

To take the specific gravity of liquids. A solid is weighed in air (= W). Then in water ($= W_1$). Finally in the liquid ($= W_2$). Then $W - W_2$ = weight, $W - W_1$ = volume. One form of the solid is a sinker consisting of a glass bulb weighed with mercury and the tail bent into a hook for suspending. If its volume is 10 c.c., then grams weight lost in liquid divided by 10 = sp. gr. For small quantities (3 c.c.), a cube of aluminium 1 c.c. volume may be used (Peckham, *Chem. News*, lxxxix., 97), or a piece of platinum or glass for denser liquids.

If the solid is made to weigh the same number of grams or grains as its sp. gr., the loss in grams or grains equals its sp. gr. without calculation. Taylor (*Pharm. Journ.*, [3], xviii., 788) recommends the use of a piece of aluminium 256 grains in weight. As the sp. gr. of aluminium is 2·56 the number of grains lost divided by 100 gives sp. gr.

2. *Specific Gravity Bottle.*—The three commonest shapes of sp. gr. bottles are (*a*) bottles with a stopper through which a capillary hole is drilled, (*b*) bottles with a thermometer passing through the stopper, (*c*) flasks or tubes with a narrow neck on which a mark is made, and a cork or stopper. In forms (*a*) and (*b*) care must be taken that the balance case is not warmer than the temperature at which the bottle is filled, or owing to expansion the liquid will be lost. Neither of them are suitable for very volatile liquids. (*b*) has the advantage of showing the temperature of the liquid. (*c*) is suited for volatile liquids and for small quantities; for the latter it may be made small with the neck almost capillary. It has been suggested that two marks, one for the top and the other for the bottom of the meniscus should be made, or that its capacity should be known at several graduations on the neck.

There is a form which combines (*b*) and (*c*), but I have not used it. It is always advisable to ascertain that a sp. gr. bottle contains the amount marked on it; but an examination of several has shown the error to be about 1 in 2500.

When a counterpoise is supplied with the bottle it should be tested, as from this cause one I examined gave an error of 1 in 1600.

For liquids the figures required are the weight of the bottle, the weight of water contained in it, and the weight of the bottle full of the liquid. I find the temperature of the liquid is best brought to 60° F. by putting the bottle nearly to the neck in a large volume of water at 60° F. as the temperature of the water does not then so rapidly change. As soon as the temperature is correct the volume is adjusted or the stopper put in. If the co-efficient of cubical expansion is known the temperature need not be accurately adjusted, but the sp. gr. at 15·5° C. may be calculated. For instance, the co-efficient of expansion of most fixed oils is ·00064 for 1° C. If the sp. gr. of olive oil at 20·5° is ·9130 then its sp. gr. at $15·5° = ·9130 + 5 \times ·00064 = ·9162$.

The sp. gr. bottle may be used for a solid in powder or fragments in the following manner. Balance the dry empty bottle, introduce the substance into it, weigh ($= W_1$); fill up with water, adjust the temperature, and again weigh ($= W_2$); the weight of the water contained by the bottle ($= W$). Then volume $= W_1 + W - W_2$.

3. *Jolly's Balance.*—This consists of a spiral vertical spring supporting two scale pans, one some distance above the other. Behind the upper scale pan is a graduated mirror scale, and on the wire is a bead. To take the sp. gr. of a solid the lower pan is immersed in water, the solid put in the upper pan and the scale division opposite the bead is noted. The solid is removed and weights added till the bead is opposite the same scale division as before. This is the weight of the solid. It is then placed in the lower pan and weights adjusted till the bead again comes to the same number. This is the volume. For liquids, a small body unacted on by the liquid is placed on the upper pan, the lower being in water and the scale division read. Then the solid is put on the lower pan and weights added to the same scale division. This equals the weight of its volume of water. The water is replaced by the liquid and the readings repeated. The second weight divided by the first will give sp. gr.

4. *Nicholson's Hydrometer* consists of a hollow metal cylinder, with a stem above supporting a cup, and a cup or cage fastened below. About half-way on the stem is a mark. The manipulation is very similar to Jolly's balance, except the mark is always brought to the surface of the liquid, instead of the bead to a scale division. For solids the hydrometer is floated in water and weights are put in the cup till the mark on the stem is level with the surface of the liquid. This weight often equals 1000 grains. The weights are removed, the body put in a cup, and weights added to bring the mark to the surface, the difference in the weights will be the weight of the body. Then the body is put in the lower cup (if lighter than water it must be tied down, or put in the cage) and the weights adjusted. The difference between this and the first will be the weight in water and volume = weight in air—weight in water. For liquids the hydrometer is weighed ($= H$) and weights added to sink it to the mark ($= W$). The weights are also observed that are required to sink it to the mark in the liquid ($= W_1$). Then $W_1 + H \div W + H = \text{sp. gr.}$

5. *Raikow's Method* (*Journ. Soc. Chem. Ind.*, [illegible] 147).—The apparatus consists of a small long necked flask with a mark on the neck, and the side tube inserted at right angles between the wide part and the mark. A tube graduated in c.c. is attached to the side tube, water is put into the apparatus, the level adjusted to the mark by means of a piston working in the flask neck, and the graduated tube read. The weighed solid or liquid is then introduced into the flask, the level again adjusted, and the increase of volume read. If the liquid and water mix, water must be replaced by an immiscible liquid.

6. Dobbie and Hutcheson (*Phil. Mag.*, [5], xvi. 459) use a similar apparatus, but instead of using a piston to adjust the level they attach a cup and tap and blow till the liquid reaches the mark.

7. *Sprengel Tube.*—The most usual form is a U tube with horizontal capillary arms, one of which terminates in a point, the other has a mark on it.

Caps are often used to cover the ends to prevent evaporation during weighing. Its special advantage is that it can be used for taking the sp. gr. of fats and waxes which are solid at 60° F., at the boiling point of water. The tube is filled with the melted fat and then boiled in a beaker or flask of water till expansion has ceased. For accurate work it is advisable to take the temperature of the boiling water and correct the sp. gr. to 99° C. On applying blotting paper to the point the fat is sucked out, till the mark on the other limb is reached. A more convenient form for liquids at 60° F. is where the arms, instead of being bent at a right angle, are bent twice at more than a right angle, the mark is put near to the wide part and above it a small bulb is blown. This enables the tube to be moved with less fear of the liquid running or expanding out.

Nicol has introduced a form that may be used for solids. Its shape is a cylinder, with a side tube inserted near the top, bent twice at right angles, and the mark made on the horizontal part; the pointed tube is attached to a stopper at the top. The weights taken are the same as with a sp. gr. bottle.

II. Methods only Suitable for Solids.

The simplest theoretical way of taking the sp. gr. of a light solid is to float it in water. If it floats with [illegible] of its volume submerged its sp. gr. is ·6. Practically the difficulty of accurately measuring the volume prevents its use. Other simple ways are to weigh the solid and obtain its volume by measuring, or by dropping the weighed solid into a graduated cylinder containing water and note the increase of volume.

8. Brasse and Vlash (*Journ. Soc. Chem. Ind.*, [illegible] 1878) use a pear-shaped vessel with the bottom connected with a graduated burette, and a stopper with a capillary prolongation, having a mark on it. Water is put in the apparatus and the vessel lowered till it stands on the mark on the capillary tube, the burette is read, the vessel raised, the solid introduced, and the increase in volume noted, when the liquid is again at the mark, which is the volume of the solid.

9. *By Liquids.*—If a solid rests in any part of a iquid it is evident that the solid and liquid have the ame sp. gr. By mixing two liquids a denser and a ighter till the given solid rests in it, and then takng the sp. gr. of the mixture, the sp. gr. of the solid s obtained. An interesting application is the assay of potatoes. A salt solution is prepared in which ome potatoes sink and some float, the sp. gr. of the olution is taken; this varies with the percentage of tarch in the potatoes. Thus sp. gr. 1·08 represents 4 per cent. of starch and 1·15 indicates 30 per cent.

The following liquids have been suggested: salt olution sp. gr. 1·2; Thoulet's solution 2·77; double odide of potassium and mercury in water 3·11; double iodide of mercury and barium in water ·56; and a mixture of methylene iodide 3·3 and benzine ·85. The latter for use with salts soluble in water. For fats and resins dilute ammonia, alcohol or glycerine (Hager, 'Year-Book of Pharmacy,' 1879, 255).

III. *Methods Suitable for Liquids Only.*

10. *Hydrometers.*—Probably the most widely used method of taking the sp. gr. of liquids is by hydrometers. They, as a rule, consist of a weighted glass bulb, with a graduated stem above. They are placed n the liquid and the mark on the stem to which they sink is read. Siebold has shown ('Year-Book of Pharmacy,' 1879, 473) that good instruments afford reliable ndications of specific gravities, no matter whether the gravity is due to suspended or dissolved matter. Some hydrometers of limited range are known by the name of the liquid for which they are to be used, as acetometers, ammoniometres, argentometers, urinometers.

Lactometers have often a thermometer enclosed in the hydrometer, so that the temperature can be read at the same time. Gay Lassac's centesimal alcoholometer has on the stem the percentage of pure alcohol in the spirit in which it is placed. I have an alcoholometer which gives the percentage of proof spirit on the stem, but the indications are about 3° too low. The indications of Bates' brewers' saccharometer are pounds of sugar per barrel. Balling's and Brix's instruments give the per cent. by weight of cane sugar in the solution. Some hydrometers have specific gravities marked on the stem, but those of Baumé, Beck, and Cartier have arbitrary scales and require reference to a table to obtain the sp. gr. Baumé's degrees are unsatisfactory, as their equivalents vary in different instruments and in different countries (see Wigner, *Analyst*, v., 138). Hydrometers should be tested to see that their indications are correct, and temperature must be adjusted, except in rough determinations. Twaddle's hydrometers are only applicable to solids heavier than water. The degrees originally indicated ounces of salt in the mperial gallon. Specific gravities are obtained by multiplying the degrees by five, adding 1000 and dividing by 1000. They are usually made in sets of six, as the stem would be inconveniently long if one hydrometer was used for the range of specific gravities. Fahrenheit's hydrometer has a little table at the top, one mark on the stem, and is used in the same way as Nicholson's. Rosseau's hydrometer has at its summit a little cavity in which 1 c.c. of the liquid is placed, and the sp. gr. is read according to the division in which the hydrometer sinks when placed in water.

Sikes' hydrometer is the revenue instrument. It consists of brass, and to increase the range of its indications eight weights are supplied with it, to be used with denser spirits. Derham (*Pharm. Journ.*, [3], xix., 15) brings grave charges against the instrument and the tables used with it, and has suggested an instrument with ten poises of graduated specific gravities.

11. *The Westphal Balance* has lately come into very extended use. It consists of a thermometer plummet, suspended at the end of a counterpoised lever, divided into ten equal parts and having eight riders for use on the beam. In the balance before you the plummet displaces 6·48 grams of water at 60°. The weight of the riders are as follows, and their ratio to the plummet:—

Rider	1·0	a	weighs	6·4800	ratio 1 to	1·0000.
„	1·0	b	„	6·4806	„ „ „	1·0001.
„	·1	a	„	·6486	„ „ „	·1001.
„	·1	b	„	·6485	„ „ „	·1001.
„	·01	a	„	·0653	„ „ „	·0101.
„	·01	b	„	·0655	„ „ „	·0101.
„	·001	a and b	„	·0067	„ „ „	·00104.

It will be observed that the error introduced by riders does not exceed ·0001. If the plummet is immersed in water at 60° it loses 6·48 gram. On putting the rider 1·0a at the end of the beam (weighing 6·48), the balance is brought to equilibrium, the sp. gr. being 1·0. If the liquid was sp. gr. 1·5, the plummet would lose 9·72 grams, and 1a rider at the end and 1b at ·5 (the weight being 6·48 + ½ 6·48) would balance. This shows that the sp. gr. is read from the riders without calculation. It is necessary to test the graduations of the beam, for some cheap instruments have an error in the ·8 division sufficient to make a difference of ·0015 in the sp. gr. With fine compasses measuring will show the error, but not having these I adopted another method. The plummet was removed and a light scale pan put in its place; the rider was placed on the pan and weights were put on to balance. The rider was moved to ·9, ·8, etc., and additional weights used to counterpois. If W = weight on pan when rider is at 1·0 (=0) W_1 = weight on pan when rider is at ·9, ·8, etc., R = weight of rider and X equals distance from the fulcrum.

$$\text{Then } W+R=W1+X.R.$$
$$\text{and } X=1-(W_1\div R.)$$

These are the results and the value of the divisions of the beam:—

Rider at	·9	W =	·6480	and X =	·9000.
„	·8	„ =	1·2975	„ =	·7998.
„	·7	„ =	1·9445	„ =	·6999.
„	·6	„ =	2·5930	„ =	·5999.
„	·5	„ =	3·2410	„ =	·4999.
„	·4	„ =	3·8875	„ =	·4001.
„	·3	„ =	4·5365	„ =	·3000.
„	·2	„ =	5·1845	„ =	·2000.
„	·1	„ =	5·8335	„ =	·0998.

This shows the graduation of the beam would only introduce an error of ·0002 when the large rider was used. If the thermometer plummet is replaced by a glass rod of the same displacement, the balance may be used for taking the sp. gr. of fats, etc., at the boiling point of water. The tube containing the fat, being immersed in a water bath, a method first suggested by Estcourt (*Chem. News*, xxxiv., 254).

12. *Hare's Method.*—The most convenient form consists of a U tube inverted, one leg being in water and the other in the liquid. At the top a rubber tube and tap is attached. If air is sucked out through the upper tube the liquids rise in the tubes to a height inversely proportional to the sp. gr. of the liquids. Dividing the height of the water column by that of the liquid gives the sp. gr.

13. *Wilson's Sp. Gr. Bubbles* consist of hollow glass balls, which are graduated to remain at rest in liquids of a certain density marked on them. They will show a difference in sp. gr. of ·001. In the manufacture of ether the liquid is distilled until one of them, of sp. gr. ·735, begins to float. In *Journ. Soc. Chem. Ind.*, 1889, 310, a series of bubbles of increasing density is described, arranged in a tube open at both ends. On immersing the tube in a liquid, the gravity is evidently between the sp. gr. of the highest, which sinks, and the lowest, which floats.

14. *Sommerkorn's Method* (*Chem. News*, xli., 203).—He uses a thin sided glass tube of 3 to 4 c.m. in diameter, graduated in m.m., and a thin circular glass

plate of the same diameter. The plate is held to the bottom of the tube by string and the tube partly immersed in the liquid and gradually raised till the glass plate sinks, when the depth in m.m. is read. The sp. gr. equals the weight of the plate divided by the area of the plate multiplied by the depth of liquid.

15. *By Weighing.*—If a 10 oz. measure is balanced and weighed again with 10 fluid ozs. of syrup, etc., in it, the weight in ounces divided by 10 will roughly give the sp. gr. of the liquid, or 10 c.c. measured in an accurate pipette, may be weighed in a tared beaker.

16. *Differential Sp. Gr.*—Dittmar (*Journ. Chem. Soc.*, xl., 938). Sometimes it is required to know the difference in the sp. gr. of two liquids. This method is relatively independent of errors of temperature.

Ascertain the volume of a cylindrical sp. gr. bottle that can be hung from the balance (= V), fill with liquid 1 and weigh immersed in a beaker of the same liquid (= W). Fill the bottle with liquid 2 and weigh in liquid 1 (= W_1). Then the difference in the sp. gr. = $W_1 - W \div V$.

IV. Special Methods.

1. *Syrups and Viscous Liquids.*—Symons (*Pharm. Journ.*, [3], v., 180) recommends method 1, using a glass stopper for the solid. Geniser (*Journ. Soc. Chem. Ind.*, 1890, 216) with frothy syrups filters the warm syrup through wire gauze, then boils a sp. gr. bottle two-thirds full, in an oil bath, filling up with water after cooling and weighing. I have found a similar method answer well for condensed milk. About 20 grams was put (through a funnel) into a tared 50 c.c. bottle and weighed. It was put under the air pump with a little water on it to remove air bubbles, made up to 50 c.c. and weighed. The sp. gr. equalled the first weight divided by 50 – (2nd — 1st weight).

2. *Sulphuric Acid.*—Hager (*Journ. Soc. Chem. Ind*, ii., 176) remarks that Epsom salt crystals sink if the gravity is lighter than 1·829 or 1·830. With acid 1·836 to 1·840 two-thirds of ferrous sulphate crystals should float.

3. *Substances Soluble in Water* may be examined by method 1, but weighed in turpentine, paraffin, benzine, or some liquid in which it is insoluble. Weight in air (= W) loss of weight in liquid (= W1), sp. gr. of liquid (= S), then sp. gr. = W × S ÷ W1.

Other methods are to varnish on the surface, to weigh in a saturated solution of the salt, or to balance in a mixture of methylene iodide and benzene by method 9 (see Retgers, *Journ. Chem. Soc.*, lvi., 812).

Zehnder (*Journ. Chem. Soc.*, lii., 9) inverts the sp. gr. bottle in water, when the soluble substance falls out, then weighs the water which replaces it, and corrects for temperature and pressure.

4. *Waxes, Fats, etc.*, have been mentioned under methods 1, 2, 7, 9, 10 and 11. Muter and others weigh the butter, etc., at 100° F., and compare it with water at the same temperature, calling this "actual density." Jones (*Analyst*, xiii., 201) has shown that if a lard granulates at 100° F. the crystallization may make a difference of ·004 in the sp. gr. Cassamajor (*Chem. News*, xliv., 309) gives the sp. gr. of pure butter at 60° F. as ·926, and margarine as ·918, therefore if a little of the melted fat is dropped into alcohol of sp. gr. ·922 when cold a butter sinks and a margarine floats.

Wigner (*Analyst*, i., 35 and 145) notes the temperature at which a bubble, sp. gr. ·896, sinks. Waxes are best prepared for balancing in alcohol, etc., by melting, allowing to cool gradually, and cutting cubes.

5. *Porous Substances.*—The apparent density of a porous substance is the weight of a unit of volume including the air spaces. When the body is pervious to water, as wood, to determine the apparent density, it must be varnished before weighing in water. For chalk weigh and immerse in water till saturated, after removing the external moisture a second weighing will give the weight of the water necessary to fill the pores of the chalk. A weighing in water will give sufficient data to obtain both apparent and absolute densities.

Some porous substances may be powdered and then examined by a suitable method. Bailhache and Commelin (*Journ. Chem. Soc.*, lviii., 206) determine the sp. gr. of fruits and roots with an apparatus consisting of a U tube containing mercury. One leg has coloured alcohol on the surface communicating with a graduated glass tube. The root, etc., is pressed under the surface in the other leg by means of an iron plunger and the increase in volume noted.

Fleury (*Pharm. Journ.*, [3], x., 255) uses an apparatus resembling Gay Lassac's burette. It is filled with mercury, the substance pushed under the surface in the wide part and the mercury expelled from the point weighed.

Gunpowder, cotton-wool fabrics and certain salts may have their volumes determined by the stereometer. As it is not of pharmaceutical interest, and requires a diagram, I will refer you for a description of it to Stewart and Gee's 'Practical Physics,' volume I.

6. *Minerals.*—If the mineral has a sp. gr. greater than 4, or is porous, Joly (*Phil. Mag.*, [5], xxvi., 33) melts it into a piece of paraffin candle, and balances it in a liquid of known specific gravity. Pisani (*Journ. Chem. Soc.*, xxxiv., 364) uses a bottle of peculiar shape to determine the volume when only small quantities of the mineral are available.

THE INTRODUCTION OF DRUGS INTO THE HUMAN BODY BY ELECTRICITY.*

A very interesting paper was read at Philadelphia by Frederick Peterson, M D., College of Physicians and Surgeons, New York, before the Philadelphia Electro-Therapeutic Society, recently, on "The Introduction of Drugs into the Human Body by Electricity," of which the following is a copy:—

It is with some degree of diffidence that I have ventured to accept the kind invitation of the former president of your Society to read a short paper upon the subject of Electro Cataphoresis, for the reason that I have already written about all that I know concerning it, and that I already find myself placed, with many of my good friends, among hobby riders. Just as some of them are designated, or at least in danger of being so-called Apostoli cranks, bacillus cranks, hydrotherapeutic cranks, and the like, so I have begun to hear faint whisperings of a similar term applied to myself in connection with anodal diffusion. But I wish to shun the imputation at once by stating that it is not a panacea for all human ills, that, indeed, it is useful in only a few conditions of the human system. Presuming, then, that its limitations as a therapeutic agent are many, it is in order to speak of it first historically and then practically.

While the diffusion of the solutions through a membrane by the anode, and of the sarcous substance of the muscle from the anode to the cathode, had been known to electricians, the earliest investigation of its power to drive drugs through the human skin was made by Richardson in 1859 with morphine, aconite and chloroform. Nothing further was written until 1886, when Wagner, Adamkiewicz, Lumbroso, Matteini and others reintroduced the subject in connection with chloroform. Corning and Reynolds made some experiments later with cocaine solutions upon the anode.

My own trials have been conducted since 1888, and the results published from time to time since then ("Electric Cataphoresis as a Therapeutic Measure," N.Y. *Medical Journal*, April 27, 1889; "Note on a New System of Exact Dosage in the Cataphoretic use of Drugs," N.Y. *Medical Journal*, November 15, 1890;

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* From *Invention*, May 16, 1891.

"Farther studies of the Therapeutics of Anodal Diffusion," N.Y. *Medical Record*, January 31, 1891.) The drugs made use of have been cocaine, chloroform, menthol, aconitia, ouabain, strophanthin, carbolic acid, strychnine, succinimide of mercury, corrosive sublimate, iodol, iodide of potash, helleborin and the citrate, benzoate and chloride of lithium. Within a very short time experiments have been carried on by Dagney, of London, Gärtner, of Vienna, and Edison in the United States, with the results of all of which you are doubtless familiar.

When my first paper was read before the section in theory and practice of the New York Academy of Medicine, the cataphoretic power of the galvanic current was still so little understood that considerable incredulity, if not positive disbelief in the existence of such a power, was manifested by some who participated in the discussion. But so much has been accomplished since then that there is no longer any doubt as to the actual diffusion of drugs in solution through the skin and into the subcutaneous tissues by the galvanic anode, and it only remains to be established what actual therapeutic value, over and above any other means of administration, this particular method may possess, and to what disorders it may be especially applicable.

One of the reasonable criticisms has been that even if drugs were diffused as stated, exact dosage was impossible; but this is no longer a valid objection, since, very recently, it has become possible to make the doses accurate and certain.

A number of electrodes have been devised for cataphoretic purposes, some of them quite complicated, like those of Adamkiewicz, Munk and my own. But these are now no longer necessary. The cataphoretic electrode should be very simple, an ordinary metal one, either with or without a covering of cloth or sponge. Electrodes of tin are the cheapest, and the oxides may be easily scraped off when they collect. Gold or platinum would be better, but are very expensive, about equally so.

The ordinary sponge electrodes may be employed with solutions, such as those of lithium, iodide of potash, iodine, and the like, where precision in dosage is not required; the plain metal ones, however, for the more careful administration of medicaments, like cocaine, aconitia, strychnine, and helleborin. A narrow rim of rubber around the metal surface is needed to prevent evaporation. A disc of cotton cloth, or tissue, or blotting paper, may be cut to fit the metallic surface, and upon this is dropped any desirable quantity of the drug in solution. The wet disc of paper is next the skin, and prevents burning.

It is sometimes useful to prepare the skin a little before treatment by rubbing with ether to dissolve out the oil globules. The anode being applied with the drug, the cathode may be placed anywhere upon the surface of the body and a current of any endurable strength turned on. The stronger the current the speedier the effect.

Besides the use of these simple electrodes, it is often desirable to make more extensive applications over wider areas. If, for instance, it were wished to diffuse a solution of lithium about a large joint like the knee, a sufficiently large strip of zinc is covered with sponge or cloth, saturated with the solution, tied around the extremity, to be then connected with the anodal rheophore. For diffusion through the whole body a bath tub is used, one either constructed for the purpose or any ordinary bath tub. The common bath tub of our houses is readily converted into an anode by placing a large sheet of zinc on the bottom and connecting it with an insulated copper wire. The sheet of zinc is then covered over with a board to prevent its contact with the body. When the patient is immersed in the bath, he merely keeps one arm out to grasp the cathode and the circuit is made.

These are, in brief, the means by which drugs are introduced into the body, and it is clear that any soluble agent may be employed in some one of the ways described. The poisonous medicaments, which are to be administered in accurate doses, are kept either in solution (cocaine 10 to 20 per cent., helleborin 1 per cent.), or discs of filtering paper impregnated with solutions and dried, and containing a known quantity of the remedy, are kept on hand for the purpose. Such cataphoretic discs may be made by any pharmacist.

As regards, now, the therapeutical advantages of anodal diffusion, it would seem as though it had its widest applicability in maladies of the skin and mucous membranes, or of immediately subjacent tissues; but, of course, it may be given a much greater scope in conjunction with mineral, antiseptic and alterative baths, which is a problem for the investigations of others in the future.

Dermatologists have already evinced considerable interest in the subject, but I have no doubt that the rhinologist, laryngologist and gynecologist, who have so much dealing with mucous membranes will, in the course of time, avail themselves profitably of a power which promises so largely.

Surgeons have employed it frequently and successfully for local anæsthesia in minor surgical operations.

The physician cannot fail to take up the particular line pointed out by Edison, and makes use of local applications by means of sponges, or generally by means of baths, for the purpose of influencing local and systematic affections, like gout and rheumatism.

I was led myself into making a study of electric cataphoresis by my own work in a neurological line, and my first experiments were conducted with a view to relieving pain. I received the suggestion after vainly endeavouring to combat severe supraorbital neuralgias in several patients. All known appliances and agents of the healing art had been ineffectual, blistering, electricity, aconitia and the progressive series of narcotics and anodynes, which generally terminate with the morphine habit. One of the patients had suffered from morphine inebriety for a year, but had recovered from that with her supraorbital anguish unassuaged. I found that 10 to 20 per cent. solutions of cocaine on the anode gave absolute relief in those cases for from four to ten or eleven hours, and without constitutional effects of any kind. A deep analgesia was produced in the area covered by the anode. No doubt constitutional effects would ultimately result by indefinite continuance of the application.

Since that time I have made it a point always to use the cocaine solution in any sort of superficial pain in which I think the anode to be of advantage. The method does not mitigate neuralgic pains which owe their origin to lesions far back of the point to which the electrode is applied, as in disease of the Gasserian ganglion, or the idiopathic neuralgias of central origin; and it is here that cocaine cataphoresis has an actual diagnostic significance. If the pain is relieved by the treatment, the lesion is in the immediate neighbourhood or peripheral to the anæsthetized area, and this would furthermore suggest the possibility of permanent cure by neurectomy. This idea of the diagnostic value of cocaine cataphoresis is Dr. Starr's, and it has some sort of corroboration in a case of intense supraorbital neuralgia which I lately saw with him. A 20 per cent. solution of cocaine, used with a strong current for a considerable period of time, did not diminish the paroxysms of pain in the least. A few days afterwards neurectomy was performed, and this also had no effect upon the neuralgia.

Cocaine employed in this way does not cure neuralgias of peripheral origin. All that is claimed for it is that it gives relief without producing constitutional effects, and is, therefore, superior to any narcotic given internally, and to any other local application.

Other local anæsthetics are chloroform, aconitia, ouabain, strophanthin, helleborin, menthol and carbolic acid.

Chloroform causes a dermatitis, and should be used only when counter-irritation is desired in conjunction with a transitory anæsthesia. I have employed chloroform cataphoresis in one case of cervical neuralgia with good effect. Helleborin and aconitia I have also used successfully, but the latter, while it gives rise to a deep analgesia, also causes painful smarting and burning, unless combined with a cocaine solution.

While my experience with the method has been chiefly in neuralgias of superficial nerves, I have not failed to give it a trial in other conditions where it seemed to be expedient. I have been using cocaine and helleborin with the anode in two cases of tic convulsif of late, placing the electrode over the trunk of the facial, or one of its branches. Whatever may be the explanation of its effect, these cases certainly show very great improvement, and a remarkable diminution of the spasm after each application, such as was not obtained from the employment of the electric current alone. In case of blepharospasm, cocaine cataphoresis practised near the outer angle of the eye produced a very marked change in the extent and frequency of the movement. I have no doubt, however, that the results would be better still if we had some drug to use with the anode which would act upon motor nerves in the same way as the local anæsthetics act upon sensory nerves; if, in other words, we had some trustworthy local paralytic. Atropia and curarin do not seem to answer the purpose.

There can be no doubt that the effects of the galvanic current upon nutrition are in part due to the cataphoretic transfer of molecules of protoplasm and liquid from one cell to another, or from a cell to a capillary vessel in the path of the anodal stream, and since the diffusion takes place more readily and more quickly in direct proportion to the current strength, it behoves us to employ as many milliamperes as feasible in our galvanization of the atrophied and paralysed extremities of poliomyelitis, chronic neuritis, and peripheral nerve trauma. Moreover, there would seem to be a possible advantage in the use of nutritive emollients in conjunction with the labile application of the anode to the atrophied member, just as they have been combined from time immemorial in the exercise of the aliptic art (massage). ("The Aliptic Art," by Frederick Peterson, M.D., Philadelphia *Medical News*, August 11, 1883).

As a last word, let me say that while the constant current has proved so useful to the medical profession for diagnosis, for stimulating nerve and muscle, for electrical endoscopy, for cauterization, we must not neglect its catophoretic property, by which remedial agents are diffused through the tissues and fluids of the body to improve nutrition, to produce anæsthesia, to relieve pain, to destroy germs, to modify morbid processes, and to make soluble chemical combinations with deleterious substances which frequently collect in the organism.

THE SOURING OF CREAM.*

BY V. STORCH.

In order to ascertain the causes of certain defects in butter, especially "oily" butter, several samples were submitted to bacteriological analysis. The attempts to isolate an organism which produced the "oily" taste in butter were unsuccessful, but numerous fungi were found in butters with this defect, which were not found in others, and it is probable that these fungi are injurious. With regard to "tallowy" butter, a definite organism was found; it coagulates milk much as the usual souring-bacterium, which it also resembles in size and form. The turnip taste which butter sometimes has, although made from the milk of cows which receive no turnips in their food, is also probably due to a special micro-organism.

In order to sterilize milk, heating at 107° for 5—10 minutes is not sufficient. Even a temperature of 120° for 10 minutes was in one case found not to have sterilized the milk; a pure cultivation of a small bacillus was obtained, whose thick, egg-shaped spore had resisted the high temperature.

Milk heated at 70° acquires a strong odour and taste. By discontinuous heating at this temperature, sterilization may be effected.

Attempts were made to isolate a souring bacterium which produces the pure aromatic odour which well soured cream has. Bacteria were isolated from soured butter milk, and from two samples of butter, but the bacteria produced either only a slightly aromatic taste or none at all, although they all produced the right consistence and a pure acid taste.

Cream and butter from a farm distinguished for very aromatic butter were next tried, and the souring bacteria isolated. Of these, two (both from cream) were found always to produce the distinct aromatic taste.

The one (No. 18) which also produced an especially agreeable, mild and pure acid taste was further examined, and is no doubt one source of butter aroma. On gelatin plates it forms small, pure white colonies which show a somewhat oval form. The temperature most favourable to it, is somewhat higher than that usually employed in dairies for souring. In shape, size, and mode of growth, the bacterium is in many respects similar to Pasteur's "ferment lactique;" but the power of motion, which the author's bacterium possesses, shows that it is not identical with Pasteur's ferment.

The virulence of most of the souring bacteria is much weakened when they are kept in the same milk, but at once returns when the pure cultures are repeatedly inoculated in fresh milk. Souring bacteria which lose their virulence in one or two months when kept in the usual way may be kept more than a year when finely powdered calcium carbonate is added to the nutritive solution.

The amount of acid produced in milk by various souring bacteria was determined, and the results are given in tables. The difference in the acidity produced by the different bacteria was only slight; but the bacterium which also gives rise to the aromatic taste, etc., gave the least amount of acid. The greater part of the acid was formed in the first twenty-four hours, and the production ceased after six days. It was found that a loss of 0·656 per cent. of milk-sugar corresponds with a production of 0·635 per cent. of lactic acid. No evolution of gas ever took place.

The souring bacterium (No. 18) is capable of producing in milk-sugar solutions, free from fat and proteids, and containing only a little peptone, the same aromatic taste which it gives rise to in milk or cream, so that the opinion, sometimes expressed, that this taste is due to volatile acids formed from butter fat, is erroneous.

The author proposes that in practice, fresh souring material should be prepared daily by means of pure cultivations. The danger of the contamination of butter with pathogenic bacteria would thus be much lessened.

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THE SOCIETY'S JUBILEE

THE ensuing week will be largely occupied with the proceedings appertaining to the celebration of the Society's Jubilee, and as there will be on that occasion a considerable number of visitors from the continent and from America, for their sake it is to be hoped that climatic conditions will be somewhat more propitious than they have been hitherto. Although official notifications have already appeared in reference to the various meetings that will take place during the week, it may not be out of place briefly to recapitulate the arrangements that have been made.

The official celebration of the Jubilee of the Society will take place at the Society's House in Bloomsbury Square, on Tuesday evening at eight o'clock. Our readers will probably remember that there was some desire to have this ceremony carried out in a more spacious place than the Society's house affords, but that the difficulties which this year attached to the execution of that project were such as to necessitate its abandonment. The official celebration will therefore take place n the lecture theatre, and though its capacity is somewhat limited, it is hoped that with ome alteration of the internal arrangements which are being carried out, it will meet the equirements of the occasion. In addition to the eception of addresses, etc., in the lecture theatre, elections of instrumental music will be given in the xamination hall by the band of the Grenadier Guards, by permission of the commanding officer, Colonel TROTTER, and a number of objects of hisoric interest will be exhibited in other parts of he Society's premises, both of which will probably be sources of attraction for many of the members and associates of the Society. Refreshments will be provided in the old council room, the brary, and the old examination room.

The Annual Meeting will also be held as usual n the lecture theatre. This will take place at welve o'clock precisely on Wednesday next. mmediately after this business is concluded a pecial General Meeting will be held for the urpose of amending some of the Bye-laws of he Society, which have already been printed in their amended form at page 821 of the Journal for 7th March last.

The Annual Dinner, which will this year be a feature in the celebration of the Jubilee, will take place at the Criterion Restaurant on Wednesday evening. It promises to be very largely attended, almost the whole of the tickets having already been disposed of. The number of Stewards on this occasion is unusually large, as will have been seen from the list in last week's Journal. There will also be a large number of distinguished visitors, including many representatives of pharmaceutical bodies on the Continent and in America.

THE PRELIMINARY EXAMINATION.

AMONG the letters that have appeared in reference to Mr. SAUL's paper on the subject of the Preliminary examination there are some which are not altogether indicative of approval of the views expressed by Mr. SAUL, but the objections that are urged appear to arise from misconception rather than anything else. Thus for instance our correspondent who signs himself "Insulted" resents the term "deficient intellectual capacity" as being applicable to those who pass the Minor examination. It is a mistake to suppose that to have been intended. It is amongst those who constitute "the terrible percentage of failures in the Minor" that we understand Mr. SAUL to suggest that there are many who, whether naturally "brainless" or "deficient in intellectual capacity" or not, are at least deficient in such a general education as would fit them for the pursuit in which they are endeavouring to obtain legal qualification. Although the drug trade cannot be considered as a professional occupation in all cases, it has at least its professional side, and however little that may be developed in some instances, the requirements connected with it must not on that account be overlooked, since the legal qualification conferred by the passing of the Minor examination gives every one who passes it the right to exercise the professional part of the business. Whatever, therefore, may be the particular object of those who present themselves for the examination, the standard of the qualification it confers must necessarily be maintained at a sufficiently high level to justify those who desire to engage in the more professional part of the business in doing so with due regard to the public interest. It has sometimes been held that it is a hardship to require candidates to pass an examination to test their scientific knowledge when the business in which they are to be engaged will not require that knowledge for its successful conduct, and at first sight there seems to be a certain amount of plausibility in the complaint. No doubt those who are thus situated are to some extent subjected to hardship from their point of view. But they forget that the fault may be with themselves in seeking to assume the designation of chemist and druggist. Is that title at all necessary for them? On the other hand they perhaps fail to consider that the only claim the chemist and druggist has for being ranked higher than ordinary tradesmen, and having protective restrictions in his favour, is the fact that his business demands, for its proper discharge, scientific knowledge and training that are not requisite in other trades. If the business to which they intend to devote themselves does not require the possession of such knowledge, that circumstance is no ground for complaint that the Minor examination is too scientific, but it would be rather a proof that they had made a mistake in seeking to assume the title of chemist and druggist.

However, it is satisfactory to find that the majority of the letters on this subject are distinctly in favour of Mr. SAUL's suggestion that the Preliminary examination should be broadened and made a more efficient test of the candidate having received a sound scholastic education. This is now felt to be a necessity in the case of the medical profession and in other pursuits which involve scientific study, for without a good general education to begin with, the progress of the student at a later stage is rendered more difficult, at least, if he is not altogether incapacitated from doing what is required of him. It is no doubt the want of educational training early in life that is the real cause of much of that mental deficiency which counts as want of intellectual capacity. As Mr. STARK has well suggested, much of what looks like lack of brains is rather need of their development by training. And there is another point of especial importance, as we believe, which is also referred to by Mr. STARK, viz., the application of that training and mental development at the right time, when the influence thus exercised may be most of all effectual in producing the desired result. For that reason it is the duty of the Society, as the guardian not only of the public interest but also of the interest of the pharmaceutical body, to insure that every apprentice admitted to the business shall have had a training that will warrant a prospect of future success in the calling he is to enter upon. It is equally essential that this test should be applied at the right time. If the Preliminary is not passed before apprenticeship, many who are improperly admitted to that position will never pass it at all, and will merely swell the number of hopelessly incompetent men who, having been inconsiderately brought into the business, hang on to the ranks of pharmacy as a disgrace and incumbrance.

It is indeed remarkable that considering the frequent expression of the opinion that the passing of the Preliminary before apprenticeship is one of the greatest needs for the improvement of the business of pharmacy, there should not have been any attempt to bring about this pressing desideratum. The Preliminary examination is already a distinct part of the qualifying examination, with the requirement of an interval of three months between the passing of it and subsequently going up for what is termed the Minor examination. But if it be desirable for the general interests of pharmacy and of pharmaceutical qualification, that the Preliminary should be passed before apprenticeship, it would seem that this might be managed by a bye-law, made under the sixth section of the Pharmacy Act, extending the three months' interval between the Preliminary and the Qualifying examination, to a three years' interval, as three years is now about the usual period of apprenticeship. Section 8 of the Pharmacy Act, 1852, provides that the examinations are to comprise Latin, botany, materia medica, chemistry and, with certain specified exceptions, such other subjects as may be determined by bye-law. Again, the Charter states that the examinations are to be conducted in such manner as the Council of the Society shall deem proper. All these provisions appear to agree in giving power to add to the subjects of examination and to vary the mode of conducting the examination which has been adopted as the test of legal qualification. Consequently there appears to be a possibility of altering this examination in the manner above suggested and of adding to that part of it which is termed the Preliminary other subjects which would make it a better test of thorough scholastic training. Some of these subjects might be left to the option of the candidates to select from.

Physiological botany has just lost one of its most distinguished votaries in Professor Karl Wilhelm von Nägeli, who died at Munich on the 10th inst., at the age of seventy-four, only two days after the celebration of the fiftieth year of his doctorate. Born at Kilchberg, Nägeli commenced his studies in the neighbouring city of Zürich, and continued them afterwards at Geneva and Berlin. Returning to Zürich he acted there as *Privat-docent* until 1852, when he went as ordinary professor to Freiburg. In 1858 he received a call to Munich, where he fulfilled the functions of professor, curator of the botanical collections and president of the botanical gardens until 1888, when he retired. The light thrown by the researches of Nägeli upon the structure of the vegetable cell and the part played by protoplasm upon its life history initiated a distinct advance in biological science.

* * *

At the recent meeting of the American Pharmaceutical Association the question of the sale of proprietary preparations at cut prices was under the consideration of the "commercial interests" section for some time, and in view of the fact that the representative manufacturers and dealers in such articles had at a previous meeting passed a resolution agreeing to support any practical plan for the prevention of cutting prices that might be endorsed by the American Pharmaceutical Association, the section appointed a committee to consider the subject. At the following session this committee presented a report embodying certain suggestions that it recommended should be brought under the notice of the manufacturers and dealers' association. These were to the effect that a system of contract should be established, under which manufacturers and owners of proprietary preparations and wholesale druggists or distributing agents should pledge themselves to sell contract goods solely to druggists, except in those localities where no druggists are in business, and only to such druggists as agree to sell the preparations at full prices. Any breach of the respective undertakings on the part of the wholesale distributor or the retailer it was proposed to punish by placing the offender in a "cut off" list. The report was agreed to and arrangements were made for submitting the propositions to the manufacturers and dealers' association, and to render assistance in working out the details if required.

* * *

We have much pleasure in stating that at the election of the Royal Masonic Benevolent Institution last Friday Mr. How, of Bournemouth, was elected an annuitant. The request made in this Journal some weeks ago has been largely responded to, and the assistance thus rendered has been very useful in securing the election of Mr. How. For this kind response to our request we desire to thank our masonic brethren, and we hope that the success achieved on this occasion may be followed by future combined action on the part of masons connected with pharmacy to support the candidature of members of the trade or their widows and children who seek election to one or other of the masonic charitable institutions. We must not, however, omit to mention in connection with Mr. How's election that his success has been very materially promoted by the assistance of Mr. Dugdale, of Poole, who was in a position to command a large number of votes from the province of Dor-et, and in addition to using them in support of Mr. How, undertook to borrow a considerable number of votes to ensure success, thus placing himself under a heavy liability to return those borrowed votes at future elections. We mention this circumstance to show that those who took an interest in the election of Mr. How are therefore under a great obligation to Mr. Dugdale, and with the object of inducing all who may have votes to dispose of, whether for the Royal Masonic Institution or for the Boys' or Girls' School, to do all they can in the future towards helping him to repay the votes borrowed for Mr. How's election.

* * *

It may be interesting to some of our readers to now that a collection of prints in colours, illus-rative of the application of photography to chromo-thography, chromotypography, chromocollotype, nd chromophotogravure, and showing the nearest pproach in the present state of knowledge to the olution of the problem of photography in colours, ill be on view daily between 2 p.m. and 9 p.m., ntil the end of June, in the rooms of the Photo-raphic Society, 50, Great Russell Street, and that dmission may be obtained on presentation of a siting card.

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An inquest has been held at Brentford upon a hild poisoned by eating some leaves of *Œnanthe ocata*, gathered while at play in Sion Park.

Pharmaceutical Society of Ireland.

CHEMISTS AND DRUGGISTS.

Several inaccuracies having, it is regretted, occurred in the list of persons registered as chemists and druggists published on the 16th inst., the Registrar requests that the following, which he certifies to be correct, may be published:—

John Breen, Danescastle, Carrig Bannow, Wexford.
Francis A. Brittain, Manorhamilton.
Michael Bowden, Urlingford.
James Canavan, High St., Headford.
Kate Chapman, Aughnacloy.
Mary Anne Crampton, Borrisokane.
Anne Delany, Maryborough.
John James Eccles, Keady.
John Farlow, 14, Berkeley Road, Dublin.
Patrick Gribben, Magherafelt.
Thos. Hamilton, Raphoe.
William Hanna, senior, Main St., Bangor, Co. Down.
Richard Kain, Shrule, Co. Mayo.
Alexander Thos. Kerr, Mountmellick.
James Mahony, Templemore.
Richard C. Marshall, 42, Market Square, Dungannon.
Jas. Miller Moore, Lurgan.
John Temple Moore, Dungiven.
Thos. Erskine Moore, Letterkenny.
Andrew McBrinn, Gilford.
Thos. L. O'Callaghan, Killucan.
John O'Loughlin, 58, Francis St., Dublin.
John Riordan, senior, Glin., Co. Limerick.
Thos. Saul, Rathdrum.
James Selkirk, 7, Pembroke Street, Cork.
Humphrey Smith, Mountmellick.
Joseph Smyth, Abbey Hill, Wicklow.
John Sweeney, Aughrim, Co. Galway.
Patrick Sweeney, Ahascragh, Co. Galway.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting of this Association was held on Thursday, May 7, Mr. A. Campbell Stark, president, in the Chair. The minutes of the previous meeting having been read and confirmed, and Messrs. Morrell and Evans appointed scrutineers of the voting papers, Mr. W. A. Morris, in the absence of the honorary secretary, read the following—

Annual Report.

The Council, herewith, submits to the members the fourteenth annual report of the Association. The Association now numbers 152 members, 46 having been enrolled during this session.

The number of patrons is 48, an increase of 4 over the number of last session. The Council records with much regret the lamented death of one of the officers of the Association, the late honorary secretary, Mr. C. Richards. During the past session 23 notes and papers have been read at the Association meetings and a discussion has taken place on "The Preliminary Examination." Abstracts or full reports of the papers, and discussion have appeared in the *Pharmaceutical Journal*. The average attendance at the meetings has been equal to that of previous sessions.

The conversazione at the Portman Rooms, on Nov. 13, and the annual dinner at the Holborn Restaurant, on March 5 (presided over by Thos. Tyrer, Esq., F.I.C., F.C.S.), were eminently successful and were as numerously attended as on former similar occasions. The musical and social evenings, held monthly at the Association's rooms, have also been highly appreciated and numerously attended. The Association's medals, with the gifts generously given to the Association by Messrs. Burroughs, Wellcome and Co., have been awarded as follows:—To Mr. E. J. Millard the Research Prize for an investigation entitled "An Examination of the so-called 'Cream of Tartar Fruit' from Pretoria," published in the *Pharmaceutical Journal*. To Mr. E. H. Sherlock the Essay Prize for an essay entitled "Recent Advance in Pharmacy." The accompanying balance sheet shows the financial condition of the Association. In conclusion the Council congratulates the Association on its fourteenth successful session.

The President, after commenting upon the unsatisfactory features in the report, and explaining the reason for them, moved the adoption of the report. It was seconded by the Vice-President, Mr. F. Alfred Rogers, and carried unanimously.

The Treasurer, Mr. C. J. Strother, then read the balance sheet.

Election of Council.

The scrutineers appointed to receive and examine the voting papers reported as follows:—

Number of voting papers received . . .	60
Number of voting papers informal . . .	1
Number of voting papers valid	59

The following is the result of the election:—

Ellwood, T. A.	58	Seccombe, C. W.	52
Strother, C. J.	57	Morris, W. A.	51
Williams, W. E.	56	Stark, A. C.	
Robins, H. H.	53	Layman, E.	46
Goodman, F. W.		Stead, J. C.	45
Umney, J. C.		Barnett, E. C.	42
Rogers, Frank A.	52	Gaskin, J. H.	39

The above form the Council.

Sheppard, F. J., 33	Smith, J. J., 24.

A vote of thanks was proposed to the scrutineers by the President, and seconded by Mr. C. J. Strother.

The President then presented the Association's medals to the successful candidates with a few appropriate words.

Mr. Millard, in thanking the Association for the honour accorded him, gave a short description of his reasons for undertaking the research and the points connected with the composition of the drug.

The President announced that Mr. Sherlock's essay would be read at a subsequent meeting of the Association.

The following alteration in a rule of the Association was moved from the chair, seconded by Mr. W. L. Williams, and carried unanimously:

> "In Rule 6 the words 'due in advance on the first of May' to read 'due in advance on the first of October.'"

The President then read the following—

VALEDICTORY ADDRESS.

Gentlemen,—At the close of the fourteenth session of our Association's existence, I resign into your hands the trust you gave to me a year ago.

The past session has taught me many things, not the least of them being the knowledge it has given me of my own shortcomings, and although I am painfully aware that this knowledge has been gained at your expense, still I hope and believe that it will redound to our mutual advantage. The session I have had the honour of presiding over has been marked by disastrous incidents and by the most evil fortune. The sad loss occasioned by the death of our respected and regretted secretary, Edwin Richards, threw much of the affairs of the Association into confusion, and it will be long before the loss occasioned by the death of such an energetic and useful member ceases to be felt, whilst that section of the Association's affairs with which he was entrusted will need some time to recover its equilibrium. Moreover, at the most important part of this session, a recent sad bereavement incapacitated our literary secretary for the work of the Association he had undertaken. It is to this circumstance, one with which every member of the Association sympathises, that the delay in the performance of the official business of the latter part of the session has arisen. Besides all this, at the commencement of the session the ranks of the Association's workers were thinned by a most appalling outbreak of matrimony.

I would take this opportunity of expressing to my colleagues on the Council the deep sense of gratitude I felt to them for the loyal and generous way in which they have supported me during the session. No president of any association, I am convinced, has been more generously supported by his colleagues than the unworthy individual who now addresses you. The especial thanks of the Association are due to Messrs. Seccombe and Morris, who have acted as secretaries, and on whom the whole burden of the secretarial work has fallen alternately. Our respected treasurer, Mr. C. J. Strother, the Vice-Presidents, Messrs. Williams and Rogers, and the gentleman who preceded me so well in the chair, Mr. T. A. Ellwood, have done work for the Association beyond all praise, and I ask you to endorse the feeling of gratitude I feel to them for their generous assistance.

Turning to the prospects of the Association in the future, I have learnt many lessons in the past session which, although unpleasant to realize, will, I hope, profit us to discuss, and may guide our policy in the future. There has never been a time when the Association stood in so much need of new departures as it does now. A few years ago it was the only Association of the kind in London or, indeed, in the five counties surrounding the metropolis. Now in every suburb of London a chemists' association is formed or in contemplation, whilst in some places, and in connection with the various schools of pharmacy, junior associations have been started on our own lines. I do not say that these things are to be deprecated, or are a source of danger to the Association. Far from it. Viewed as signs of tendencies in English pharmacy they are highly gratifying, but let us not forget to look well to our own condition, and take stock of our own strength. We must remember that many of these associations draw their revenue from the same sources as we do. These sources are not inexhaustible, and we may find that some of our rivals will be supported at our expense.

As in all human affairs, however, the fittest will survive, and that Association will endure the longest which can offer the most attractions to its members. The great needs of our Association appear to me to be the development of its social side and the stimulation of interest in its technical meetings. Let us for the first part secure for the Association a habitation in which it has a complete proprietary right instead of only a fractional share of such. I believe that after a small initial outlay this could be done at no more cost than is at present involved. In this way we could form a "Chemists' Assistants' Institute," open always to our members, and which would prove to many of us a decided boon. Next, let us apply ourselves seriously to consider why some of the meetings are so poorly attended. The attendance during my five years' experience of the Association, although subject to fluctuations, has remained at the same average as when I first became a member, yet the numbers of the Association since then have considerably increased. I believe we should gain greatly by extending the number of evenings for short notes and papers and limiting the remainder, as far as possible, to subjects of strictly practical pharmaceutical interest. I would impress on the members of the Association, and especially those who take an active part in its work, the positive duty of attending the meetings as often as possible, and particularly when papers are read by our own members. Nothing is more disheartening to the reader of a paper, often produced at great trouble and expense, or to the best interests of the Association, than an audience of such very limited numbers as is occasionally seen in this room. I do not think that many of us realize what a powerful and pleasant means of education the meetings of the Association often are. Our 'Proceedings' form up to the present quite a comprehensive technical encyclopedia, and I find the bound volume of the six copies I possess one of the most useful books I have, while the value of its contents has been much enhanced for me by having heard much of them, at first hands, from the author's lips.

In conclusion, gentlemen, I thank you for the very kind consideration you have shown me during my year of office. I fear that I have done my duty thoroughly to none of you, but I ask you to believe that my defects are constitutional rather than inclinatory; due to physiological weakness rather than to mental depravity. Let me urge you all to a great effort in the coming session to increase the Association's prosperity, and with the hope that it will bear good fruit, I bid you, sirs, in my presidential capacity, farewell!

At the conclusion of the address a vote of thanks was proposed to Mr. Stark by Mr. E. J. Millard, and seconded by Mr. C. J. Strother, for the manner in which he had filled the presidential chair during the past session.

The vote being carried by acclamation, and replied to by Mr. Stark, the proceedings terminated.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the meeting held on the 12th inst. at the Society's Rooms, 50, Great Russell Street, W.C., Mr. J. Glaisher, F.R.S., President, in the chair, a paper by Mons. Leon Vidal on "Photographic Methods of Obtaining Polychromatic Impressions" was read by the Assistant Secretary. In this paper the author described simple and composite photochromy. In simple photochromy a negative of the subject is taken on an ortho-chromatic plate, a collotype plate is prepared from it, and transfers laid on as many stones as there are colours required. The stones are worked by a lithographic artist and printed in the usual way. To complete the picture a collotype impression is printed over the colours. In composite photochromy three or more negatives are taken through suitable colour screens; these are retouched if necessary, made into collotype plates and printed in the usual way. The paper was illustrated by lantern slides and specimens.

The Assistant Secretary had got together numerous examples of photochromatic work which were hung upon the walls.

Mr. J. Spiller, referring to the collection, said that they proved the great advance that had recently been made in reproductions in colour, especially referring to three examples by Haufstaugel, of Munich, and to a series of Swiss views by the Photochrom Co. of Zurich.

Mr. G. L. Addenbrooke urged that the discussion should be adjourned till the members had had an opportunity of studying the paper and the exhibits.

Mr. V. Blanchard said that Mr. Woodbury was the discoverer of the process described by M. Vidal.

Dr. E. Albert mentioned that he had applied composite photochromy to type blocks.

Votes of thanks to M. Vidal and the exhibitors terminated the proceedings, the discussion standing adjourned.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, April 30, Mr. J. C. Umney, Vice-President, in the chair.

Mr. E. F. Harrison read a note on "Commercial Benzoles," giving the composition of several specimens which contained from 3 to 71 per cent. of real benzene, some consisting almost entirely of toluene. He also read the following:—

Note on the Melting Point of Citric Acid.

BY E. F. HARRISON,

Bell Scholar.

Having found that the melting point of a sample of citric acid with which I was working did not agree with that given in the text-books, I thought it might be worth while to ascertain if other samples agreed with this one or with the books. It is stated by Roscoe and Schorlemmer, Remsen, Beilstein and others that citric acid melts at 100° C.; it is of course understood that on points of this kind statements in different books are all taken from one or more original researches.

I ascertained the melting point of six samples by placing the acid in powder in capillary tubes, and heating gradually in the usual way, with the following results:—

Sample.	Condition when procured.	Began to melt at	Continued melting as temp. rose, liquefaction being complete at	Purity as to tartaric acid.
A . .	Powder.	70°	150°	Cont. little tart. ac.
B . .	Crystal.	70°	140°	,, no ,,
C . .	,,	65°	138°	,, little ,,
D . .	,,	65°	131°	,, very little ,,
E . .	,,	65°	133°	,, much (abt. 5°/o) ,,
F . .	,,	70	148°	,, little ,,
F_1 . .	Powdered and dried over H_2SO_4 for 3 hours.	70°	132°	
F_2 . .	First recrystallisation.	70°	142°	,, no ,,
F_3 . .	Same as F, but in sealed tube.	64°	134°	

I also tried the effect of putting tubes containing portions of the acid into baths previously heated to various temperatures, instead of raising the temperature gradually while the tube was in the bath; and I find that if small crystals of the acid are taken, and the tube at once put into a bath at 86° or higher, complete liquefaction occurs, and if the tube is left in the bath for a minute or two after the acid has melted, small crystals are deposited, and since small drops of water collect in the upper part of the tube, there is no doubt the crystals are anhydrous citric acid.

If the acid is taken in fine powder, however, very little is melted, even if the tube is placed in a bath at 100°, though drops of water still collect in the upper part of the tube.

If the tube is placed in a bath below 86°, not more than partial liquefaction occurs, whether the acid is in crystals or powder.

A slight contamination with some other substance often considerably affects the melting point of any given substance. It is evident that tartaric acid is not the cause of the citric acid melting so low, as those samples perfectly free from tartaric acid behaved similarly. The test I employed for tartaric acid was Pusch's, which consists in heating the acid in powder with sulphuric acid in a water-bath for one hour;

if at the end of that time the solution is of a lemon yellow colour only, no tartaric acid is present. If tartaric acid is present, however, the colour will be brownish-yellow to dark brown, according to the amount present. As little as ½ per cent. is readily detected by this test.

I also separated the low melting portion by heating some of the acid in a test tube at 70° for nearly an hour and pouring out what had melted. On examining this for malic acid, etc., I failed to find anything in it but citric acid.

It is also evident that water adhering to the crystals is not the cause of their commencing to melt at the low temperature, as the sample that was dried over sulphuric acid was unaffected in this respect.

My conclusion is therefore that citric acid melts at about 65° to 70° C., but at once loses some water, and if the heat be continued, liquefaction is complete at from 130° to 150°. The looseness of the last figure is probably accounted for by the different degree to which water vapour would be given off, according to whether the acid was tightly packed in the tube or not, and whether the temperature was raised slowly or quickly.

The acid does not appear to be entirely liquefied at about 70°, but probably while those parts farthest from the source of heat are liquefying, the previously liquefied portions are giving up water and depositing anhydrous crystals, so that it is not all in the liquid state at once; whereas if suddenly exposed to a temperature of 86° or higher, melting occurs with sufficient rapidity to be complete before any part becomes anhydrous. This of course only applies to small portions, which do not take long in becoming equally heated throughout.

It might be thought that when heated in a sealed tube complete melting would have occurred at a considerably lower temperature than in an open tube. As a matter of fact, the temperature was somewhat lower, and the reason there was not more difference is probably that as the tube was not filled with the acid, water could easily become separated from it, although it could not escape from the tube.

It is worth noting that it is stated in Roscoe and Schorlemmer's Treatise that "it melts at 100°, and on increasing the heat begins to lose its water of crystallization, which is driven off completely at about 130°;" in Watts's 'Dictionary,' that "the crystals . . . . lose their water of crystallization at 100°;" and in a text-book by Hodgkinson and Greenaway, that "the crystals melt at 100°, but only lose water at a higher temperature;" but it is evident from the above experiments that they lose at least some of their water considerably below 100°.

A discussion followed, in which the Chairman, Secretary, Messrs. Garnett and Shepheard took part.

A report on Analytical Chemistry was then read by Mr. W. F. J. Shepheard.

REPORT ON ANALYTICAL CHEMISTRY.

BY W. F. J. SHEPHEARD,

Pharmaceutical Chemist.

Rapid Method for the Detection of Iodine, Bromine and Chlorine in presence of one another. By F. A. Gooch and F. T. Brooks.—The solution of the substance under examination is acidified with dilute sulphuric acid and treated with a drop or two of a solution of sodium or potassium nitrite free from chlorine. Unless the amount present is small the iodine shows itself in the solution and in the vapours which escape. Small amounts may be detected by shaking with carbon bisulphide or by heating the solution and testing the escaping fumes with red litmus paper, which is coloured greyish blue by iodine. The whole of the iodine must be removed previous to making the tests for bromine and chlorine, and this is done by adding a sufficient amount of nitrite and sulphuric acid to liberate the iodine, and heating the liquid until the vapour has no effect on red litmus paper. A portion of the solution is then tested for bromine by cautiously adding a dilute solution of sodium hypochlorite and shaking with colourless carbon bisulphide. Another portion of the solution is evaporated to dryness and treated with potassium dichromate and sulphuric acid; the fumes of chromyl chloride which are given off on warming are condensed and converted into chromic acid and the latter detected by means of lead acetate.

Distinction between Arsenic and Antimony. By G. Deniges.—The stain obtained in Marsh's test is placed in a porcelain capsule and heated with a few drops of pure nitric acid, and small quantity of a solution of ammonium molybdate in nitric acid is added. Antimony gives no precipitate, but if arsenic is present arsenomolybdic acid separates as a yellow precipitate which under the microscope is even to consist of stellate crystals with triangular arms, generally six, arranged in rectangular planes along the axes of a cube. They act on polarized light.

Separation of Tin and Antimony. By H. N. Warren.—The pulverized material, after fusion in a nickel crucible with sodium carbonate and borax, is dissolved in hydrochloric acid and an aliquot part of the solution precipitated with hydrogen sulphide. This precipitate is collected, boiled with sodium hydroxide, and the solution of sodium sulphostannate and sulphoantimonate obtained is divided into two portions; in the one only the antimony sulphide is precipitated by boiling with excess of oxalic acid, whilst in the other, the tin and antimony sulphides are precipitated together by warming with dilute hydrochloric acid, but in both cases, the sulphides are decomposed by ignition and weighed as oxides, from which data the relative proportions are easily obtained.

Test for Resorcinol and Thymol. By H. Bornträger.—When treated in warm acid solution with nascent nitrous acid, resorcinol gives a blood red colour, thymol a yellowish red. If aqueous solutions are used that of resorcinol remains clear, whilst that of thymol gives a flocculent precipitate: alcoholic solutions remain clear in both cases. Very minute quantities can be detected and distinguished by performing the following experiment:—About equal quantities of a nitrite, solid gypsum, and sodium hydrogen sulphate are mixed in a test tube, and moistened with water; the liquid to be tested is added, and the whole is warmed. Thymol produces a chrome-red colour and resorcinol a dark chrome-green, magenta red drops separating in the upper part of the tube.

Detection of Rosin in Beeswax. By H. Röttger.—If a sample containing 5 to 10 per cent. of rosin is heated to 110° C. a strong odour of turpentine will be noticed. If large quantities of the impurity are present it would be noticed from the appearance, but small quantities are best tested as follows:—Thoroughly boil the suspected sample with strong alcohol, evaporate the alcoholic solution, boil with nitric acid, when the resin is gradually dissolved with the evolution of nitric vapours. On water being added a yellowish flocculent precipitate is obtained, which is not altered by fixed alkalies, but dissolves in ammonia with a blood red colour.

Volumetric Estimation of Phenol, Thymol, Naphthol and Salicylic Acid.—J. Messinger and G. Vortmann have found that the principles of the process by which aristol and similar compounds are obtained, viz., treatment with iodine of a strongly alkaline solution of thymol, etc., may be applied to the quantitative estimation of the above named substances, and no doubt also of others chemically allied to them. The equisite volumetric reagents are a $\frac{1}{10}$ normal solution f iodine and a $\frac{1}{10}$ normal solution of sodium hypoulphite.

In the estimation the phenol must be in alkaline olution. For each molecule of phenol there will be onsumed 6 atoms of iodine. The mode of proceeding s as follows:—2 to 3 grams of the phenol to be estimated are dissolved in soda, so that there are at least molecules of soda present for every molecule of henol. The solution is then diluted to 250 or 500 c.c. f this an exactly measured quantity of 5 or 10 c.c. is ut into a small flask, the contents heated to about 0° C., and enough of the $\frac{1}{10}$ iodine solution added to ender the liquid strongly yellow by excess of iodine. Jpon agitation a bright-red precipitate will fall. After he liquid has cooled it is acidulated with dilute sulhuric acid, diluted to 250 or 500 c.c. and a definite ortion, say 100 c.c., titrated with $\frac{1}{10}$ hyposulphite olution in order to ascertain the excess of iodine. 'he actual amount of iodine consumed (in grams), multiplied by the factor ·123518, gives the quantity of ure phenol.

The factor is derived thus:—

$$\frac{1 \text{ molecule phenol}}{6 \text{ atoms iodine}} = \frac{93·78}{759·24} = ·123518.$$

Thymol can be similarly determined, but no heat is equired. The precipitate caused by iodine has a rownish-red colour. Each molecule requires four toms of iodine. The amount of iodine actually conumed, multiplied by ·2956772, indicates the quantity f thymol.

From ·1 to ·3 gram of thymol is dissolved in soda n the proportion of 4 molecules of soda to 1 of thynol. The solution is then diluted to 250 or 500 c.c., nd except that no heat is applied, treated in the same nanner as in the case of phenol.

Naphthol (Beta).—This yields under the same conlitions a dirty green precipitate. Here also 4 moleules of soda must be taken for every molecule of aphthol. The amount of iodine consumed must be multiplied by the factor ·37843106. In this case the olution must be heated to 50° or 60° C.; otherwise he method is the same.

Salicylic Acid.—This may be estimated either alone r when mixed with benzoic acid; the latter not ntering into reaction. In this case also 4 molecules f soda must be taken for one of acid. On adding the $\frac{1}{10}$ iodine solution to the acid solution warmed to 50° r 60° C., a precipitate should not be formed at once. Only after iodine is present in excess, and the liquid as been slightly warmed, is there produced a bright ed precipitate, which increases in quantity after cidulation. If too small a quantity of alkali is preent, a yellowish-white precipitate is formed before he iodine is present in excess. Should this happen nore alkali is added until the precipitate dissolves, fter which the addition of the iodine solution is coninued. The factor with which the quantity of iodine ctually consumed must be multiplied is ·18132606. The alkali which is used in these processes must be ree from nitrite. If not, the latter must be deternined separately by means of iodine solution and the roper correction made when the alkali is employed.

Separation of Tin and Titanium. By H. Haas.—The method is founded on the fact that tin oxide SnO_2) is reduced to the metallic state by ignition in a urrent of hydrogen, whilst this is not the case with itanic acid (TiO_2). A lower stage of oxidation is ormed, but this on boiling with hydrochloric acid is gain converted into titanic acid.

After both oxides have been ignited in a current of ydrogen the metallic tin is dissolved by treatment with hydrochloric acid, and the tin thrown down from ts solution as sulphide by means of sulphuretted hydrogen, after excess of acid has been partially neutralized.

The insoluble residue is fused with potassium bisulphate, the melt is taken up in water, acidifying the solution if necessary, and the liquid is neutralized with potassium hydroxide or ammonia. After 5 per cent. of the volume of undiluted sulphuric acid has been added it is boiled for six hours to precipitate the titanic acid, more water being added to compensate for loss by evaporation.

The method is not applicable in presence of ferric salts. When ferric salts are present the separated ferriferous titanic acid is filtered off and ignited in a glass tube in a current of hydrogen, which is kept up until the product is cold. The reduced mass is then rinsed into a small beaker, boiled for half an hour with 20 per cent. hydrochloric acid; the white residue is collected on a filter, washed and weighed as pure titanic acid.

The report gave rise to a discussion, in which the Chairman, Messrs. Garnett, Fuge, Taylor and the Secretary joined.

The meeting then adjourned.

ROYAL INSTITUTION.

CRYSTALLIZATION.

At the commencement of a discourse on "Crystallization," delivered at the Royal Institution, on Friday, the 15th inst., Professor Liveing remarked that the subject had always produced a feeling of wonder in him, not so much at the beauty and variety of crystalline forms, as at the power of nature that regulates the forms assumed by bodies in passing from the liquid to solid state. Crystalline forms, the speaker said, are the outcome of ordinary received mechanical principles, and it is not necessary to hypothesize the existence of any extraordinary force to explain their construction other than that which causes liquids to rise in capillary tubes or produces surface-tension. In fact, the force in question may be the same as gravity; at any rate, all the requirements are fulfilled by a force like gravity, to which atoms are practically indifferent at greater distances. One of the most characteristic features of crystalline bodies is the property of cleavage, which is observable in the readiness of mica to split into layers, or in the tendency of calc-spar to assume rhombohedral forms, so that after pulverization the dust consists of minute rhombohedra. More interesting phenomena are revealed by the examination of the optical properties of different crystals; thus common salt shows no double refraction, whilst more unsymmetrical crystals exhibit double refraction in all directions. These facts lead to the conclusion that the external form is an outcome of internal structure, and in order to explain the connection several assumptions must be made. Matter is made up of molecules or atoms, the freedom of movement of which is very restricted in matter in the solid state, but although the length of their path is curtailed, the molecules are always in very rapid motion. In consequence of this rapid internal motion radiation obtains, and a number of wave movements are communicated to the surrounding ether, amounting to billions per second. The average distance of movement on either side of the central position will determine the space occupied by the atom, and Dalton had thought the sphericity of atoms was proved, because he observed no sign of a cause that the dimensions should be unequal in different directions. Professor Liveing took the opposite view, which he thought was borne out by the unsymmetrical shapes that many crystalloids assume. Chemists, he said, are in the habit of thinking and talking about complex molecules, like NaCl, made up of atoms, Na and Cl, held together by a force, and it may be that the atoms are the vibrating parts. Such, however, was not his own idea, for he was so paradoxical as to disbelieve the existence of sodium and chlorine in common salt. A less philosophical audience, the lecturer continued, would at once retort that such a view was absurd, because both sodium and chlorine could be obtained from common salt, and common salt resulted from the combination of sodium and chlorine. But he would reply that these operations could not be conducted without the addition or withdrawal of energy, and that in the essence of the matter physicists were on his side. Even chemists admit that molecules of a body are of equal weight and occupy equal volumes, whilst the intermolecular spaces are on the average the same for the same temperature and pressure. Moreover, similar molecules are similarly constituted and assume similar motions, so that they therefore move about in similar spaces. In the passage from the gaseous or liquid to the solid state the molecules of a body will tend to pack themselves, and if they are to occupy a stable position, potential energy must be at a minimum, *i.e.*, the molecules will pack as closely as possible. With these premises some further conclusions concerning the molecular arrangements in crystalline bodies may be gathered from the examination of models. If the packing of spherical molecules be so arranged that one molecule shall touch as many others as possible, *i.e.*, that the interstices shall be minimal, it will be found, as Professor Liveing illustrated with piles of balls, that one may be touched by twelve others, but by no more. In a three-sided pyramid six touch in one plane and three in each of the other planes, whilst in a four-sided pyramid four touch in all three planes. The same law holds good with spheroids and ellipsoids, though the resulting figures are less symmetrical; but in point of fact only one arrangement of molecules is possible, since if they attract one another at all they must pack as close as possible. Moreover it will be observed in the models that the arrangement of the balls on the faces of the three-sided pyramid corresponds to the arrangement on the base of the four-sided pyramid and *vice-versâ*; in fact they are but the cube and octahedral varieties of the same system. These considerations can of course be theoretically applied to actual molecules, although, according to Sir W. Thomson, they may be so minute that one hundred and forty millions in a row only stretch one linear centimetre. A second prominent feature that may be illustrated by models is that the condensation always occurs so as to produce a minimum of surface-tension, *i.e.*, a surface in which the molecules are most closely aggregated. With spherical balls it is found that least surface energy or tension occurs in the octahedron, and therefore this is the primary form of the regular system, but the forms in which least surface energy obtains varies according to the shape of the molecules. If the cube be taken as the unit of condensation per unit of area, it is found with differently shaped molecules to bear the following relations to the octahedron and dodecahedron, a common crystalline form in which certain edges of the octahedron or the cube are truncated, yielding a plane in which it is only possible for two molecules to touch a third.

I. With spheres.—Condensation per unit of area in faces of—

Cube	1·0000
Octahedron	1·1548
Dodecahedron	0·7071.

II. With oblate spheroids in which the greatest and least diameter are as $\sqrt{2}:1$.

Cube	1·0000
Octahedron	0·8660
Dodecahedron	1·4142.

III. With oblate spheroids in which the greatest and least diameter are as 2 : 1.

Cube	1·0000
Octahedron	0·3775
Dodecahedron.	0·7071.

With increase of the total condensation there is necessarily an increase of surface tension, but the increase is not proportional. This surface force is of course comparatively minute, but no one has yet been able to measure the surface tension of solids, although Quincke has determined the value in a number of substances just above the point of solidification and expressed it in dynes per lineal centimetre.

Platinum	1658	Antimony	244
Gold	983	Borax	212
Zinc	860	Na_2CO_3	206
Tin	587	NaCl	114
Mercury	377	H_2O	86·2
Lead	448	Selenium	70·4
Silver	419	Sulphur	41·3
Bismuth	382	Phosphorus	41·4
Potassium	364	Wax	33·4
Sodium	253		

From the above arguments Professor Liveing said it might be expected that all solid substances would assume the cubic form, but the tendency to reduce to a minimum the surface energy per unit of surface and the total surface energy per unit of mass produces other effects that are perceptible in the tendency of a liquid to assume a spherical form as affording the smallest surface for a given mass. The latter point was prettily illustrated by the lecturer in a repetition of Liebreich's experiments of mixing solutions of chloral and carbonate of soda and observing by means of an electric beam the cloud of fine drops of chloroform formed and permeating the solution. The same general effect can be traced in the truncation of certain angles in solids, since wherever there is an angle there is a greater tendency to condense the mass, and as there is always a similar angle on the opposite side, the opposite angle is also truncated to equalize the result. Indeed it is generally observed that if one angle is modified all the angles, or at any rate the opposite angle, will be similarly modified in order to equalize the surface tension. It is the same factor that renders it easier to continue the growth of an old surface than to start a new surface, as may be evidenced by the rapid growth of crystals in a supersaturated solution when a crystal possessing the same surface tension has been introduced, or by the growth of crystals to an enormous size without development of new faces. In breaking crystals two new surfaces are formed and the cleavage takes place in the direction of least surface tension. Some bodies, however, do not crystallize in forms in which the surface tension is theoretically least. Thus fluorspar does not usually crystallize in octahedra but in cubes, yet it cleaves readily in the octahedral form. These apparent exceptions are really additional proofs of the correctness of the hypothesis, since they are instances in which the normal surface tension has been affected by neighbouring exterior forces, such as may result from temperature, electrical and other conditions. In other crystals of the regular system the octahedral cleavage is not the easiest, as in blende cleavage, which takes place easiest in the dodecahedral plane. If the motions of the molecules are not equal in all directions, but only in directions about one axis, as in spheroids where the short axis is half the length of the long axis, the tetrahedron is subjected to stress, and the cleavage is cubical, as illustrated by rock salt. With less symmetrical molecules less symmetrical octahedra result, and with increasing stress the rhombohedral and hexagonal forms obtain. As a rule, all the faces of a crystal are equally developed or modified, but when his is not the case, as in Rochelle salt, where certain dges are bevelled and not others, a certain amount of train occurs in the interior of the crystal. These nequal developments are therefore associated with eculiarities in optical and electrical properties. uartz crystallized under circumstances of strain liffers in optical properties from fused quartz, in which the internal stress has been removed. Unlike an niaxial crystal, such as calc spar, in which a black cross s so distinctly visible by polarized light, in quartz the ross is only seen on the edges of the rings and does not xtend through the middle. At the conclusion of the ecture Professor Liveing demonstrated experimentally hat similar results could be obtained by subjecting atural crystals to artificial strain. Thus he showed a rystal of ferrocyanide of potassium, that in the atural state exhibited a black cross by polarized ight, but when compressed exhibited almost the ppearance of a biaxial crystal. Numerous experinents of the same nature were made, and a magniicent collection of crystals of different inorganic salts vas also displayed.

Obituary.

Notice has been received of the death of the following:—

On the 4th of May, Mr. Henry Wilson, Chemist and)ruggist, 19, Rusholme Road, Ardwick Green, Manhester. Aged 50 years.

On the 4th of May, at Sheffield, Mr. Charles William awford, Chemist and Druggist, late of Huddersfield. ged 45 years. Mr. Lawford was an Associate in Business of the Pharmaceutical Society.

On the 5th of May, Mr. Herbert Malster Kerridge, hemist and Druggist, Tottenham Lane, Hornsey. Mr. Kerridge was an Associate of the Pharmaceutical ociety.

On the 12th of May, Mr. Richard Dresser, Pharmaeutical Chemist, York. Aged 73 years. Mr. Dresser vas one of the Founders of the Pharmaceutical Society, aving joined it in 1841.

On the 15th of May, Mr. Charles Farrer, Chemist nd Druggist, Castleford, Yorkshire. Aged 66 years.

On the 15th of May, Mr. Evan Williams, Chemist nd Druggist, St. Clears, Carmarthenshire. Aged 78 ears.

On the 17th of May, Mr. Amos Doidge Davey, Chemist and Druggist, Union Street, Stonehouse. Aged 9 years.

Reviews.

INTMENTS AND OLEATES, ESPECIALLY IN DISEASES OF THE SKIN. By JOHN V. SHOEMAKER, A.M., M.D., etc. Second Edition.*

This book is professedly a second edition of Dr. hoemaker's little work on the Oleates, in which the uthor sought to present a *résumé* of all that had been ritten on the subject up to the time of its publication 1 1885, or about the time that the oleates of zinc and ercury first acquired a place in the British Pharmaopœia. It is in reality, however, much more than iis, since it is now extended to include formulæ and ther information respecting most of the ointments in se in the civilized countries of the world.

Part I. is devoted to Ointments, and the first chapter as somewhat of an *olla podrida* character, being in turn dermatological, historical, physiological, therapeutical, chemical, and pharmaceutical. Lanolin occupies in this chapter the premier place among the ointment bases, since no less than ten out of the twenty-seven pages are occupied by a description of its properties and uses. The second chapter deals with the ointments—official and non-official—of the United States, and successive chapters are devoted to the ointments of Great Britain, Germany, France, Austria, Italy, Spain, Mexico and Chili. The non-official formulæ given are very numerous, and for this reason alone the book deserves a place among the works of reference in a pharmacy. Throughout the work a digest of literature published on the several subjects, well up to date, is supplemented by useful remarks suggested by the practical experience of the author as a professor of materia medica and specialist in the treatment of diseases of the skin. Sometimes, however, statements are made that appear a little wild, as for instance, where iodol is described as being "prepared from Dippel's animal oil.... first purified and then treated with a solution of iodine in iodide of potassium."

Part II. is taken up with the "Oleates." Although more or less pure oleates, in the shape of soap and lead plaster, have long been employed, the use of oleic acid as a solvent for alkaloids for medicinal purposes was first suggested by Professor Attfield in 1862, and ten years later the use of oleic acid compounds in medicine was advocated by the late Professor John Marshall. As pointed out by the author, the oleates then introduced were at best only solutions of some oleate in excess of oleic acid, and the same remark applies to those now official. Dissatisfied with this kind of preparation, the author worked in conjunction with Dr. L. Wolff, of Philadelphia, with a view to their improvement, with the result that in 1881 the latter read before the Philadelphia College of Pharmacy a paper, in which he described a process for preparing what he termed "true oleates." Other papers followed, and in 1889 Mr. Beringer published a series of formulæ for preparing the oleates by double decomposition, using a pure sodium oleate as a rule as one of the factors (see *Pharm. Journ.*, vol. xx., p. 676), and most of these formulæ appear to be adopted in the present work.

In a chapter on the physiological action of the oleates the results are given of some experiments made with a view of determining whether these compounds are absorbed into the blood when applied to the skin, so as to produce systematic effects. The experiments were made upon rabbits by applying the oleate mixed with more or less oleic acid to a portion of the abdomen from which the hair had been removed, the oleates employed being those of quinine (25 per cent.), mercury, copper, zinc, strychnine and aconitine, the two last in the proportion of 2½ grains in 2 drachms. The observations showed that the supposition that the oleates are directly absorbed and taken up by the lymphatics and conveyed into the blood, is erroneous, since on no occasion did one penetrate deeper than the epidermis and its continuation into the glands and follicles. But it is this amount of penetration which it is claimed constitutes the peculiar advantage of the oleates in certain cases. For instance, while the ointments of white and red precipitate will destroy the conidia and mycelium of superficial fungi in trichophytosis, chromophytosis, etc., the mercury and copper oleates dip into the follicles and there exercise a like destructive action.

The last chapter is upon the therapeutic action of the oleates, concerning which the author is able to speak from unusual practical experience. It would appear from this that several of these compounds are worthy of wider attention than they have yet received.

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* Philadelphia and London: F. A. Davis, 12mo. Pp. 8. 6s. 6d.

MEDEDEELINGEN NIT 'SLAND PLANTENTUM VII. Chemisch-Pharmacologisch Laboratorium. M. GRESHOFF. Batavia: 1890.

The Botanical Gardens at Buitenzorg, Java, may be said to take the lead of all the botanical gardens in the world so far as relates to the excellence and importance of the scientific work carried on there. The present contribution, a brochure of 127 pages, marks a new departure. Six valuable reports have been previously issued; the first in 1884, by Dr. W. Burck, Assistant Director, giving full descriptions of the gutta percha trees of the Padang highlands; the second contains the details of an investigation of the sugar cane disease by the Director, Dr. Melchior Treub; the third an account of the hitherto botanically unknown trees yielding minjak-tangkawang and other allied fats; the fourth and fifth, an account of the coffee-leaf disease and the means of combating it, by Dr. W. Burck, as was also the sixth, comprising the first part of a history of the Buitenzorg Gardens, by Dr. M. Treub. The seventh is the present *brochure*, and is the first of a series of contributions to a knowledge of the chemical constituents and active principles of the more important plants grown in the Buitenzorg Botanic Gardens. The investigations are carried on in the chemical and physiological laboratory in connection with the Gardens, which is in fact a research laboratory, having the unusual but exceedingly important advantage of being able to obtain material, the botanical source of which can be absolutely guaranteed.

So many chemical researches have hitherto been of necessity carried on under conditions in which the exact botanical source could not be verified, and the date of collection and consequent physiological state of the plant could not be ascertained, that it is evident the results obtained in the Buitenzorg laboratory should be of the highest scientific value. Indeed, this is shown in the very first chapter, which gives an account of an alkaloid detected in the leaves of the papaw tree, but which has hitherto been overlooked.

The present report is divided into six chapters, the first giving an account of carpaine, the alkaloid from papaw leaves; the second records an investigation of ten plants belonging to the natural order Leguminosæ; the third deals with fifteen plants of Apocyneæ; the fourth with *Cerbera Odollam*; the fifth with Lauro-tetanine, an active constituent of several Lauraceous plants; and the sixth is a first contribution to a knowledge of the plants that afford hydrocyanic acid, and occur in the Dutch East Indies.

Carpaine has a special action on the heart, depressing its action. Dr. Greshoff believes that it might be found useful in medicine. As it is comparatively insoluble in water he recommends for use the hydrochlorate, which can be obtained in silky acicular crystals and is easily soluble in water.

One of the most interesting of Leguminous plants investigated is *Derris elliptica*, the root of which, under the name "tuba root," is well known in the East Indies as a fish poison, and which is also stated to form an ingredient of the Ipoh arrow poison. The active ingredient of this plant is not an alkaloid, but is apparently of the nature of an acid resin. It is soluble in alkalies and precipitated from the alkaline solution by acids. It is remarkable for the extraordinary power it possesses of stupefying fishes.

The other Leguminous plants examined belong to the genera *Pachyrhizus*, *Sophora*, *Erythrina*, *Cassia*, *Crotallaria*, *Milletia*, *Acacia*, *Albizzia* and *Pithecolobium*. The first named, *Milletia*, contains a glucoside poisonous to fishes; *Sophora*, an alkaloid of a nauseous character; *Erythrina*, an alkaloid affecting the respiration; *Pithecolobium Saman* yields a very poisonous liquid alkaloid, and *Acacia tenerrima*, one which depresses the action of the heart.

The majority of the apocynaceous plants examined contain an alkaloid acting on the heart, and in some cases as a paralysant. The plants examined belong to the genera *Melodinus*, *Leuconotis*, *Rauwolfia*, *Hunteria*, *Pseudochrosia*, *Ochrosia*, *Kopsia*, *Vinca*, *Alstonia*, *Voacanga*, *Tabernæmontana*, *Rhyncodia* and *Chonemorpha*. Besides the alkaloids found, in many cases a brown substance giving a strong blue fluorescence was met with which seems to be a characteristic constituent of East Indian Apocyneæ. *Cerbera Odollam* contains cerberine or cerberide, a body agreeing in many points with Arnaud's tanghinine.

Laurotetanine is an alkaloid allied to nectandrine, but differing from it in its greater toxicity as a tetanic poison. It is soluble also in excess of alkali. It has been found in the genera *Litsæa*, *Tetranthera*, *Haasia*, *Notaphœbe*, *Aperula*, *Actinodaphne* and *Illigera*. The alkaloids found in *Hernandia*, *Gyrocarpus* and *Cassytha* differ in some respects both chemically and physiologically from laurotetanine.

The plants yielding hydrocyanic acid are divided into two groups, the first containing amygdalin, and the second having none. The first comprises plants of the genera *Gymnema* and *Pygeum*, the second *Lasia* and *Pangium*, belonging respectively to the natural orders Asclepiadeæ, Rosaceæ, Aroideæ and Bixineæ.

Accompanying each investigation is a summary of the present state of our knowledge of the alkaloids, glucosides, or other active principles derived from other plants of the same genus, and in some cases from other genera of the same family. References are also given to uses of the same plants in other countries and to various works on botany and materia medica containing useful information concerning them.

From the brief notice here given it will be readily seen what a splendid contribution has been made in one year to our knowledge of the active principles of plants, and how valuable such contributions must be even if only a few of the new bodies discovered can be turned to practical account in medicine or the arts, since a better knowledge of the chemical constituents of the plants of different natural orders may throw light on the natural affinity of the plants, on processes of vegetable life, and on the chemical relationship of various active principles. It is much to be regretted that the Government in this country is so behind that of other nations in supporting scientific investigations of the natural products of our vast empire, thus permitting other countries to get the advantage of a start in the keen competition of the present day. The Dutch Government has already reaped the advantage of its liberality and foresight in the case of cinchona and will probably do so in the case of gutta percha. Dr. Treub and Dr. Burck are to be greatly congratulated on having such an energetic and able coadjutor in Dr. Greshoff, and on the excellent work that is being issued under the auspices of the Buitenzorg Gardens.

NOTICES OF MEETINGS.

Pharmaceutical Society of Great Britain.—Tuesday, May 26, at 8 p. m.: Celebration of the Jubilee of the Society.—Wednesday, May 27, at 12 noon. Annual Meeting, followed by Special General Meeting. At 6[illegible] Jubilee Dinner.

Photographic Society.—Tuesday, May 26: Discussion on the Influence of Development on Gradation.

Brighton Junior Association of Pharmacy.—Wednesday, May 27, at 8.45 p.m.: General meeting, followed by Social and Musical Evening.

Society of Chemical Industry (London Section).—Monday, June 1: "Gum Arabic and its Modern Substitutes," by Dr. S. Rideal and Mr. W. E. Youle. "On the Quantitative Analysis of Light and Colour," by Mr. J. W. Lovibond.

R. J. Newby.—We regret that a reply to your query must be deferred till next week.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Gillow, Hesse, Riddle, Improver, Dutchman, A.P.S.

A RETROSPECT.

SOON after the commencement of the present cenury it appears to have been discovered that the conequences of the desolate freedom which could then e enjoyed by anyone who pleased to assume the tle of chemist and druggist were in various ways rejudicial. The unlimited liberty then prevailing n that respect did not satisfy the requirements of ublic safety. It was also detrimental to respectable hemists and druggists, since they could not altoether escape the denunciations launched against heir less competent fellows by the apothecaries ho were then legitimately engaged in the practice f pharmacy. About the same time it appears to have een perceived that, to compete with apothecaries in hat business, chemists and druggists required to be ualified for the duties appertaining to it, not only n certain instances but collectively, and that to esist the opposition and attacks of the apothearies, organized association of the chemists and ruggists was equally necessary. Since that time arious associations of chemists and druggists have een formed. Only one of them, however, is now urviving, and as the celebration of its Jubilee has ust taken place, the present is a fitting occaion for reviewing some of the circumstances under hich the practice of pharmacy has been transerred from the apothecaries to chemists and drugists as members of a corporate body.

In looking back upon the events of the last fifty ears and to the antecedent period when chemists nd druggists were first occupying the position f dispensers of medicine, it is throughout apparent hat the dangers which they have had to apprehend, as well as the attempts that have been made o interfere with the exercise of their business, ave always arisen from the absence of any recognized qualification. The want of a system of educaion by which the younger members of the calling would necessarily receive an efficient training has also been a disadvantage. In regard to educational equirements it is probable that the apothecaries were formerly no better off; but they possessed the great advantage of being members of a corporate body, and were thus enabled, by the aid of the apprenticeship system, to maintain their position with he public as the most trustworthy purveyors of drugs nd the legitimate dispensers of medicine. That position was partially maintained by the apothecaries ven while the conflict between them and the dispensaries established by physicians was continued.

But even prior to that period the considerable increase in the number of chemists and druggists had hown that they supplied a public want as vendors of harmaceutical preparations and dispensers of medicine. Though the practice of pharmacy had been left o a great extent open by the apothecaries as a result f their development into medical practitioners, he apothecaries still endeavoured to retain their former monopoly. Their objections to the practice of pharmacy by chemists and druggists were based upon allegations that chemists and druggists were uneducated and unskilful persons, unauthorized by any public charter, who from ignorance and incapacity were likely to make serious mistakes in dispensing or by giving wrong directions. It was not until apothecaries were legally recognized as medical practitioners that their attempts to subjugate chemists and druggists to their control, by inspection of their shops, and to restrain them from practising pharmacy, were to a great extent abandoned and diverted into another channel.

It was to give effect to such views and to put an end to the evils attributed to the practice of pharmacy by chemists and druggists that in 1793 a number of apothecaries united to form the General Pharmaceutical Association of Great Britain under the auspices of Mr. JOHN MASON GOOD. Their object was to obtain legislation to prevent what was regarded by them as an encroachment upon their profession by restricting to apothecaries the liberty to sell pharmaceutical preparations and to compound physicians' prescriptions. The right to carry on business was to be restricted to those who had served an apprenticeship of at least five years with an apothecary, and had passed an examination as to competence. No assistant was to be engaged without having passed an examination, and no apprentice taken who had not received a suitable education. Although this Association was but short-lived and unsuccessful in its opposition of the chemists and druggists, the attempt made serves to show what were the weak points of the class to which the practice of pharmacy was being gradually transferred, and the requirements that were even then recognized as desirable for ensuring competence for that occupation.

The altogether incoherent condition of the chemists and druggists at that time was probably the only reason for the requirements of systematic education and qualification having been practically overlooked by them. But they were not lost sight of by the apothecaries, whose next attempt was to bring about the constitution of a medical body empowered to examine persons desirous of practising medicine or pharmacy, and to grant licences subject to the payment of annual fees. Another object was the establishment of a School of Pharmacy. Failing to obtain the co-operation of the Colleges of Physicians or Surgeons, or even of the Society of Apothecaries as a body, the Associated Apothecaries introduced a Bill into Parliament in 1813 in order to effect their objects. It was opposed by the Colleges of Physicians and Surgeons, and also by the chemists and druggists, who were induced to appoint a committee for the purpose by apprehension that they might be brought under the control of the apothecaries. Probably one ground of opposition was the prospect that the practice of counter prescribing would be interfered with; but, however that may have been, the chemists and druggists were eventually successful in obtaining a withdrawal from the Bill of all provisions affecting their business. Before the measure was passed in 1815 alterations were made which restricted the Act to those who "practised as apothecaries," and a clause was added stating that there was to be no interference with the trade or business of the chemist or druggist; but that all persons exercising the same should continue to do so in such a manner and as fully and amply to all intents and purposes as the same trade or business had been carried on by chemists and druggists before the passing of the Act.

From that time the practice of pharmacy became absolutely free. Apothecaries continued, as medical practitioners, to compound and dispense medicine for their own patients. In some instances they also kept open shops for the sale of drugs and pharmaceutical preparations. That association of the practice of medicine with the practice of pharmacy unfortunately gave rise to the popular idea of the "doctor's shop," and virtually sanctioned the "counter practice," which has since continued to be more or less a source of contention. But from that time the dispensing of medicines according to physicians' prescriptions was more generally entrusted to chemists and druggists. Certain houses directed their attention especially to that business, and thus particular individuals acquired exceptional repute and prestige. Still, as it was open to any person to assume the title of chemist and druggist, there was no basis upon which the interests of the class could be promoted or protected, and in some instances dispensing chemists took the apothecary qualification in order to overcome any disadvantage they might otherwise have experienced.

In the year 1819 the introduction into Parliament of a Bill "for establishing regulations for the sale of Poisonous Drugs and for better preventing the mischiefs arising from inattention or neglect by persons vending the same," again furnished opportunity for the committee representing chemists and druggists to take action which led to a withdrawal of the Bill. It was considered that the provisions of the Bill would be likely to embarrass the dispensing of medicines, without being calculated to effect the object intended. But being deeply sensible of the importance of the subject, and anxious that every possible means should be adopted to attain the object intended by the Bill, the committee issued a recommendation that chemists and druggists should adopt in their shops certain regulations. It was proposed that a printed label with the word "poison" should be affixed to every wrapper, box, bottle, or other vessel containing certain articles; that all drugs or preparations likely to produce serious mischief if improperly used should be sold with printed labels bearing their names, and that none but persons of sufficient age and experience, to judge of the great caution necessary for avoiding the sale of poisons to improper or ignorant persons, should be allowed to supply such drugs or preparations.

Up to the year 1829 the chemists and druggists committee had continued to be scarcely more than a body for trade defence as occasion arose and the idea of forming a permanent society appears to have been only vaguely entertained. In the following year an attempt was made by Mr. John Savory, Mr. Hudson, and Mr. [illegible] to draw attention to the desirability of organized association of all the members of the trade, with a view to establishing education, controlling the sale of poisons, and adopting such regulations as would conduce to the elevation of the practice of pharmacy and the protection of the public. So little response was given to this proposal that it was abandoned, and it was not until the year 1839 that the quiescent condition of chemists and druggists began to be seriously disturbed by a parliamentary inquiry instituted in regard to the laws affecting the medical profession. The evidence given before a committee of the House of Commons furnished material for the introduction of a measure of general medical reform. The Bill first introduced by Mr. Warburton, with the assistance of Mr. Wakley and Mr. Hawes, was withdrawn, and several succeeding Bills were no more successful. But in 1841 a Bill was introduced by Mr. Hawes, Mr. Ewart, and Mr. Hutton, in which it was made unlawful under a penalty of £20 to carry on the business of a chemist and druggist without a licence obtained from a medical council. Moreover the words "practising medicine" were so defined that, in connection with the clauses inflicting penalties for practising without a license, the most simple recommendation of a drug would have been made an offence punishable by a fine of £20 or imprisonment.

Though at first little attention was given to this measure by chemists and druggists, its importance was urged upon them by Mr. Farmer, Mr. G. W. Smith and Mr. Baxter. The action that was then taken for opposing it eventually gave the occasion for the formation of the Pharmaceutical Society. The first result of the opposition offered by the chemists and druggists was the temporary withdrawal of the Bill. Neither the College of Physicians nor the College of Surgeons was disposed to interfere with the practice of pharmacy or with chemists and druggists; but the former body, thinking that some adequate education and an examination should be instituted, proposed to form a board for that purpose, in conjunction with the Society of Apothecaries. When the Bill in an amended form was subsequently introduced by Mr. Hawes, and it came on for second reading, the large number of petitions from chemists and druggists presented in opposition to it showed that it had excited considerable interest throughout the country.

The idea of establishing a Society representative of pharmacy then began to assume more definite shape. So long as it remained a fact that there was no institution for the systematic education and examination of chemists and druggists, by which their qualification could be guaranteed, the imputations that had been cast upon chemists and druggists did not well admit of being efficiently answered. It had also become evident that, in the absence of any organized association among chemists and druggists by which provision could be made for supplying those deficiencies, measures would again be taken from other quarters for doing so. With that prospect in view, and recognizing the possibility then offering for some steps to be taken to raise the professional character of the pharmaceutical body, several of those who afterwards became founders of the Pharmaceutical Society conferred together as to the basis on which such an association should be constituted. A leading part in this work was taken by Mr. Jacob Bell, and it was ultimately decided to form an independent body, to represent the permanent interests of chemists and druggists. It was proposed that the object of the Society should be to elevate the calling of pharmacy by furnishing proper means of instruction and thus to benefit the public, while at the same time protecting the individual and collective interests of the body against hostile attacks in Parliament or otherwise. It was further desired that all established chemists and druggists should be included in the Society; that a fund should be established for the relief of decayed or distressed members; and that a committee should be appointed for the purpose of framing bye-laws and regulations for the conduct of business. At the meeting held on the 15th of April, 1841, at the Crown and Anchor Tavern, the chemists and druggists' committee, assuming the body it represented to be capable of self-government, recommended that an association should at once be formed for the union of all the members of the trade, the protection of their general interests, and the advancement of scientific knowledge. It was also recommended that the basis of such union should be the adoption of education, examination, registration and representation as involving results beneficial to the general public, and particularly to chemists and druggists, while offering to the medical profession and its representative corporations a guarantee that chemists and druggists were disposed to afford every evidence of their fitness to exercise the privileges they desired to retain. At that meeting a resolution, moved by William Allen and seconded by John Bell, was unanimously carried, constituting the Pharmaceutical Society of Great Britain. An Executive Committee was appointed, with Mr. G. W. Smith and Mr. Farmar as Secretaries, for the purpose of framing bye-laws. At a meeting held on the 1st of June, bye-laws were presented with a report on the objects and methods to be adopted by the Society. In that report it was pointed out that the bye-laws had been drawn up in such a manner as to secure to all principals, assistants, and apprentices their existing rights and privileges, whilst assuring to the public and the medical profession for the future the competence of chemists and druggists who were members of the Society. It was urged that as the Society not only involved the prosperity of chemists and druggists throughout the kingdom, but was also of a public nature, it was only by the combined and continued efforts of individuals that it could be successful either in preventing the imposition of restrictions in the future, or in the general advancement of pharmacy. At that meeting the bye-laws were adopted and the Executive Committee was constituted the first Council of the Society. In an address issued by the Council to the chemists and druggists of Great Britain, attention was drawn to the very important consideration that, while comparatively little permanent benefit would result from protection of the trade merely as a trade, a recognition of the need for regulation, and the endeavour to supply deficiencies in that respect, would be the only sure means of removing any pretext for hostile proceedings and of securing immunity from persecution.

The first work of the Council after the settlement of the constitution of the Society was directed to the means to be adopted for promoting education and to the mode of conducting the examination of members and associates. In that work the assistance of the College of Physicians and of the Senate of the London University was sought; but those bodies, while expressing general approval of the educational objects and plans of the Society, were not disposed to co-operate in them officially. The old fear that improved education of chemists and druggists might lead them to interfere with medical practice still remained, to some extent, in force, giving rise to distrust and suspicion. But as the work of the Society proceeded those feelings gradually gave place to a more favourable impression. The meetings held by the Society were attended by many members of the medical profession who regarded with satisfaction the nature of the subjects introduced for discussion and the general character of the proceedings. The establishment of the Pharmaceutical Journal, for the publication of the Society's transactions and as a medium of communication for its members, was another circumstance that had an important influence in gaining for the Society the appreciation of the medical profession. The steps taken to form a Library and Museum as well as to provide an efficient School of Pharmacy, with courses of lectures by Dr. ANTHONY TODD THOMPSON, Dr. PEREIRA, Professor FOWNES, and Professor REDWOOD, also tended in the same direction.

By the end of the year 1841 the Society was established in the house it now occupies in Bloomsbury Square, and the regular evening meetings, as well as the Council meetings, were commenced in January of the following year. But though the Society had been thus firmly established, and had met with considerable approval from the Government and medical authorities, the support given to it by chemists and druggists was only partial. The total number of members and associates at the end of 1841 was not more than 800 and at the first annual meeting in May, 1842, it had only increased to 1258—not more than one-third of the entire number of chemists and druggists in the kingdom. The important principle that the maintenance of a position of independence and freedom from control by one or other of the medical corporations could only be ensured by improving the qualifications of the members of the body had not been generally recognized. Nor was it perceived that the acquisition of increased powers and privileges depended upon the same condition. With many a feeling prevailed that the course of education which the Society aimed at providing for students was in excess of what was required. A large number of those who then called themselves chemists and druggists had no real claim to the former title. Though they dealt in drugs and chemicals they were often as little entitled to be called pharmacists and they rarely had a physician's prescription to dispense. Consequently the majority of chemists and druggists throughout the kingdom were indifferent to the promotion of education and to the general advancement of pharmaceutical knowlege which were the chief objects of the Society. When JACOB BELL visited different parts of the country in 1841, for the purpose of bringing members of the trade together, his success was but limited. Though he always received a cordial welcome, with attentive consideration of the object of his mission, the result was that only a few took a lively interest in the advancement of pharmacy, some were satisfied with the prevailing state of mediocrity, but the majority hesitated in a state of indecision if not of indifference or opposition.

After the Royal Charter of Incorporation had been obtained by the Society in 1843, some temporary interest was excited by the introduction of a clause into Sir JAMES GRAHAM's Medical B by which it was proposed to provide that eve person who should "act or practice as an apoth cary" without being registered by the Council Health was to be subject to a penalty of twe pounds. But the influence thus exercised was short duration. After the exemption of chemi and druggists from the proposed provision had be obtained, the previous condition of apathy and i action was resumed.

However, a Pharmacy Bill was required as means of strengthening the position of the Ph maceutical Society, from the probability that Bill relating to the practice of pharmacy would introduced by the Government, if the medical leg lation then before Parliament were carried o Consequently the Council was led to consider th advisability of promoting such a measure. A B was drawn and presented to the annual meeting 1846. It proposed to found a College of Pharma to exercise the functions of an examining body while the Pharmaceutical Society continued i work as an educating body. It was also propos that registration as a member of the college shou be made a necessary condition for every pers engaged in the business of preparing, compoun ing, or dispensing medicine for sale; chemists an druggists who had been in business before th passing of the Act being excepted. Difficulti afterwards arose as to the constitution of the exa mining board, and the fear that the education of chemists and druggists might lead them into medical practice again became manifest. To those obstructions was added the opinion entertained by the Government that pharmaceutical legislation should not precede but follow medical legislation, and nothing was then done.

The alarm that was created shortly afterwards by the frequent occurrence of cases of poisoning with arsenic, had the effect of again directing public attention to the conditions under which poisons were sold, and to the necessity for legislation in regard to the practice of pharmacy. In passing the Sale of Arsenic Act in 1851 it was found impossible to adopt the recommendation of medical and pharmaceutical authorities that the sale of arsenic should be limited to medical men and chemists and druggists, owing to the want of any legal definitions of the titles chemist and druggist or pharmaceutical chemist. However the recognition by the Legislature that such a limitation, if practicable, would have rendered the Act more efficient had shown that protection, respectability and success were directly connected with professional qualification. That was an important step towards the admission of the principle that the business of a chemist and druggist was something more than a mere trade.

At the annual meeting of the Society in 1851 it was resolved to petition the House of Commons to pass an Act for regulating the qualifications of pharmaceutical chemists. The petition set forth that Great Britain was an exception to almost all other civilized countries, in having no provision that the persons who sold medicines and dispensed prescriptions should be regularly educated for those responsible duties. It was also stated that there was good reason for believing the public consequently sustained injury. It was further stated that, though the endeavours of the Pharmaceutical Society to provide a remedy for the evil, by introducing a regular system of pharmaceutical education and examination, had met with as much success as could be expected by a voluntary society, the sanction of the Legislature was requisite in order to ensure the full accomplishment of the reform requisite for the safety of the public. The petition was presented by Mr. Jacob Bell, then member for St. Albans, and in the following month he obtained leave to introduce a Bill to regulate the qualifications of pharmaceutical chemists and the practice of pharmacy. The object of that Bill was to establish grades of legal qualification for all persons engaged in the practice of pharmacy as principals or as assistants and apprentices, with a system of registration and penalties for breaches of the regulations. The Bill was opposed by Mr. Hume, Mr. Henley, and the Home Secretary, Sir George Grey, on the grounds that it would interfere with free trade principles by creating a monopoly and tend to convert chemists and druggists into medical practitioners. It was also opposed by petitions from the Royal College of Physicians of Edinburgh, and the Faculty of Physicians and Surgeons for Glasgow, but was supported by Mr. Wakley and by petitions from all parts of the country with more than fifteen thousand signatures. It then stood over until the following session, when it was again introduced, and after the introduction of some amendments by Mr. Bell was referred to a Select Committee. The evidence given showed the neglect of pharmaceutical knowledge which had prevailed until the Pharmaceutical Society was established, and the necessity for regulating the practice of pharmacy in the interests of the public. But, notwithstanding the support thus afforded, it was held that the restriction of the dispensing of medicine and of the business of chemists and druggists to examined and registered persons could not be adopted, inasmuch as that would be inconsistent with the free trade principles which had been recognized by the Government in regard to the regulation of the practice of medicine. The utmost that could be obtained was the means of securing to qualified men, who voluntarily passed the requisite examination, the right to use the title of pharmaceutical chemist, by which they might be distinguished. Consequently the most important provision of the Bill, which would have restricted the exercise of the duties of chemists and druggists to examined persons, was struck out. Especial care was also taken to guard against the possibility of educated pharmacists becoming medical practitioners as the apothecaries had done, by specifying that the examinations should not include the theory and practice of medicine, surgery or midwifery.

So far, therefore, the Pharmaceutical Society had not advanced in its endeavours to obtain legislative regulation of the practice of pharmacy beyond what might be effected, on the basis of voluntary action, by those who desired to assume the title of pharmaceutical chemist. It was still open to any one to carry on the business of chemist and druggist without qualification or any test of competence for the due performance of the duties it involved.

The position of pharmacy in this country about that period was well described in an address delivered in 1854 by Professor Christison to the North British Branch of the Pharmaceutical Society. Contrasting the conditions obtaining in France or Germany and in this country, the impracticability of attempting to regulate the practice of pharmacy by the principles of free trade was forcibly insisted upon as inevitable, since the business does not admit of indefinite extension. It was contended that the policy of a wise Government should be restrictive, so regulating the practice of pharmacy by education and licence, that those engaged in it might not only be well qualified, but, being so, might live, and live respectably, elevating their social position and drawing closer the ties which connect their trade with the sciences. But if it were left open the educated portion of the pharmaceutical profession would be grievously injured. Education failing to meet its just reward would turn away, and thus it was argued chemists and druggists as a class were held down below their proper level by the impolitic and unjust neglect of Government, to the retardation of the advance of knowledge and the infinite damage of the community.

At this period of the history of the Society much time was occupied by internal dissension among its members; but, notwithstanding that disadvantage, the Society still continued to advance in public estimation and to gain greater confidence from the medical profession. The suspicion that its members might seek to follow the example of the apothecaries had been to a great extent dissipated by the experience of twelve years, and by the evidence afforded that the Society, in endeavouring to advance education and improve the practice of pharmacy, was steadily confining its attention to its own proper business. Satisfactory proof of the regard in which the Society was held was afforded

by the application of the College of Physicians to the Council for assistance in the preparation of a new edition of the London Pharmacopœia.

The occurrence, in 1855 and 1856, of a number of cases of poisoning again drew serious attention to the subject of the sale of poison, and the provision of some measure of protection against accidental and criminal poisoning. The urgent necessity of a law to regulate the sale of poisons, and to restrict the facility with which they could be obtained, was pointed out in the House of Lords by Lord CAMPBELL, and the subject was very widely discussed in the press. The adulteration of food and drugs was another subject that attracted, for a time, considerable attention, on account of the sensational manner in which it was dealt with, not only in newspapers, but even in the evidence given before a Committee of the House of Commons. In regard to both these subjects the Council of the Pharmaceutical Society took occasion to point out that, ever since the foundation of the Society, its efforts had been directed to preventing the adulteration of drugs, improving the quality of medicines, and promoting legislation in reference to the sale of poisons. It was further stated that the best remedy against the evils which had been complained of, in connection with the preparation of medicines and the sale of poison, was to be provided by raising the scientific character and social position of the chemist and druggist in the manner that the Society had projected more than fifteen years previously, and that recent events had shown the necessity of.

Early in 1857 a Bill "to restrict and regulate the sale of poison" was brought into Parliament, the provisions of which, besides being otherwise objectionable, were little calculated to effect the object in view. Some amendments were introduced to meet the objections urged against the Bill, though without removing the defects which would have rendered it inoperative. Shortly afterwards the further progress of the Bill was stopped by the resignation of the Ministry; but practically the same measure was taken up by the succeeding Ministry and introduced in the House of Lords by Lord DERBY. It proposed that no persons, other than legally qualified medical practitioners, should sell poisons without a licence to vend drugs. The licence was to be granted by a new Board of Examiners that would have practically superseded that of the Pharmaceutical Society. In spite of the remonstrances urged upon the Government the Bill was hurried through the House of Lords, which passed it without amendment on the 8th July, 1858. However the energetic steps taken to oppose the Bill in the House of Commons were successful in securing its ultimate withdrawal. Towards the end of the same year the accidental substitution of arsenic for sulphate of lime in the manufacture of lozenges, resulting in the death of twenty persons and of serious injury to some two hundred others, again drew the attention of the Government to the subject. The Poison Bill, in an amended form, was again introduced, but after a brief contest it was withdrawn.

During the next two years no further legislation was attempted that in any way affected the practice of pharmacy, with the exception of the Medical Act of 1858. But in the year 1862, when the Juries Bill was before Parliament, opportunity was afforded to make a claim for the exemption of chemists and druggists on the same ground that it had been conceded to medical men. However, two difficulties were encountered. First, owing to an exaggerated statement that had been put forward as to there being about forty thousand chemists and druggists in the kingdom, it was objected that, if all who assumed that title were to be exempt, the jury lists would be so seriously reduced as to increase the difficulty experienced in getting the duties of jurymen efficiently performed. That was in itself a serious obstacle. But one of far greater weight was the second objection that there was no means of ascertaining who was a chemist and druggist. Consequently the claim on behalf of chemists and druggists was held to be quite unfounded, and the exemption from jury service was limited to pharmaceutical chemists, who being registered as legally qualified persons, engaged in the performance of delicate and responsible duties, could be recognized as fit and proper persons for exemption from a service that would take them away from those duties. That result was a fair ground for congratulation, as having been achieved for pharmaceutical chemists through the influence of organization, qualification and registration, which the Society had always declared to be essential for the whole body of chemists and druggists.

The actual condition of the trade in regard to numbers, and of the Pharmaceutical Society in relation to the trade, at the period now referred to may be stated on the basis of the census returns published by the Registrar-General for 1861, according to which the total number of persons then employed in the establishments of chemists and druggists in England and Wales was 16,026, including assistants and apprentices. Of that number 3,388 were under age, and probably apprentices, leaving 12,638 as the number of principals and assistants. It was estimated that the number of those engaged in business on their own account was about 6000, and as there were at that time upwards of 2000 members of the Pharmaceutical Society, it represented about one-third of the chemists and druggists actually in business on their own account.

The year 1863 was marked by an event of considerable importance in regard to the development of British pharmacy. Though not immediately connected with the Society it was to some extent a realization of an older project, put forward in 1852 by Mr. Schacht, that meetings of the Pharmaceutical Society should be annually held in one or other of the chief provincial towns, with the view of stimulating country members to more active interest and co-operation in the work of the Society. In a modified form this project was revived by Mr. R. Reynolds, of Leeds, and with the concurrence of Mr. Brady and Mr. Schacht it resulted in the formation of the British Pharmaceutical Conference, the first meeting of which was held at Newcastle, with Mr. Henry Deane as President.

Towards the end of 1863 the report of a committee of the General Medical Council, relating to the amendment of the Act under which that body was appointed, recommended that application should be made to Parliament for a new medical Act comprising material alterations that involved questions of great importance for pharmacy. The opinion prevailed that the state of pharmacy in this country was not only unsatisfactory but disgraceful, and that further legislation was required. It was therefore proposed that the practice of pharmacy should be included among the departments over which the Medical Council should exercise control. It was also proposed that a general system of education and examination should be established and regulated by the Medical Council; that all persons qualified by such examination to practise pharmacy should be registered; that the dispensing or compounding of physicians' or surgeons' prescriptions should be restricted to qualified practitioners of pharmacy by the imposition of penalties upon those who kept open shop for that purpose without having passed the required examination; that inspectors appointed by the Medical Council should see that the provisions were duly carried out; that the sale of all secret remedies should be prohibited, and that sellers of patent or quack medicines should be subject to a penalty unless sworn certificates of the composition of the articles were exposed for inspection in the shops or places where they were sold.

Again chemists and druggists were confronted with the possibility of being subjected to medical control, in consequence of their neglect to adopt measures of self-regulation that would satisfy the requirements of their position. The enactment of such a measure as was proposed would have superseded part of the duty of the Pharmaceutical Society and relieved it of some responsibility. It would also have accomplished objects that the Society had desired, and left it to carry out education and examination under a control similar to that exercised over medical colleges and licensing boards. In the Medical Council there was a general concurrence of opinion in favour of restricting the practice of pharmacy to qualified and examined persons. At the same time, in view of outside disapproval of the proposed measure, there was a disinclination on the part of some members to embroil the Council with chemists and druggists by undertaking the duty of regulating the system of education and examination to be adopted. Dr. Christison was of opinion that this could not be entrusted to better persons than the pharmaceutical chemists. Eventually therefore the idea of attempting to legislate for pharmacy was relinquished. But a very significant resolution was passed that a communication be addressed to the Secretary of State for the Home Department drawing his attention to the defective state of the law regarding the practice of pharmacy, under which any person, however ignorant, might undertake it, and expressing the opinion of the Medical Council that some legislative enactment was urgently called for to ensure competency in persons keeping open shop for dispensing medicines, and for compounding physicians' and surgeons' prescriptions.

One effect of the views expressed by the Medical Council was to stimulate action on the part of a society which may be regarded as having been the representative of those who had held aloof from the efforts of the Pharmaceutical Society to establish provisions for ensuring the qualification of persons engaged in the practice of pharmacy. The United Society of Chemists and Druggists had been formed in 1861, not for the education and better qualification of chemists and druggists, but ostensibly to carry out, by district meetings and combined action, any improvement that might be deemed necessary for the welfare of chemists and druggists as a trading community.

The failure of the United Society, in 1862, to obtain the exemption of those it represented from jury service had produced some effect, and had led the Society to perceive that "some qualification" and legislative recognition were necessary to enable its members to obtain the position they desired. But reliance was still placed mainly in the demand for a recognition of the existing "rights" of the thirty thousand chemists and druggists that were assumed to be engaged in the business. Meetings were held in various parts of the kingdom to denounce and oppose "the unwarrantable interference of the Medical Council with the rights of dispensing chemists," though without any apparent regard for the fact that the value of those "rights" was almost annulled so long as they could be assumed by any persons, however unqualified.

The members of the Pharmaceutical Society also felt that the time had arrived for some action to supersede, if not to oppose, legislation on the part of the Medical Council in regard to the general practice of pharmacy. That feeling was strengthened when it was found that the Medical Council was disposed to drop the subject of pharmacy and leave it to be worked out by pharmacists for them-

by the application of the College of Physicians to the Council for assistance in the preparation of a new edition of the London Pharmacopœia.

The occurrence, in 1855 and 1856, of a number of cases of poisoning again drew serious attention to the subject of the sale of poison, and the provision of some measure of protection against accidental and criminal poisoning. The urgent necessity of a law to regulate the sale of poisons, and to restrict the facility with which they could be obtained, was pointed out in the House of Lords by Lord CAMPBELL, and the subject was very widely discussed in the press. The adulteration of food and drugs was another subject that attracted, for a time, considerable attention, on account of the sensational manner in which it was dealt with, not only in newspapers, but even in the evidence given before a Committee of the House of Commons. In regard to both these subjects the Council of the Pharmaceutical Society took occasion to point out that, ever since the foundation of the Society, its efforts had been directed to preventing the adulteration of drugs, improving the quality of medicines, and promoting legislation in reference to the sale of poisons. It was further stated that the best remedy against the evils which had been complained of, in connection with the preparation of medicines and the sale of poison, was to be provided by raising the scientific character and social position of the chemist and druggist in the manner that the Society had projected more than fifteen years previously, and that recent events had shown the necessity of.

Early in 1857 a Bill "to restrict and regulate the sale of poison" was brought into Parliament, the provisions of which, besides being otherwise objectionable, were little calculated to effect the object in view. Some amendments were introduced to meet the objections urged against the Bill, though without removing the defects which would have rendered it inoperative. Shortly afterwards the further progress of the Bill was stopped by the resignation of the Ministry; but practically the same measure was taken up by the succeeding Ministry and introduced in the House of Lords by Lord DERBY. It proposed that no persons, other than legally qualified medical practitioners, should sell poisons without a licence to vend drugs. The licence was to be granted by a new Board of Examiners that would have practically superseded that of the Pharmaceutical Society. In spite of the remonstrances urged upon the Government the Bill was hurried through the House of Lords, which passed it without amendment on the 8th July, 1858. However the energetic steps taken to oppose the Bill in the House of Commons were successful in securing its ultimate withdrawal. Towards the end of the same year t
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That was in itself a serious obstacle. But one
greater weight was the second objection that
was no means of ascertaining who was a
and druggist. Consequently the claim on
chemists and druggists was held to be
founded, and the exemption from jury
limited to pharmaceutical chemists, who
registered as legally qualified persons,
the performance of delicate and responsible
could be recognized as fit and proper
exemption from a service that would
away from those duties. That result was
ground for congratulation, as having been
for pharmaceutical chemists through the
of organization, qualification and registration,
the Society had always declared to be
the whole body of chemists and druggists.

The actual condition of the trade in regard
bers, and of the Pharmaceutical Society in
to the trade, at the period now referred to
stated on the basis of the census returns
the Registrar-General for 1861, according
the total number of persons then
establishments of chemists and druggists in
and Wales was 16,026, including
prentices. Of that number 3,388 were
probably apprentices, leaving 12,638 as the
of principals and assistants. It was
the number of those engaged in business
own account was a
that time upwar
ceutical Societ
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realization of an older project [illegible] in 1852 by Mr. SCHACHT, that meetings [illegible] Pharmaceutical Society should be annually [illegible] one or other of the chief provincial towns [illegible] view of stimulating country members [illegible] active interest and co-operation in the work of the Society. In a modified form this project was revived by Mr. R. REYNOLDS, of Leeds, and with the concurrence of Mr. BRADY and Mr. SCHACHT resulted in the formation of the British Pharmaceutical Conference, the first meeting of which was held at Newcastle, with Mr. HENRY DEANE as President.

Towards the end of 1863 the report of a committee of the General Medical Council, relating to the amendment of the Act under which that body was appointed, recommended that application should be made to Parliament for a new medical Act comprising material alterations that involved questions of great importance for pharmacy. The opinion prevailed that the state of pharmacy in this country was not only unsatisfactory but disgraceful, and that further legislation was required. It was therefore proposed that the practice of pharmacy should be included among the departments over which the Medical Council should exercise control. It was also proposed that a general system of education and examination should be established and regulated by the Medical Council; that all persons qualified by such examination to practise pharmacy should be registered; that the dispensing or compounding of physicians' or surgeons' prescriptions should be restricted to qualified practitioners [illegible] pharmacy by the imposition of penalties upon [illegible] who kept open shop for that purpose without having passed the required examination [illegible] inspectors appointed by the Medical Council [illegible] that the provisions were duly carried [illegible] sale of all secret remedies should be [illegible] that sellers of patent or quack medicines [illegible] subject to a penalty unless sworn [illegible] composition of the articles were exposed [illegible] in the shops or places where they were [illegible] chemists and druggists [illegible] possibility of being subject [illegible] in consequence of their [illegible] of self-regulation [illegible] all their position [illegible]

[illegible] the progress [illegible] examination [illegible] than [illegible] Eventually [illegible] legislate for pharmacy [illegible] passed that a communication be addressed to the Secretary of State for the Home Department [illegible]ing his attention to the defective state of [illegible] regarding the practice of pharmacy, under [illegible] any person, however ignorant, might under[illegible] and expressing the opinion of the Medical [illegible] that some legislative enactment was urgently [illegible] for to ensure competency in persons keeping [illegible] shop for dispensing medicines, and for compound[illegible]ing physicians' and surgeons' prescriptions.

One effect of the views expressed by the Medical Council was to stimulate action on the part of the society which may be regarded as having [illegible] the representative of those who had held [illegible] from the efforts of the Pharmaceutical [illegible] establish provisions for ensuring the qualification of persons engaged in the practice of pharmacy. The United Society of Chemists and Druggists had been formed [illegible] and better qualification [illegible] to carry out [illegible] any improvement [illegible] for the [illegible] The failure of the [illegible] selves. Early in 1864 a requisition, signed by more than three hundred members of the Society, was presented to the Council, stating the desirability that all chemists and druggists should in future undergo a due professional examination before commencing business, and requesting the Council to convene a meeting to consider the expediency of immediate application to Parliament for an amended Pharmacy Act, by which the legitimate interests of those already in business should be protected and proper provision made for rendering the examination of future chemists and druggists compulsory instead of a merely optional proceeding. At the meeting called in accordance with that requisition in March, 1864, the subject was discussed by members from all parts of the country with much difference of opinion. But a resolution was passed that for the future chemists and druggists should be examined before commencing business and that the Society should seek to obtain an Act providing for such a protective restriction of the business with due regard to the existing interests of principals and assistants already in business. A Bill was drawn, and after approval by the Council it was adopted at the annual meeting of the Society. The main feature of the Bill was that the dispensing of medicine and the compounding of the prescriptions of duly qualified medical practitioners should be restricted to pharmaceutical chemists and duly registered chemists and druggists. Registration was to be obtainable at first by all persons who had been engaged in business, either on their own account or as assistants, before a certain date ; but in the future only by persons who obtained certificates of having passed an examination which the Pharmaceutical Society was to be empowered to conduct and regulate. At that time the system of granting annuities from the Benevolent Fund established by the Society had not been commenced and, as it was felt that the usefulness of the Fund would be materially increased by making it available, not only for members of the Society but for all persons regularly connected with the business, a clause was inserted in the Bill giving the Council power to make such an extended application of the Fund.

Shortly afterwards the United Society of Chemists and Druggists produced a Bill providing that all persons keeping open shop or store for retailing drugs or engaged in retailing or dispensing dangerous drugs, simple or compound, except persons registered under the Pharmacy Act, 1852, should be required, under a penalty, to be registered as chemists and druggists, employ none but registered assistants, and observe certain regulations in the sale of active poisons. All persons engaged in business at the time of the Act coming into operation, either as chemists and druggists or as their assistants or apprentices, were to be registered without examination ; but after that time registration was to be obtainable only by those who were examined by duly appointed examiners and certified to possess "a competent knowledge of drugs and medicines in general use and of their doses, and to be able to read physicians' prescriptions with ease and accuracy." Persons so registered were to be exempt from serving on juries.

It is unnecessary to enter into details of the conflict that arose between the promoters of these two Bills. For the present purpose it will be sufficient to recall the fact that it lasted for nearly four years, that it had the disastrous effect of demonstrating that chemists and druggists were divided into parties irreconcileably at variance with each other, and that with a considerable number of them there was, on various grounds, determined hostility to the Pharmaceutical Society. The most important consequence of that state of internal discord was that of counteracting the inclination of the Home Secretary, Sir GEORGE GREY, to bring in, as a Government measure, a Bill for regulating the practice of pharmacy. Eventually, the two Bills above referred to were introduced into Parliament. After some discussion, in which it was generally admitted that there ought to be a compulsory examination to ensure the qualification of chemists and druggists, and that the examination could not be better conducted than by the Pharmaceutical Society, both Bills were read a second time on the 29th of March, 1865, and referred to a select committee. The evidence given before that committee by Dr. ALFRED SWAINE TAYLOR, Dr. QUAIN,* and Mr. SIMON, then Medical Officer of the Privy Council, strongly supported the view that the sale of dangerous drugs and poisons should be subject to legislative restriction, and "free trade in physic" was emphatically denounced as dangerous to the public. All agreed in advocating the educational qualification of dispensers of medicine and in commending the regulations of the Pharmaceutical Society for testing by examination the qualifications required. But gradually the value of thorough pharmaceutical qualification was lost sight of. The members of the Committee became more impressed with the necessity of mere restrictions on the sale of poisons, and effect was given to that view in the report so as to exclude the proposal in the Bill of the Pharmaceutical Society that the compounding of medicines from prescriptions of medical men should be restricted to persons qualified by registration. Hence the Committee reported it was not considered expedient to proceed further with either Bill.

It is important here to direct attention to the opinions formed by a committee of the Medical Council in regard to these two Bills, and stated in a report presented, in 1865, to the Home Secretary and to the Chairman of the Parliamentary Com-

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[*] Now Sir Richard Quain, Bart.

mittee. It was considered that the preferable mode of legislation was that which adopted for a basis the Pharmaceutical Society with the Pharmacy Bill of 1852. The Bill promoted by that Society was thought to be well fitted to attain important objects and reasonable in its demands for powers and privileges. It was suggested that a clause should be added compelling chemists and druggists to follow the formularies of the British Pharmacopœia in compounding prescriptions, unless otherwise directed by the prescriber. It was also thought that the terms on which the promoters of the Bill proposed to admit into their Society practising chemists and druggists not then belonging to it, were too easy. Admission by a certificate from a qualified medical practitioner of having been in the practice of dispensing medicines from prescriptions before January, 1866, was regarded as implying a facility of admission apt to lead to abuse, and more satisfactory evidence of qualification was thought to be requisite. A further suggested defect in the Bill was the absence of any adequate provision for preventing registered pharmaceutical chemists from converting themselves into unqualified medical practitioners. In that respect reference was made to the history of medical practice in this country as indicating the danger to the interests of the public, and of the medical profession, that might be apprehended if the Bill were passed as it then stood. In view of the facts that some chemists and druggists practised medicine, though unqualified by law and not competent by education, and that the practice could not be prevented, it was considered that its existence would give peculiar facilities and temptations to pharmaceutical chemists to embark largely in irregular medical practice as unqualified practitioners, and that if the creation of a new race of unqualified practitioners should be thus inadvertently encouraged by an Act of Parliament, the endeavours of the Medical Council to raise the qualifications of legally qualified medical practitioners would have been in vain. A question was raised whether the danger thus apprehended might be averted by extending the jurisdiction of the Medical Council so as to include control over pharmaceutical chemists as well as practitioners in medicine; but that plan was admitted to be attended with difficulties, and it was considered unwise to seek to alter the relations between the Medical Council and chemists and druggists. Another suggestion to the same end was that there should be a specific provision that nothing in the contemplated Pharmacy Act should entitle any person registered under it to practice any branch of medicine or surgery. Lastly attention was called to the fact that the right of dispensing and selling medicines was to be conferred on the whole body of chemists and druggists without any control on the part of the Government, except such as was exercised over pharmaceutical chemists under the Pharmacy Act, 1852. It was shown that the medical profession had not been so dealt with in the Medical Act, and that the Medical Council was properly restricted in its action by the medical corporations and universities and also controlled by the Privy Council. Hence it was suggested that the whole practice of pharmacy ought to be subjected to similar control.

Practically the result of the action taken by the United Society amounted only to the postponement of legislation. After some months, application was made to the President of the Pharmaceutical Society to ascertain whether the Council would be willing to co-operate with the United Society for the introduction of a Bill based on the recommendations of the Select Committee. Mr. Sandford replied that whenever opportunity offered the Council would be ready to assist the Government in arranging an efficient and liberal measure, but that a mere Poison Bill, imposing registration of sales and other formalities, would only be an encumbrance to the statute book, inoperative as to the public, and especially objectionable to men who, if properly qualified to deal in dangerous articles, would each, according to the special circumstances of the case, adopt precautions far more conducive to the public safety. In regard to the liberal nature of such a measure Mr. Sandford stated that the Home Secretary was in possession of the views entertained by the Pharmaceutical Society, and he believed no chemist and druggist properly so called could fairly object to them. In that respect he added that the desire of the Council was to make the compulsory provisions of the Bill entirely prospective, and to give all persons registered under it equally easy means of access to the Society which was to regulate the examinations, etc. Lastly he repudiated the oft-repeated charge, made against the Pharmaceutical Society, of a desire to subjugate all chemists and druggists to its authority, and stated that as he regarded the union of all men in the calling to be an important means of elevating the standing of the whole body he was in favour of a voluntary registration of men already in business.

In order to keep the subject under the notice of the Government the Council of the Pharmaceutical Society early in 1866 sent to the Home Office a brief outline of such a measure as was thought to be in accord with the recommendations of the Select Committee and with the views of chemists and druggists, stating: (1) That in future, before assuming the name or title of chemist and druggist or keeping open shop for the compounding of medicines under physicians' and surgeons' prescriptions, or for vending, dispensing or compounding certain dangerous drugs and chemical or other poisonous substances to be enumerated in a sche-

dule, all persons should undergo an examination and be registered as pharmaceutical chemists or as chemists and druggists. (2) That the examination for chemists and druggists should be that known as the Minor examination, to which persons theretofore registered by the Pharmaceutical Society as assistants had been subjected. (3) That all persons registered under the proposed new Act as chemists and druggists should be eligible as chemist and druggist members of the Pharmaceutical Society, entitled to nominate and vote for members of Council, but not to be registered as pharmaceutical chemists. That the Council should be composed of pharmaceutical chemists only. That all registered chemists and druggists should be exempt from serving on juries. (4) That nothing in the Bill should interfere with or curtail the rights of chemists and druggists already in business or of persons of full age who were at a given date assistants to chemists and druggists. That chemists and druggists already in business should, if they chose, be placed on the register, on making application within a certain time after the passing of the Bill and producing satisfactory evidence that prior to that date they had been in business on their own account and engaged in the compounding and dispensing of medicines under physicians' and surgeons' prescriptions, and in vending, compounding and dispensing the dangerous poisons in the schedule.

At a meeting of the United Society in January, 1867, most of these proposals were agreed to; but objection was taken to registered chemists and druggists, desirous of becoming members of the Pharmaceutical Society, being subject to election by the Council, and to the Council being composed entirely of pharmaceutical chemists. These difficulties were afterwards removed, and all differences of opinion having thus been done away with steps were taken to prepare a Bill for introduction into Parliament. Another difficulty, however, had then to be met, arising on the part of examined men, from disapproval of the concessions made to chemists and druggists, which were thought to be unfair to those who were members of the Society. The Council in its position as trustee for examined members of the Society was thus placed in some embarrassment. But a number of influential members who were pharmaceutical chemists by examination came forward with a counter protest, expressing cordial approval of the liberal policy adopted by the Council towards chemists and druggists, as being the best compromise that could be effected to remove the difficulties that had obstructed trade legislation, to consummate the wishes of the founders of the Society and to secure the amalgamation of the whole trade, as well as the future compulsory examination of all persons entering it. In the discussion of this subject at a special meeting both views were fully argued, and the contemplated action of the Council was supported by a large majority as being a wise and expedient course for enlisting the support of members of the trade outside the Society and so effecting the incorporation of the entire body.

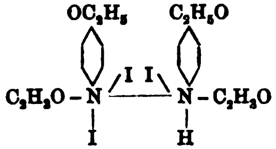
All difficulties having thus been removed, the United Society having agreed to co-operate with the Council in promoting the acceptance of a Bill by the Legislature, and the Home Secretary, Mr. GATHORNE HARDY, having approved of the propositions submitted to him, the Bill was drafted and introduced into Parliament in May, 1868. It passed through the House of Lords without alteration, and though considerably discussed in the House of Commons it was passed without any very material alteration beyond the excision of the clause exempting chemists and druggists from jury service.

From that time the chemists and druggists of Great Britain became a defined and recognized body. There was a certain prospect that in course of time all members of it would possess the legal qualification conferred by examination and registration. However, it is still to be regretted that the standard of pharmaceutical chemist was not adopted for those engaged in business on their own account, and that the principle of restricting the compounding and dispensing of medicine was not included in the Act. The incorporation of the trade that was effected by the Act was based upon regard for the public safety rather than upon the principle that the more professional part of the chemist and druggist's business requires scientific knowledge and educational training that are unnecessary for ordinary traders. Legal qualification was to be acquired by an examination test that would exclude from registration those who failed to show that they possessed the minimum knowledge requisite for ensuring the safety of the public so far as the sale of poison was concerned. In that respect the Act fell short of the object contemplated by the Pharmaceutical Society of ensuring for all who entered the business such scientific education and practical training as would make them competent to perform the duties of the professional part of the business. Hence the Act was rather one to protect the public than to protect the practice of pharmacy. A qualification for this was still left a voluntary matter, and that which was made compulsory was merely the mediocre qualification which had originally been intended for assistants. But sufficient legislative progress had been made to offer opportunity for chemists and druggists to improve their position in regard to the public, to gain from the medical profession greater esteem as well informed and competent dispensers of medicine, and to co-operate in various other ways for the advancement and protection of their general interests as members of a semi-professional calling. In all those respects, however, much still remains to be done, and it may be doubted whether the opportunities offered by the Pharmacy Act, 1868, have been so fully utilized by chemists and druggists generally in their own interests as they might have been.

During the twenty-three years that have elapsed since the passing of the Pharmacy Act many circumstances have contributed to influence its opera-ion, and experience has shown that all the antici- ations of its beneficial effect have not been ealized. The evil of company trading has come nto existence within that period. The final result f the litigation in regard to company trading had he unfortunate effect of permitting the business f a chemist and druggist, and even the practice of harmacy, properly speaking, to be carried on by company consisting of unregistered persons. That mode of conducting the business was held to e outside the scope of the Pharmacy Act, which pplied only to individual persons. The efficacy of he Act was thus materially weakened, and though t has been held that company trading of the kind eferred to could not be carried on except through he agency of a duly registered person acting for a ompany, the necessity of registration, for the awful performance of certain duties by individuals, as not been upheld by chemists and druggists so trictly as to have made that condition a source of rotection to themselves. According to the judi- ial decisions that have been given on that point ompany trading would have been impossible un- ess duly registered persons were employed to onduct that part of the chemist and druggist's usiness which is placed under restriction by the Pharmacy Act. In any case this requirement would have helped to limit company trading, and f registered persons had generally refused to make heir qualification serviceable in that way, company rading could not have been carried on at all. Another experience that has been gained is hat the necessity of undergoing examination, s a preliminary to registration, has altogether ailed to operate as such an effective stimulus f sound education as it was hoped might be he case. The continuance of the practice of aking apprentices without any adequate test f their educational and general fitness for he occupation, the want of suitable provision or apprentices to study the various scientific subjects they require to be familiar with, and the cus- om of employing unqualified persons as assistants ave all contributed to introduce into the body a arge number of persons who, failing to pass the examination requisite for obtaining legal qualification, become material for supplying stores, trading ompanies, and other irregular competitors of duly egistered chemists and druggists with the means of arrying on business to the serious detriment of he latter. These are conditions that have long ince made themselves sensible and, as the educa- ional deficiency lies at the root of them, the efforts f the Society's Council have been continuously irected to the establishment of an improved sys- em of pharmaceutical training, though as yet without success. The Bill now before Parliament may therefore be regarded as a natural supplement of the Act of 1868, which the experience of ubsequent years has proved to be necessary for he more effective protection of pharmaceutical nterests. Hence it is the duty of all who appre- iate the importance of the pharmacist's calling and who estimate rightly their own interests, as engaged in the practice of pharmacy, to promote by every means in their power the passing of that measure as the means by which a further advance may be made towards realizing the objects of the Society's founders, and placing the practice of pharmacy in this country upon a sound basis.

"THE MONTH."

Iodphenin. If a cold aqueous saturated solution of phenacetin, to which some hydrochloric acid has been added, be treated with iodine a grey precipitate is formed, which afterwards separates in crystalline needles. These form when dry a chocolate-brown powder, but by recrystallization from glacial acetic acid, steel-blue crystals can be obtained. This compound is said to possess extraordinary bactericidal properties, and under the name "iodphenin" was brought by Herr Scholvien under the notice of the Berlin Pharmaceutical Society at its meeting on the 14th inst. (*Apot.-Zeit.*, May 20, p. 279). Other acetanilides are said to form analogous compounds. On the manufacturing scale, in order to avoid working upon excessively large quantities of liquid, a solution of phenacetin in glacial acetic acid is used. To 600 grams of phenacetin, dissolved in 5 kilograms of acetic acid, 3 kilograms of water and 900 grams of hydrochloric acid are added, and finally a solution of 680 grams of iodine in 1360 grams of potassium iodide and 1360 grams of water. If a warm solution be used, the iodphenin (1175 grams) is obtained, upon cooling, in crystals resembling in form those of potassium permanganate; otherwise it forms a dark brown powder. Iodphenin is described as having an acrid burning taste and a weak iodine odour, and as melting at 130° to 131° C., with decomposition. It is soluble in 20 parts of cold, and freely soluble in hot glacial acetic acid, also in boiling hydrochloric acid (sp. gr. 1·19) and in alcohol. It is less soluble in 50 per cent. acetic acid, difficultly soluble in benzol and in chloroform, and almost insoluble in water. Upon heating it in any of these solvents, especially in water, iodine readily splits off, but a part of the iodine, of which it is said to contain 50·54 per cent., is retained in combination even after boiling for hours. Splitting off of iodine readily takes place also upon treatment with caustic soda solution or hyposulphite. At first iodphenin was considered to be a mixture of a compound containing two atoms of iodine in the molecule with another containing four, but this was afterwards thought to be hardly in accord with its definite crystalline form and the more difficult separation of a part of the iodine. It is therefore now suggested that the constitution of iodphenin is probably represented by the following formula, in which out of three atoms of iodine one is supposed to be less loosely combined than the other two.



It is claimed that five minutes' contact with a 1 in 5000 solution of iodphenin renders *Staphylococcus aureus* incapable of further developing.

Microcidine. At a recent meeting of the French Academy of Medicine Dr. Berlioz called attention to a new antiseptic, to which he has given the name "microcidine" (*Nouv. Rem.*, May 8, p. 209). He described it as being prepared by adding to melted β-naphthol half its weight of caustic soda, and the whitish powder obtained on cooling of the mixture was said to "consist in great part of naphthalate of soda and for the remainder of naphthalic and phenolic compounds." Microcidine is represented as being soluble in water, concentrated solutions being brownish and dilute solutions nearly colourless. In antiseptic power it is admitted to be inferior to mercuric chloride and naphthol, though ten times more powerful than carbolic acid, but on the other hand its toxicity is claimed to be lower than that of naphthol and incomparably less than that of mercuric chloride. Dr. Berlioz stated that he had found a 3 per cent. solution very useful in his clinic.

Physiological Action of Nickel Carbonmonoxide.

Nickel carbonmonoxide $Ni(CO_4)$, the remarkable volatile nickel compound discovered by Messrs. Mond, Langer and Quincke (*Pharm. Journ.*, [3], xxi., 154), has been the subject of some physiological experiments by Messrs. McKendrick and Snodgrass (*Nature*, May 21, p. 70). As might be expected, it proves to be a powerful poison, one-thirtieth of a cubic centimetre injected subcutaneously being sufficient to kill a rabbit weighing 1·5 kilogram, while the vapour to the extent of 0·5 per cent. is dangerous. The symptoms are those of a respiratory poison and similar to those caused by carbonic oxide, the spectrum of the blood of the poisoned animal being that of carbonic oxide hæmoglobin. One very interesting fact is that nickel carbonmonoxide, or as it is proposed to call it, "nioo," even when given in very minute quantities produces a remarkably prolonged fall of temperature, which may be attributed to the hæmoglobin being prevented to a large extent from supplying the tissues with oxygen. But the use of the compound as an antipyretic is precluded by its intensely poisonous properties, since it would be difficult to inject it subcutaneously in sufficiently small doses, whilst it is not easy to obtain a solution of it in any menstruum in which decomposition will not take place. If, however, a convenient solution could be prepared, it is thought that "nioo" might become a valuable antipyretic, the *modus operandi* of which would be intelligible.

Ethylene Bromide in Epilepsy.

The sedative action of potassium bromide is by some attributed to the bromine, but by others to the potassium. Upon the assumption that it is the bromine that plays the more important *rôle*, as indicated by the action of other bromides, Professor Donath has sought to avoid the disagreeable symptoms sometimes following the continuous administration of large doses of potassium bromide, as in epilepsy, by substituting an organic bromine compound. With this object he has experimented with ethylene bromide, and although withholding for the present a final judgment reports that he has obtained good results with it in several cases (*Pharm. Cent.*, May 14, p. 277). Ethylene bromide, $C_2H_4Br_2$, contains 90·9 per cent. of bromine; it has hitherto not found practical use in medicine, although on two occasions at least the confounding of the name with "ethyl bromide" is known to have led to fatal results. Ethylene bromide is a liquid, sp. gr. at 21° C. 2·163, having an odour resembling that of chloroform, and a sweetish but subsequently burning taste. At 0° C. it solidifies to a snow-white crystalline mass, which melts at +9·5° and boils at 131° C. The liquid is insoluble in water but mixes in any proportion with alcohol, and dissolves in fixed oils. On account of its insolubility in water Professor Donath has administered it in an oily emulsion containing 5 per cent.; the dose for adults commencing with 30 drops in half a glassful of sugar and water two or three times daily and rising to 70 drops. Children of from eight to ten years begin with 10 to 20 drops twice a day. Another form of administration is to dissolve the ethylene bromide in an equal quantity of spirit, of which from 5 to 15 drops are given two or three times daily stirred in a little milk. Dilution with milk or water is necessary to prevent disturbance of the stomach. For very delicate patients gelatine capsules are recommended, containing 3 drops of ethylene bromide and 6 drops of almond oil, of which two to four may be taken two or three times a day. It will be evident that if ethylene bromide should come into use considerable caution will require to be exercised in prescribing and dispensing to avoid confusion between it and ethyl bromide. In the German Pharmacopœia an attempt is made to meet the difficulty by calling ethyl bromide "æther bromatus."

Iron and Magnesium Sulphate.

The frequency with which sulphate of iron and sulphate of magnesium are combined in mixtures, and the variations in the relative proportions in which they are prescribed have induced Dr. Woods to call attention to the advisability of administering the iron and magnesium in the form of a definite double sulphate (*Brit. Med. Journ.*, May 23, p. 1122). The salt to which he refers is represented by the formula $FeSO_4 \cdot MgSO_4 + 6H_2O$, and may be conveniently prepared by dissolving 278 parts by weight of sulphate of iron and 246 parts of sulphate of magnesium in a minimum quantity of boiling water, with the addition of a little dilute sulphuric acid to prevent the formation of oxide, evaporating the solution until it becomes quite thick from the salt crystallizing out, and after allowing it to cool, drying the deposited salt, without strong heat, on filter paper. The product is a greenish white crystalline powder, readily soluble in water and fairly stable. But if the water of crystallization be driven off by heat, the resulting powder absorbs water and deliquesces. Given in 10-grain doses three times a day, Dr. Wood has not found the double sulphate to exercise any definite astringent or aperient effect, and he therefore thinks it will prove convenient for administration over a considerable time in anaemia or chlorosis. A dose of 40 grains produced a slight aperient effect, with a little flatulence and intestinal pain.

Chloralamide.

Dr. Robert Main calls attention to a danger that may possibly attend the administration of chloralamide in cases where the kidneys are affected so as to interfere with its free excretion from the system (*Brit. Med. Journ.*, May 23, 1123). In the case of a patient eighty years of age, with granular kidneys and a dilated heart, a 30 grain dose of chloralamide has always produced refreshing sleep and a sense of well-being, without headache in the morning; it has also apparently abolished the desire to micturate in the night. But on each morning after the chloralamide has been taken there has been profuse epistaxis and a great deal of congestion of face and neck on the following day.

A preparation described as being a homogeneous compound of egg albumen with quinine, possessing

Quinine Albuminate.

the remarkable property of not being decomposed by the strongest alkalies, has been recently introduced by M. Tarozyi (*Union Pharm.*, May, p. 196). It is claimed that the preparation is easily absorbable by the mucous membrane of the stomach and passes into the circulation, where it exercises its therapeutic properties without undergoing decomposition, under conditions in which the ordinary salts of quinine are broken up by the alkaline liquids of the system. This "albuminate of quinine" is stated to be prepared by double decomposition between sulphate of quinine and albuminate of soda, but the manner of operating is not indicated. The product is a white amorphous bitter substance, said to contain 56 per cent. of quinine; it is alkaline in reaction, dissolves more readily in hot water or alcohol than in cold, and more freely still in water acidulated with lactic or hydrochloric acid. It may be distinguished from other salts of quinine by treating it with water acidulated with sulphuric acid, which forms with the quinine soluble acid sulphate, the albumen being precipitated after standing.

Liquefaction of Gases.

M. Raoul Pictet, whose name is associated with the liquefaction of oxygen, has recently brought some interesting demonstrations of the liquefaction of gases before the Berlin Physical Society (*Pharm. Cent.*, March 14, p. 275). As a first source of cold he uses a liquid mixture obtained by pressure of carbonic acid and sulphurous acid, which is already known as "Pictet's liquid." By the cold produced in the volatilization of this liquid and the application of a pressure of four to twelve atmospheres nitrous oxide is liquefied. The evaporation cold of the liquid nitrous oxide is then used in the liquefaction of oxygen, nitrogen, hydrogen and atmospheric air, strong pressure being simultaneously applied, in the case of air amounting to two hundred atmospheres. It is stated that upon the opening of the tap of the vessel in which the liquefaction of air has been effected, the air escapes in a splendid blue jet, which immediately changes into a bluish cloud and then quite disappears. The temperature of the liquefied air reaches - 200°. Solidified quicksilver is said to present some beautiful tree-like crystalline forms.

Chloroform Purified by Cold.

The artificial production of cold is about to be practically applied by M. Pictet, under a patent, in the purification by congelation of various liquids, and amongst others chloroform. It is stated that when the temperature of the purest brands of commercial chloroform is lowered to - 70° C., partial crystallization takes place. If the crystals be removed and the refrigeration increased, at a temperature below - 100° C. the chloroform itself crystallizes out, and can be removed from a residuary impure fraction. The chloroform so purified is described as being at a temperature of 15° C. a clear liquid of specific gravity 1·51, which can be preserved unaltered for an indefinite time, even in daylight, in white bottles and without any addition of alcohol. Upon shaking it with concentrated sulphuric acid no coloration of the latter occurs even after a long time. When shaken with chromic acid mixture no reduction takes place, the mixture remaining yellow.

Macassar Oil.

The oil from the seeds of the *Schleichera trijuga*, Willd., from the Sunda islands, where it passes under the name "macassar oil," and enjoys a great reputation as a hair dressing and means of removing scurf and eczema, has been submitted to examination by Messrs. Thümmel and Kwasnick (*Pharm. Zeit.*, May 20, p. 314). It was found that the seeds, which contained no starch grains, yielded to petroleum ether 68 per cent. of fixed oil, but from the seeds freed from epidermis only 45·8 per cent. was obtained by pressure. The oil was in both cases of the consistence of butter, yellow, mild in taste, and with an odour of bitter almonds. It melted at 21° to 22° C., but after long standing the more solid glycerides separated, melting first at 28° and appearing under the microscope as fine needles. The fatty acids, with the exception of 3·14 per cent. of free oleic acid, were present as glycerides. Of those in combination 70 per cent. consisted of oleic acid, and of the solid fatty acids 5 per cent. was palmitic acid and 25 per cent. arachic acid, the characteristic acid of the ground nut. Lauric acid was not present, and of the volatile fat acids only acetic acid and no butyric acid could be detected. Hydrocyanic acid was found in the oil and in the seeds, being determined as 0·03 per cent. in the former and 0·62 per cent. in the latter. No amygdalin could be detected in the seeds, but hydrocyanic acid, benzaldehyde and grape sugar, possibly the decomposition products of it, were found. A small quantity of cane sugar was also separated in the crystallized form.

Japanese Valerian.

It will be remembered that the "kesso," or so-called "Japanese Valerian root," from *Valeriana officinalis*, var. *angustifolia*, was not long since examined for its essential oil by Messrs. Schimmel, who reported that the oil was practically identical with that obtained by distillation of the European valerian root, though containing in addition a constituent heavier than water, boiling at 300° C. and lævogyre, which they named "kessyl alcohol" and represented by the formula $C_{14}H_{24}O_2$ (*Pharm. Journ.*, [3], xx., 837). The root has now been examined especially for its acid contents by Messrs. Shimojama and Hyrano, who report (*Tokyo Mitteilungen*, i., 347) that by neutralizing an acid aqueous distillate after the removal of the oil, evaporating to dryness and distilling the residue with dilute sulphuric acid, they obtained an almost colourless oily liquid, having the characteristic odour of valeric acid, from which they prepared a silver salt that left upon incineration approximately the theoretical quantity of silver corresponding to that acid. As, however, the liquid had a slightly dextrorotatory action upon polarized light it is assumed by the investigators that, besides the inactive isovaleric acid characteristic of ordinary valerian root, a little optically active valeric acid (methylethylacetic acid) was present; but it seems quite possible that the optical action might have been due to a derivative from the lævogyre kessyl alcohol.

Amanita pantherina.

In Japan the "panther fungus" (*Amanita pantherina*, D.C.) enjoys a high reputation as a fly killer and also holds a prominent position among the indigenous poisonous fungi. The European "fly fungus," *A. muscaria*, also occurs in Japan, but appears to be decidedly inferior in toxic properties to *A. pantherina*. The latter is used as a fly poison in the fresh state, since it becomes inert when dry, tion was the prospect that the practice of counter prescribing would be interfered with; but, however that may have been, the chemists and druggists were eventually successful in obtaining a withdrawal from the Bill of all provisions affecting their business. Before the measure was passed in 1815 alterations were made which restricted the Act to those who "practised as apothecaries," and a clause was added stating that there was to be no interference with the trade or business of the chemist or druggist; but that all persons exercising the same should continue to do so in such a manner and as fully and amply to all intents and purposes as the same trade or business had been carried on by chemists and druggists before the passing of the Act.

From that time the practice of pharmacy became absolutely free. Apothecaries continued, as medical practitioners, to compound and dispense medicine for their own patients. In some instances they also kept open shops for the sale of drugs and pharmaceutical preparations. That association of the practice of medicine with the practice of pharmacy unfortunately gave rise to the popular idea of the "doctor's shop," and virtually sanctioned the "counter practice," which has since continued to be more or less a source of contention. But from that time the dispensing of medicines according to physicians' prescriptions was more generally entrusted to chemists and druggists. Certain houses directed their attention especially to that business, and thus particular individuals acquired exceptional repute and prestige. Still, as it was open to any person to assume the title of chemist and druggist, there was no basis upon which the interests of the class could be promoted or protected, and in some instances dispensing chemists took the apothecary qualification in order to overcome any disadvantage they might otherwise have experienced.

In the year 1819 the introduction into Parliament of a Bill "for establishing regulations for the sale of Poisonous Drugs and for better preventing the mischiefs arising from inattention or neglect by persons vending the same," again furnished opportunity for the committee representing chemists and druggists to take action which led to a withdrawal of the Bill. It was considered that the provisions of the Bill would be likely to embarrass the dispensing of medicines, without being calculated to effect the object intended. But being deeply sensible of the importance of the subject, and anxious that every possible means should be adopted to attain the object intended by the Bill, the committee issued a recommendation that chemists and druggists should adopt in their shops certain regulations. It was proposed that a printed label with the word "poison" should be affixed to every wrapper, box, bottle, or other vessel containing certain articles; that all drugs or preparations likely to produce serious mischief if improperly used should be sold with printed labels bearing their names, and that none but persons of sufficient age and experience, to judge of the great caution necessary for avoiding the sale of poisons to improper or ignorant persons, should be allowed to supply such drugs or preparations.

Up to the year 1829 the chemists and druggists' committee had continued to be scarcely more than a body for trade defence as occasion arose and the idea of forming a permanent society appears to have been only vaguely entertained. In the following year an attempt was made by Mr. JOHN SAVORY, Mr. HUDSON, and Mr. [illegible] to draw attention to the desirability of organized association of all the members of the trade, with a view to establishing education, controlling the sale of poisons, and adopting such regulations as would conduce to the elevation of the practice of pharmacy and the protection of the public. So little response was given to this proposal that it was abandoned, and it was not until the year 1839 that the quiescent condition of chemists and druggists began to be seriously disturbed by a parliamentary inquiry instituted in regard to the laws affecting the medical profession. The evidence given before a committee of the House of Commons furnished material for the introduction of a measure of general medical reform. The Bill first introduced by Mr. WARBURTON, with the assistance of Mr. WAKLEY and Mr. HAWES, was withdrawn, and several succeeding Bills were no more successful. But in 1841 a Bill was introduced by Mr. HAWES, Mr. EWART, and Mr. HUTTON, in which it was made unlawful under a penalty of £20 to carry on the business of a chemist and druggist without a licence obtained from a medical council. Moreover the words "practising medicine" were so defined that, in connection with the clauses inflicting penalties for practising without a licence, the most simple recommendation of a drug would have been made an offence punishable by a fine of £20 or imprisonment.

Though at first little attention was given to the measure by chemists and druggists, its importance was urged upon them by Mr. FARMER, Mr. G. W. SMITH and Mr. BAXTER. The action that was then taken for opposing it eventually gave the occasion for the formation of the Pharmaceutical Society. The first result of the opposition offered by the chemists and druggists was the temporary withdrawal of the Bill. Neither the College of Physicians nor the College of Surgeons was disposed to interfere with the practice of pharmacy or with chemists and druggists; but the former body, thinking that some adequate education and an examination should be instituted, proposed to form a board for that purpose, in conjunction with the Society of Apothecaries. When the Bill in an amended form was subsequently introduced by Mr. Hawes, and it came on for second reading, the large number of petitions from chemists and druggists presented in opposition to it showed that it had excited considerable interest throughout the country.

The idea of establishing a Society representative of pharmacy then began to assume more definite shape. So long as it remained a fact that there was no institution for the systematic education and examination of chemists and druggists, by which their qualification could be guaranteed, the imputations that had been cast upon chemists and druggists did not well admit of being efficiently answered. It had also become evident that, in the absence of any organized association among chemists and druggists by which provision could be made for supplying those deficiencies, measures would again be taken from other quarters for doing so. With that prospect in view, and recognizing the possibility then offering for some steps to be taken to raise the professional character of the pharmaceutical body, several of those who afterwards became founders of the Pharmaceutical Society conferred together as to the basis on which such an association should be constituted. A leading part in this work was taken by Mr. Jacob Bell, and it was ultimately decided to form an independent body, to represent the permanent interests of chemists and druggists. It was proposed that the object of the Society should be to elevate the calling of pharmacy by furnishing proper means of instruction and thus to benefit the public, while at the same time protecting the individual and collective interests of the body against hostile attacks in Parliament or otherwise. It was further desired that all established chemists and druggists should be included in the Society; that a fund should be established for the relief of decayed or distressed members; and that a committee should be appointed for the purpose of framing bye-laws and regulations for the conduct of business. At the meeting held on the 15th of April, 1841, at the Crown and Anchor Tavern, the chemists and druggists' committee, assuming the body it represented to be capable of self-government, recommended that an association should at once be formed for the union of all the members of the trade, the protection of their general interests, and the advancement of scientific knowledge. It was also recommended that the basis of such union should be the adoption of education, examination, registration and representation as involving results beneficial to the general public, and particularly to chemists and druggists, while offering to the medical profession and its representative corporations a guarantee that chemists and druggists were disposed to afford every evidence of their fitness to exercise the privileges they desired to retain. At that meeting a resolution, moved by William Allen and seconded by John Bell, was unanimously carried, constituting the Pharmaceutical Society of Great Britain. An Executive Committee was appointed, with Mr. G. W. Smith and Mr. Farmar as Secretaries, for the purpose of framing bye-laws. At a meeting held on the 1st of June, bye-laws were presented with a report on the objects and methods to be adopted by the Society. In that report it was pointed out that the bye-laws had been drawn up in such a manner as to secure to all principals, assistants, and apprentices their existing rights and privileges, whilst assuring to the public and the medical profession for the future the competence of chemists and druggists who were members of the Society. It was urged that as the Society not only involved the prosperity of chemists and druggists throughout the kingdom, but was also of a public nature, it was only by the combined and continued efforts of individuals that it could be successful either in preventing the imposition of restrictions in the future, or in the general advancement of pharmacy. At that meeting the bye-laws were adopted and the Executive Committee was constituted the first Council of the Society. In an address issued by the Council to the chemists and druggists of Great Britain, attention was drawn to the very important consideration that, while comparatively little permanent benefit would result from protection of the trade merely as a trade, a recognition of the need for regulation, and the endeavour to supply deficiencies in that respect, would be the only sure means of removing any pretext for hostile proceedings and of securing immunity from persecution.

The first work of the Council after the settlement of the constitution of the Society was directed to the means to be adopted for promoting education and to the mode of conducting the examination of members and associates. In that work the assistance of the College of Physicians and of the Senate of the London University was sought; but those bodies, while expressing general approval of the educational objects and plans of the Society, were not disposed to co-operate in them officially. The old fear that improved education of chemists and druggists might lead them to interfere with medical practice still remained, to some extent, in force, giving rise to distrust and suspicion. But as the work of the Society proceeded those feelings gradually gave place to a more favourable impression. The meetings held by the Society were attended by many members of the medical profession who regarded with satisfaction the nature of the subjects introduced for discussion and the general character of the proceedings. The establishment of the Pharmaceutical Journal, for the publication of the Society's transactions and as a medium of communication for its members, was another circumstance that had an important influence in gaining for the Society the appreciation of the medical profession. The steps taken to form a Library and Museum as well as to provide an efficient School of Pharmacy, with courses of lectures by Dr. ANTHONY TODD THOMPSON, Dr. PEREIRA, Professor FOWNES, and Professor REDWOOD, also tended in the same direction.

By the end of the year 1841 the Society was established in the house it now occupies in Bloomsbury Square, and the regular evening meetings, as well as the Council meetings, were commenced in January of the following year. But though the Society had been thus firmly established, and had met with considerable approval from the Government and medical authorities, the support given to it by chemists and druggists was only partial. The total number of members and associates at the end of 1841 was not more than 800 and at the first annual meeting in May, 1842, it had only increased to 1258—not more than one-third of the entire number of chemists and druggists in the kingdom. The important principle that the maintenance of a position of independence and freedom from control by one or other of the medical corporations could only be ensured by improving the qualifications of the members of the body had not been generally recognized. Nor was it perceived that the acquisition of increased powers and privileges depended upon the same condition. With many a feeling prevailed that the course of education which the Society aimed at providing for students was in excess of what was required. A large number of those who then called themselves chemists and druggists had no real claim to the former title. Though they dealt in drugs and chemicals they were often as little entitled to be called pharmacists and they rarely had a physician's prescription to dispense. Consequently the majority of chemists and druggists throughout the kingdom were indifferent to the promotion of education and to the general advancement of pharmaceutical knowlege which were the chief objects of the Society. When JACOB BELL visited different parts of the country in 1841, for the purpose of bringing members of the trade together, his success was but limited. Though he always received a cordial welcome, with attentive consideration of the object of his mission, the result was that only a few took a lively interest in the advancement of pharmacy, some were satisfied with the prevailing state of mediocrity, but the majority hesitated in a state of indecision if not of indifference or opposition.

After the Royal Charter of Incorporation had been obtained by the Society in 1843, some temporary interest was excited by the introduction of a clause into Sir JAMES GRAHAM'S Medical Bill, by which it was proposed to provide that every person who should "act or practice as an apothecary" without being registered by the Council of Health was to be subject to a penalty of twenty pounds. But the influence thus exercised was of short duration. After the exemption of chemists and druggists from the proposed provision had been obtained, the previous condition of apathy and inaction was resumed.

However, a Pharmacy Bill was required as a means of strengthening the position of the Pharmaceutical Society, from the probability that a Bill relating to the practice of pharmacy would be introduced by the Government, if the medical legislation then before Parliament were carried out. Consequently the Council was led to consider the advisability of promoting such a measure. A Bill was drawn and presented to the annual meeting in 1846. It proposed to found a College of Pharmacy to exercise the functions of an examining body, while the Pharmaceutical Society continued its work as an educating body. It was also proposed that registration as a member of the college should be made a necessary condition for every person engaged in the business of preparing, compounding, or dispensing medicine for sale; chemists and druggists who had been in business before the passing of the Act being excepted. Difficulties afterwards arose as to the constitution of the examining board, and the fear that the education of chemists and druggists might lead them into medical practice again became manifest. To those obstructions was added the opinion entertained by the Government that pharmaceutical legislation should not precede but follow medical legislation and nothing was then done.

The alarm that was created shortly afterwards by the frequent occurrence of cases of poisoning with arsenic, had the effect of again directing public attention to the conditions under which poisons were sold, and to the necessity for legislation in regard to the practice of pharmacy. In passing the Sale of Arsenic Act in 1851 it was found impossible to adopt the recommendation of medical and pharmaceutical authorities that the sale of arsenic should be limited to medical men and chemists and druggists, owing to the want of any legal definitions of the titles chemist and druggist or pharmaceutical chemist. However the recognition by the Legislature that such a limitation, if practicable, would have rendered the Act more efficient had shown that protection, respectability, and success were directly connected with professional qualification. That was an important step towards the admission of the principle that the business of a chemist and druggist was something more than a mere trade.

At the annual meeting of the Society in 1851 it was resolved to petition the House of Commons to pass an Act for regulating the qualifications of pharmaceutical chemists. The petition set forth that Great Britain was an exception to almost all other civilized countries, in having no provision that the persons who sold medicines and dispensed prescriptions should be regularly educated for those responsible duties. It was also stated that there was good reason for believing the public consequently sustained injury. It was further stated that, though the endeavours of the Pharmaceutical Society to provide a remedy for the evil, by introducing a regular system of pharmaceutical education and examination, had met with as much success as could be expected by a voluntary society, the sanction of the Legislature was requisite in order to ensure the full accomplishment of the reform requisite for the safety of the public. The petition was presented by Mr. Jacob Bell, then member for St. Albans, and in the following month he obtained leave to introduce a Bill to regulate the qualifications of pharmaceutical chemists and the practice of pharmacy. The object of that Bill was to establish grades of legal qualification for all persons engaged in the practice of pharmacy as principals or as assistants and apprentices, with a system of registration and penalties for breaches of the regulations. The Bill was opposed by Mr. Hume, Mr. Henley, and the Home Secretary, Sir George Grey, on the grounds that it would interfere with free trade principles by creating a monopoly and tend to convert chemists and druggists into medical practitioners. It was also opposed by petitions from the Royal College of Physicians of Edinburgh, and the Faculty of Physicians and Surgeons for Glasgow, but was supported by Mr. Wakley and by petitions from all parts of the country with more than fifteen thousand signatures. It then stood over until the following session, when it was again introduced, and after the introduction of some amendments by Mr. Bell was referred to a Select Committee. The evidence given showed the neglect of pharmaceutical knowledge which had prevailed until the Pharmaceutical Society was established, and the necessity for regulating the practice of pharmacy in the interests of the public. But, notwithstanding the support thus afforded, it was held that the restriction of the dispensing of medicine and of the business of chemists and druggists to examined and registered persons could not be adopted, inasmuch as that would be inconsistent with the free trade principles which had been recognized by the Government in regard to the regulation of the practice of medicine. The utmost that could be obtained was the means of securing to qualified men, who voluntarily passed the requisite examination, the right to use the title of pharmaceutical chemist, by which they might be distinguished. Consequently the most important provision of the Bill, which would have restricted the exercise of the duties of chemists and druggists to examined persons, was struck out. Especial care was also taken to guard against the possibility of educated pharmacists becoming medical practitioners as the apothecaries had done, by specifying that the examinations should not include the theory and practice of medicine, surgery or midwifery.

So far, therefore, the Pharmaceutical Society had not advanced in its endeavours to obtain legislative regulation of the practice of pharmacy beyond what might be effected, on the basis of voluntary action, by those who desired to assume the title of pharmaceutical chemist. It was still open to any one to carry on the business of chemist and druggist without qualification or any test of competence for the due performance of the duties it involved.

The position of pharmacy in this country about that period was well described in an address delivered in 1854 by Professor Christison to the North British Branch of the Pharmaceutical Society. Contrasting the conditions obtaining in France or Germany and in this country, the impracticability of attempting to regulate the practice of pharmacy by the principles of free trade was forcibly insisted upon as inevitable, since the business does not admit of indefinite extension. It was contended that the policy of a wise Government should be restrictive, so regulating the practice of pharmacy by education and licence, that those engaged in it might not only be well qualified, but, being so, might live, and live respectably, elevating their social position and drawing closer the ties which connect their trade with the sciences. But if it were left open the educated portion of the pharmaceutical profession would be grievously injured. Education failing to meet its just reward would turn away, and thus it was argued chemists and druggists as a class were held down below their proper level by the impolitic and unjust neglect of Government, to the retardation of the advance of knowledge and the infinite damage of the community.

At this period of the history of the Society much time was occupied by internal dissension among its members; but, notwithstanding that disadvantage, the Society still continued to advance in public estimation and to gain greater confidence from the medical profession. The suspicion that its members might seek to follow the example of the apothecaries had been to a great extent dissipated by the experience of twelve years, and by the evidence afforded that the Society, in endeavouring to advance education and improve the practice of pharmacy, was steadily confining its attention to its own proper business. Satisfactory proof of the regard in which the Society was held was afforded

by the application of the College of Physicians to the Council for assistance in the preparation of a new edition of the London Pharmacopœia.

The occurrence, in 1855 and 1856, of a number of cases of poisoning again drew serious attention to the subject of the sale of poison, and the provision of some measure of protection against accidental and criminal poisoning. The urgent necessity of a law to regulate the sale of poisons, and to restrict the facility with which they could be obtained, was pointed out in the House of Lords by Lord CAMPBELL, and the subject was very widely discussed in the press. The adulteration of food and drugs was another subject that attracted, for a time, considerable attention, on account of the sensational manner in which it was dealt with, not only in newspapers, but even in the evidence given before a Committee of the House of Commons. In regard to both these subjects the Council of the Pharmaceutical Society took occasion to point out that, ever since the foundation of the Society, its efforts had been directed to preventing the adulteration of drugs, improving the quality of medicines, and promoting legislation in reference to the sale of poisons. It was further stated that the best remedy against the evils which had been complained of, in connection with the preparation of medicines and the sale of poison, was to be provided by raising the scientific character and social position of the chemist and druggist in the manner that the Society had projected more than fifteen years previously, and that recent events had shown the necessity of.

Early in 1857 a Bill "to restrict and regulate the sale of poison" was brought into Parliament, the provisions of which, besides being otherwise objectionable, were little calculated to effect the object in view. Some amendments were introduced to meet the objections urged against the Bill, though without removing the defects which would have rendered it inoperative. Shortly afterwards the further progress of the Bill was stopped by the resignation of the Ministry; but practically the same measure was taken up by the succeeding Ministry and introduced in the House of Lords by Lord DERBY. It proposed that no persons, other than legally qualified medical practitioners, should sell poisons without a licence to vend drugs. The licence was to be granted by a new Board of Examiners that would have practically superseded that of the Pharmaceutical Society. In spite of the remonstrances urged upon the Government the Bill was hurried through the House of Lords, which passed it without amendment on the 8th July, 1858. However the energetic steps taken to oppose the Bill in the House of Commons were successful in securing its ultimate withdrawal. Towards the end of the same year the accidental substitution of arsenic for sulphate of lime in the manufacture of lozenges, resulting in the death of twenty persons and of serious injury to some two hundred others, again drew the attention of the Government to the subject. The Poison Bill, in an amended form, was again introduced, but after a brief contest it was withdrawn.

During the next two years no further legislation was attempted that in any way affected the practice of pharmacy, with the exception of the Medical Act of 1858. But in the year 1862, when the Juries Bill was before Parliament, opportunity was afforded to make a claim for the exemption of chemists and druggists on the same ground that it had been conceded to medical men. However, two difficulties were encountered. First, owing to an exaggerated statement that had been put forward as to there being about forty thousand chemists and druggists in the kingdom, it was objected that, if all who assumed that title were to be exempt, the jury lists would be so seriously reduced as to increase the difficulty experienced in getting the duties of jurymen efficiently performed. That was in itself a serious obstacle. But one of far greater weight was the second objection that there was no means of ascertaining who was a chemist and druggist. Consequently the claim on behalf of chemists and druggists was held to be quite unfounded, and the exemption from jury service was limited to pharmaceutical chemists, who being registered as legally qualified persons, engaged in the performance of delicate and responsible duties, could be recognized as fit and proper persons for exemption from a service that would take them away from those duties. That result was a fair ground for congratulation, as having been achieved for pharmaceutical chemists through the influence of organization, qualification and registration, which the Society had always declared to be essential for the whole body of chemists and druggists.

The actual condition of the trade in regard to numbers, and of the Pharmaceutical Society in relation to the trade, at the period now referred to may be stated on the basis of the census returns published by the Registrar-General for 1861, according to which the total number of persons then employed in the establishments of chemists and druggists in England and Wales was 16,026, including assistants and apprentices. Of that number 3,388 were under age, and probably apprentices, leaving 12,638 as the number of principals and assistants. It was estimated that the number of those engaged in business on their own account was about 6000, and as there were at that time upwards of 2000 members of the Pharmaceutical Society, it represented about one-third of the chemists and druggists actually in business on their own account.

The year 1863 was marked by an event of considerable importance in regard to the development of British pharmacy. Though not immediately connected with the Society it was to some extent a realization of an older project, put forward in 1852 by Mr. SCHACHT, that meetings of the Pharmaceutical Society should be annually held in one or other of the chief provincial towns, with the view of stimulating country members to more active interest and co-operation in the work of the Society. In a modified form this project was revived by Mr. R. REYNOLDS, of Leeds, and with the concurrence of Mr. BRADY and Mr. SCHACHT it resulted in the formation of the British Pharmaceutical Conference, the first meeting of which was held at Newcastle, with Mr. HENRY DEANE as President.

Towards the end of 1863 the report of a committee of the General Medical Council, relating to the amendment of the Act under which that body was appointed, recommended that application should be made to Parliament for a new medical Act comprising material alterations that involved questions of great importance for pharmacy. The opinion prevailed that the state of pharmacy in this country was not only unsatisfactory but disgraceful, and that further legislation was required. It was therefore proposed that the practice of pharmacy should be included among the departments over which the Medical Council should exercise control. It was also proposed that a general system of education and examination should be established and regulated by the Medical Council; that all persons qualified by such examination to practise pharmacy should be registered; that the dispensing or compounding of physicians' or surgeons' prescriptions should be restricted to qualified practitioners of pharmacy by the imposition of penalties upon those who kept open shop for that purpose without having passed the required examination; that inspectors appointed by the Medical Council should see that the provisions were duly carried out; that the sale of all secret remedies should be prohibited, and that sellers of patent or quack medicines should be subject to a penalty unless sworn certificates of the composition of the articles were exposed for inspection in the shops or places where they were sold.

Again chemists and druggists were confronted with the possibility of being subjected to medical control, in consequence of their neglect to adopt measures of self-regulation that would satisfy the requirements of their position. The enactment of such a measure as was proposed would have superseded part of the duty of the Pharmaceutical Society and relieved it of some responsibility. It would also have accomplished objects that the Society had desired, and left it to carry out education and examination under a control similar to that exercised over medical colleges and licensing boards. In the Medical Council there was a general concurrence of opinion in favour of restricting the practice of pharmacy to qualified and examined persons. At the same time, in view of outside disapproval of the proposed measure, there was a disinclination on the part of some members to embroil the Council with chemists and druggists by undertaking the duty of regulating the system of education and examination to be adopted. Dr. CHRISTISON was of opinion that this could not be entrusted to better persons than the pharmaceutical chemists. Eventually therefore the idea of attempting to legislate for pharmacy was relinquished. But a very significant resolution was passed that a communication be addressed to the Secretary of State for the Home Department drawing his attention to the defective state of the law regarding the practice of pharmacy, under which any person, however ignorant, might undertake it, and expressing the opinion of the Medical Council that some legislative enactment was urgently called for to ensure competency in persons keeping open shop for dispensing medicines, and for compounding physicians' and surgeons' prescriptions.

One effect of the views expressed by the Medical Council was to stimulate action on the part of a society which may be regarded as having been the representative of those who had held aloof from the efforts of the Pharmaceutical Society to establish provisions for ensuring the qualification of persons engaged in the practice of pharmacy. The United Society of Chemists and Druggists had been formed in 1861, not for the education and better qualification of chemists and druggists, but ostensibly to carry out, by district meetings and combined action, any improvement that might be deemed necessary for the welfare of chemists and druggists as a trading community.

The failure of the United Society, in 1862, to obtain the exemption of those it represented from jury service had produced some effect, and had led the Society to perceive that "some qualification" and legislative recognition were necessary to enable its members to obtain the position they desired. But reliance was still placed mainly in the demand for a recognition of the existing "rights" of the thirty thousand chemists and druggists that were assumed to be engaged in the business. Meetings were held in various parts of the kingdom to denounce and oppose "the unwarrantable interference of the Medical Council with the rights of dispensing chemists," though without any apparent regard for the fact that the value of those "rights" was almost annulled so long as they could be assumed by any persons, however unqualified.

The members of the Pharmaceutical Society also felt that the time had arrived for some action to supersede, if not to oppose, legislation on the part of the Medical Council in regard to the general practice of pharmacy. That feeling was strengthened when it was found that the Medical Council was disposed to drop the subject of pharmacy and leave it to be worked out by pharmacists for themselves. Early in 1864 a requisition, signed by more than three hundred members of the Society, was presented to the Council, stating the desirability that all chemists and druggists should in future undergo a due professional examination before commencing business, and requesting the Council to convene a meeting to consider the expediency of immediate application to Parliament for an amended Pharmacy Act, by which the legitimate interests of those already in business should be protected and proper provision made for rendering the examination of future chemists and druggists compulsory instead of a merely optional proceeding. At the meeting called in accordance with that requisition in March, 1864, the subject was discussed by members from all parts of the country with much difference of opinion. But a resolution was passed that for the future chemists and druggists should be examined before commencing business and that the Society should seek to obtain an Act providing for such a protective restriction of the business with due regard to the existing interests of principals and assistants already in business. A Bill was drawn, and after approval by the Council it was adopted at the annual meeting of the Society. The main feature of the Bill was that the dispensing of medicine and the compounding of the prescriptions of duly qualified medical practitioners should be restricted to pharmaceutical chemists and duly registered chemists and druggists. Registration was to be obtainable at first by all persons who had been engaged in business, either on their own account or as assistants, before a certain date; but in the future only by persons who obtained certificates of having passed an examination which the Pharmaceutical Society was to be empowered to conduct and regulate. At that time the system of granting annuities from the Benevolent Fund established by the Society had not been commenced and, as it was felt that the usefulness of the Fund would be materially increased by making it available, not only for members of the Society but for all persons regularly connected with the business, a clause was inserted in the Bill giving the Council power to make such an extended application of the Fund.

Shortly afterwards the United Society of Chemists and Druggists produced a Bill providing that all persons keeping open shop or store for retailing drugs or engaged in retailing or dispensing dangerous drugs, simple or compound, except persons registered under the Pharmacy Act, 1852, should be required, under a penalty, to be registered as chemists and druggists, employ none but registered assistants, and observe certain regulations in the sale of active poisons. All persons engaged in business at the time of the Act coming into operation, either as chemists and druggists or as their assistants or apprentices, were to be registered without examination; but after that time registration was to be obtainable only by those who were examined by duly appointed examiners and certified to possess "a competent knowledge of drugs and medicines in general use and of their doses, and to be able to read physicians' prescriptions with ease and accuracy." Persons so registered were to be exempt from serving on juries.

It is unnecessary to enter into details of the conflict that arose between the promoters of these two Bills. For the present purpose it will be sufficient to recall the fact that it lasted for nearly four years, that it had the disastrous effect of demonstrating that chemists and druggists were divided into parties irreconcileably at variance with each other, and that with a considerable number of them there was, on various grounds, determined hostility to the Pharmaceutical Society. The most important consequence of that state of internal discord was that of counteracting the inclination of the Home Secretary, Sir GEORGE GREY, to bring in, as a Government measure, a Bill for regulating the practice of pharmacy. Eventually, the two Bills above referred to were introduced into Parliament. After some discussion, in which it was generally admitted that there ought to be a compulsory examination to ensure the qualification of chemists and druggists, and that the examination could not be better conducted than by the Pharmaceutical Society, both Bills were read a second time on the 29th of March, 1865, and referred to a select committee. The evidence given before that committee by Dr. ALFRED SWAINE TAYLOR, Dr. QUAIN,* and Mr. SIMON, then Medical Officer of the Privy Council, strongly supported the view that the sale of dangerous drugs and poisons should be subject to legislative restriction, and "free trade in physic" was emphatically denounced as dangerous to the public. All agreed in advocating the educational qualification of dispensers of medicine and in commending the regulations of the Pharmaceutical Society for testing by examination the qualifications required. But gradually the value of thorough pharmaceutical qualification was lost sight of. The members of the Committee became more impressed with the necessity of mere restrictions on the sale of poisons, and effect was given to that view in the report so as to exclude the proposal in the Bill of the Pharmaceutical Society that the compounding of medicines from prescriptions of medical men should be restricted to persons qualified by registration. Hence the Committee reported it was not considered expedient to proceed further with either Bill.

It is important here to direct attention to the opinions formed by a committee of the Medical Council in regard to these two Bills, and stated in a report presented, in 1865, to the Home Secretary and to the Chairman of the Parliamentary Com-

mittee. It was considered that the preferable mode of legislation was that which adopted for a basis the Pharmaceutical Society with the Pharmacy Bill of 1852. The Bill promoted by that Society was thought to be well fitted to attain important objects and reasonable in its demands for powers and privileges. It was suggested that a clause should be added compelling chemists and druggists to follow the formularies of the British Pharmacopœia in compounding prescriptions, unless otherwise directed by the prescriber. It was also thought that the terms on which the promoters of the Bill proposed to admit into their Society practising chemists and druggists not then belonging to it, were too easy. Admission by a certificate from a qualified medical practitioner of having been in the practice of dispensing medicines from prescriptions before January, 1866, was regarded as implying a facility of admission apt to lead to abuse, and more satisfactory evidence of qualification was thought to be requisite. A further suggested defect in the Bill was the absence of any adequate provision for preventing registered pharmaceutical chemists from converting themselves into unqualified medical practitioners. In that respect reference was made to the history of medical practice in this country as indicating the danger to the interests of the public, and of the medical profession, that might be apprehended if the Bill were passed as it then stood. In view of the facts that some chemists and druggists practised medicine, though unqualified by law and not competent by education, and that the practice could not be prevented, it was considered that its existence would give peculiar facilities and temptations to pharmaceutical chemists to embark largely in irregular medical practice as unqualified practitioners, and that if the creation of a new race of unqualified practitioners should be thus inadvertently encouraged by an Act of Parliament, the endeavours of the Medical Council to raise the qualifications of legally qualified medical practitioners would have been in vain. A question was raised whether the danger thus apprehended might be averted by extending the jurisdiction of the Medical Council so as to include control over pharmaceutical chemists as well as practitioners in medicine; but that plan was admitted to be attended with difficulties, and it was considered unwise to seek to alter the relations between the Medical Council and chemists and druggists. Another suggestion to the same end was that there should be a specific provision that nothing in the contemplated Pharmacy Act should entitle any person registered under it to practice any branch of medicine or surgery. Lastly attention was called to the fact that the right of dispensing and selling medicines was to be conferred on the whole body of chemists and druggists without any control on the part of the Government, except such as was exercised over pharmaceutical chemists under the Pharmacy Act, 1852. It was shown that the medical profession had not been so dealt with in the Medical Act, and that the Medical Council was properly restricted in its action by the medical corporations and universities and also controlled by the Privy Council. Hence it was suggested that the whole practice of pharmacy ought to be subjected to similar control.

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* Now Sir Richard Quain, Bart.

Practically the result of the action taken by the United Society amounted only to the postponement of legislation. After some months, application was made to the President of the Pharmaceutical Society to ascertain whether the Council would be willing to co-operate with the United Society for the introduction of a Bill based on the recommendations of the Select Committee. Mr. Sandford replied that whenever opportunity offered the Council would be ready to assist the Government in arranging an efficient and liberal measure, but that a mere Poison Bill, imposing registration of sales and other formalities, would only be an encumbrance to the statute book, inoperative as to the public, and especially objectionable to men who, if properly qualified to deal in dangerous articles, would each, according to the special circumstances of the case, adopt precautions far more conducive to the public safety. In regard to the liberal nature of such a measure Mr. Sandford stated that the Home Secretary was in possession of the views entertained by the Pharmaceutical Society, and he believed no chemist and druggist properly so called could fairly object to them. In that respect he added that the desire of the Council was to make the compulsory provisions of the Bill entirely prospective, and to give all persons registered under it equally easy means of access to the Society which was to regulate the examinations, etc. Lastly he repudiated the oft-repeated charge, made against the Pharmaceutical Society, of a desire to subjugate all chemists and druggists to its authority, and stated that as he regarded the union of all men in the calling to be an important means of elevating the standing of the whole body he was in favour of a voluntary registration of men already in business.

In order to keep the subject under the notice of the Government the Council of the Pharmaceutical Society early in 1866 sent to the Home Office a brief outline of such a measure as was thought to be in accord with the recommendations of the Select Committee and with the views of chemists and druggists, stating: (1) That in future, before assuming the name or title of chemist and druggist or keeping open shop for the compounding of medicines under physicians' and surgeons' prescriptions, or for vending, dispensing or compounding certain dangerous drugs and chemical or other poisonous substances to be enumerated in a sche-

dule, all persons should undergo an examination and be registered as pharmaceutical chemists or as chemists and druggists. (2) That the examination for chemists and druggists should be that known as the Minor examination, to which persons theretofore registered by the Pharmaceutical Society as assistants had been subjected. (3) That all persons registered under the proposed new Act as chemists and druggists should be eligible as chemist and druggist members of the Pharmaceutical Society, entitled to nominate and vote for members of Council, but not to be registered as pharmaceutical chemists. That the Council should be composed of pharmaceutical chemists only. That all registered chemists and druggists should be exempt from serving on juries. (4) That nothing in the Bill should interfere with or curtail the rights of chemists and druggists already in business or of persons of full age who were at a given date assistants to chemists and druggists. That chemists and druggists already in business should, if they chose, be placed on the register, on making application within a certain time after the passing of the Bill and producing satisfactory evidence that prior to that date they had been in business on their own account and engaged in the compounding and dispensing of medicines under physicians' and surgeons' prescriptions, and in vending, compounding and dispensing the dangerous poisons in the schedule.

At a meeting of the United Society in January, 1867, most of these proposals were agreed to; but objection was taken to registered chemists and druggists, desirous of becoming members of the Pharmaceutical Society, being subject to election by the Council, and to the Council being composed entirely of pharmaceutical chemists. These difficulties were afterwards removed, and all differences of opinion having thus been done away with steps were taken to prepare a Bill for introduction into Parliament. Another difficulty, however, had then to be met, arising on the part of examined men, from disapproval of the concessions made to chemists and druggists, which were thought to be unfair to those who were members of the Society. The Council in its position as trustee for examined members of the Society was thus placed in some embarrassment. But a number of influential members who were pharmaceutical chemists by examination came forward with a counter protest, expressing cordial approval of the liberal policy adopted by the Council towards chemists and druggists, as being the best compromise that could be effected to remove the difficulties that had obstructed trade legislation, to consummate the wishes of the founders of the Society and to secure the amalgamation of the whole trade, as well as the future compulsory examination of all persons entering it. In the discussion of this subject at a special meeting both views were fully argued, and the contemplated action of the Council was supported by a large majority as being a wise and expedient course for enlisting the support of members of the trade outside the Society and so effecting the incorporation of the entire body.

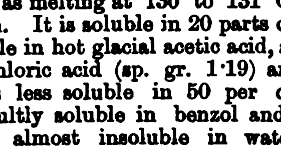
All difficulties having thus been removed, the United Society having agreed to co-operate with the Council in promoting the acceptance of a Bill by the Legislature, and the Home Secretary, Mr. GATHORNE HARDY, having approved of the propositions submitted to him, the Bill was drafted and introduced into Parliament in May, 1868. It passed through the House of Lords without alteration, and though considerably discussed in the House of Commons it was passed without any very material alteration beyond the excision of the clause exempting chemists and druggists from jury service.

From that time the chemists and druggists of Great Britain became a defined and recognized body. There was a certain prospect that in course of time all members of it would possess the legal qualification conferred by examination and registration. However, it is still to be regretted that the standard of pharmaceutical chemist was not adopted for those engaged in business on their own account, and that the principle of restricting the compounding and dispensing of medicine was not included in the Act. The incorporation of the trade that was effected by the Act was based upon regard for the public safety rather than upon the principle that the more professional part of the chemist and druggist's business requires scientific knowledge and educational training that are unnecessary for ordinary traders. Legal qualification was to be acquired by an examination test that would exclude from registration those who failed to show that they possessed the minimum knowledge requisite for ensuring the safety of the public so far as the sale of poison was concerned. In that respect the Act fell short of the object contemplated by the Pharmaceutical Society of ensuring for all who entered the business such scientific education and practical training as would make them competent to perform the duties of the professional part of the business. Hence the Act was rather one to protect the public than to protect the practice of pharmacy. A qualification for this was still left a voluntary matter, and that which was made compulsory was merely the mediocre qualification which had originally been intended for assistants. But sufficient legislative progress had been made to offer opportunity for chemists and druggists to improve their position in regard to the public, to gain from the medical profession greater esteem as well informed and competent dispensers of medicine, and to co-operate in various other ways for the advancement and protection of their general interests as members of a semi-professional calling. In all those respects, however, much still remains to be done, and it may be doubted whether the opportunities offered by the Pharmacy Act, 1868, have been so fully utilized by chemists and druggists generally in their own interests as they might have been.

During the twenty-three years that have elapsed since the passing of the Pharmacy Act many circumstances have contributed to influence its opera-on, and experience has shown that all the anticiations of its beneficial effect have not been ealized. The evil of company trading has come nto existence within that period. The final result f the litigation in regard to company trading had he unfortunate effect of permitting the business f a chemist and druggist, and even the practice of harmacy, properly speaking, to be carried on by company consisting of unregistered persons. That mode of conducting the business was held to e outside the scope of the Pharmacy Act, which pplied only to individual persons. The efficacy of he Act was thus materially weakened, and though t has been held that company trading of the kind eferred to could not be carried on except through he agency of a duly registered person acting for a ompany, the necessity of registration, for the awful performance of certain duties by individuals, as not been upheld by chemists and druggists so trictly as to have made that condition a source of rotection to themselves. According to the judiial decisions that have been given on that point ompany trading would have been impossible uness duly registered persons were employed to onduct that part of the chemist and druggist's usiness which is placed under restriction by the Pharmacy Act. In any case this requirement would have helped to limit company trading, and f registered persons had generally refused to make heir qualification serviceable in that way, company rading could not have been carried on at all. Another experience that has been gained is hat the necessity of undergoing examination, s a preliminary to registration, has altogether ailed to operate as such an effective stimulus of sound education as it was hoped might be he case. The continuance of the practice of aking apprentices without any adequate test of their educational and general fitness for the occupation, the want of suitable provision for apprentices to study the various scientific subjects they require to be familiar with, and the custom of employing unqualified persons as assistants have all contributed to introduce into the body a arge number of persons who, failing to pass the examination requisite for obtaining legal qualification, become material for supplying stores, trading companies, and other irregular competitors of duly registered chemists and druggists with the means of carrying on business to the serious detriment of the latter. These are conditions that have long since made themselves sensible and, as the educaional deficiency lies at the root of them, the efforts of the Society's Council have been continuously directed to the establishment of an improved system of pharmaceutical training, though as yet without success. The Bill now before Parliament may therefore be regarded as a natural supplement of the Act of 1868, which the experience of subsequent years has proved to be necessary for the more effective protection of pharmaceutical interests. Hence it is the duty of all who appreciate the importance of the pharmacist's calling and who estimate rightly their own interests, as engaged in the practice of pharmacy, to promote by every means in their power the passing of that measure as the means by which a further advance may be made towards realizing the objects of the Society's founders, and placing the practice of pharmacy in this country upon a sound basis.

"THE MONTH."

Iodphenin. If a cold aqueous saturated solution of phenacetin, to which some hydrochloric acid has been added, be treated with iodine a grey precipitate is formed, which afterwards separates in crystalline needles. These form when dry a chocolate-brown powder, but by recrystallization from glacial acetic acid, steel-blue crystals can be obtained. This compound is said to possess extraordinary bactericidal properties, and under the name "iodphenin" was brought by Herr Scholvien under the notice of the Berlin Pharmaceutical Society at its meeting on the 14th inst. (*Apot.-Zeit.*, May 20, p. 279). Other acetanilides are said to form analogous compounds. On the manufacturing scale, in order to avoid working upon excessively large quantities of liquid, a solution of phenacetin in glacial acetic acid is used. To 600 grams of phenacetin, dissolved in 5 kilograms of acetic acid, 3 kilograms of water and 900 grams of hydrochloric acid are added, and finally a solution of 680 grams of iodine in 1360 grams of potassium iodide and 1360 grams of water. If a warm solution be used, the iodphenin (1175 grams) is obtained, upon cooling, in crystals resembling in form those of potassium permanganate; otherwise it forms a dark brown powder. Iodphenin is described as having an acrid burning taste and a weak iodine odour, and as melting at 130° to 131° C., with decomposition. It is soluble in 20 parts of cold, and freely soluble in hot glacial acetic acid, also in boiling hydrochloric acid (sp. gr. 1·19) and in alcohol. It is less soluble in 50 per cent. acetic acid, difficultly soluble in benzol and in chloroform, and almost insoluble in water. Upon heating it in any of these solvents, especially in water, iodine readily splits off, but a part of the iodine, of which it is said to contain 50·54 per cent., is retained in combination even after boiling for hours. Splitting off of iodine readily takes place also upon treatment with caustic soda solution or hyposulphite. At first iodphenin was considered to be a mixture of a compound containing two atoms of iodine in the molecule with another containing four, but this was afterwards thought to be hardly in accord with its definite crystalline form and the more difficult separation of a part of the iodine. It is therefore now suggested that the constitution of iodphenin is probably represented by the following formula, in which out of three atoms of iodine one is supposed to be less loosely combined than the other two.



It is claimed that five minutes' contact with a 1 in 5000 solution of iodphenin renders *Staphylococcus aureus* incapable of further developing.

Microcidine. At a recent meeting of the French Academy of Medicine Dr. Berlioz called attention to a new antiseptic, to which he has given the name "microcidine" (*Nouv. Rem.*, May 8, p. 209). He described it as being prepared by adding to melted β-naphthol half its weight of caustic soda, and the whitish powder obtained on cooling of the mixture was said to "consist in great part of naphthalate of soda and for the remainder of naphthalic and phenolic compounds." Microcidine is represented as being soluble in water, concentrated solutions being brownish and dilute solutions nearly colourless. In antiseptic power it is admitted to be inferior to mercuric chloride and naphthol, though ten times more powerful than carbolic acid, but on the other hand its toxicity is claimed to be lower than that of naphthol and incomparably less than that of mercuric chloride. Dr. Berlioz stated that he had found a 3 per cent. solution very useful in his clinic.

Physiological Action of Nickel Carbonmonoxide.

Nickel carbonmonoxide $Ni(CO_4)$, the remarkable volatile nickel compound discovered by Messrs. Mond, Langer and Quincke (*Pharm. Journ.*, [3], xxi., 154), has been the subject of some physiological experiments by Messrs. McKendrick and Snodgrass (*Nature*, May 21, p. 70). As might be expected, it proves to be a powerful poison, one-thirtieth of a cubic centimetre injected subcutaneously being sufficient to kill a rabbit weighing 1·5 kilogram, while the vapour to the extent of 0·5 per cent. is dangerous. The symptoms are those of a respiratory poison and similar to those caused by carbonic oxide, the spectrum of the blood of the poisoned animal being that of carbonic oxide hæmoglobin. One very interesting fact is that nickel carbonmonoxide, or as it is proposed to call it, "nico," even when given in very minute quantities produces a remarkably prolonged fall of temperature, which may be attributed to the hæmoglobin being prevented to a large extent from supplying the tissues with oxygen. But the use of the compound as an antipyretic is precluded by its intensely poisonous properties, since it would be difficult to inject it subcutaneously in sufficiently small doses, whilst it is not easy to obtain a solution of it in any menstruum in which decomposition will not take place. If, however, a convenient solution could be prepared, it is thought that "nico" might become a valuable antipyretic, the *modus operandi* of which would be intelligible.

Ethylene Bromide in Epilepsy.

The sedative action of potassium bromide is by some attributed to the bromine, but by others to the potassium. Upon the assumption that it is the bromine that plays the more important *rôle*, as indicated by the action of other bromides, Professor Donath has sought to avoid the disagreeable symptoms sometimes following the continuous administration of large doses of potassium bromide, as in epilepsy, by substituting an organic bromine compound. With this object he has experimented with ethylene bromide, and although withholding for the present a final judgment reports that he has obtained good results with it in several cases (*Pharm. Cent.*, May 14, p. 277). Ethylene bromide, $C_2H_4Br_2$, contains 90·9 per cent. of bromine; it has hitherto not found practical use in medicine, although on two occasions at least the confounding of the name with "ethyl bromide" is known to have led to fatal results. Ethylene bromide is a liquid, sp. gr. at 21° C. 2·163, having an odour resembling that of chloroform, and a sweetish but subsequently burning taste. At 0° C. it solidifies to a snow-white crystalline mass, which melts at +9·5° and boils at 131° C. The liquid is insoluble in water but mixes in any proportion with alcohol, and dissolves in fixed oils. On account of its insolubility in water Professor Donath has administered it in an oily emulsion containing 5 per cent.; the dose for adults commencing with 30 drops in half a glassful of sugar and water two or three times daily and rising to 70 drops. Children of from eight to ten years begin with 10 to 20 drops twice a day. Another form of administration is to dissolve the ethylene bromide in an equal quantity of spirit, of which from 5 to 15 drops are given two or three times daily stirred in a little milk. Dilution with milk or water is necessary to prevent disturbance of the stomach. For very delicate patients gelatine capsules are recommended, containing 3 drops of ethylene bromide and 6 drops of almond oil, of which two to four may be taken two or three times a day. It will be evident that if ethylene bromide should come into use considerable caution will require to be exercised in prescribing and dispensing to avoid confusion between it and ethyl bromide. In the German Pharmacopœia an attempt is made to meet the difficulty by calling ethyl bromide "æther bromatus."

Iron and Magnesium Sulphate.

The frequency with which sulphate of iron and sulphate of magnesium are combined in mixtures and the variations in the relative proportions in which they are prescribed have induced Dr. Woods to call attention to the advisability of administering the iron and magnesium in the form of a definite double sulphate (*Brit. Med. Journ.*, May 23, p. 1122). The salt to which he refers is represented by the formula $FeSO_4 \cdot MgSO_4 + 6H_2O$, and may be conveniently prepared by dissolving [illegible] parts by weight of sulphate of iron and 246 parts of sulphate of magnesium in a minimum quantity of boiling water, with the addition of a little dilute sulphuric acid to prevent the formation of oxide, evaporating the solution until it becomes quite thick from the salt crystallizing out, and then allowing it to cool, drying the deposited salt, without strong heat, on filter paper. The product is a greenish white crystalline powder, readily soluble in water and fairly stable. But if the water of crystallization be driven off by heat, the resulting powder absorbs water and deliquesces. Given in 10-grain doses three times a day, Dr. Wood has not found the double sulphate to exercise any definite astringent or aperient effect, and he therefore thinks it will prove convenient for administration over a considerable time in anaemia or chlorosis. A dose of 40 grains produced a slight aperient effect, with a little flatulence and intestinal pain.

Chloralamide.

Dr. Robert Main calls attention to a danger that may possibly attend the administration of chloralamide in cases where the kidneys are affected so as to interfere with its free excretion from the system (*Brit. Med. Journ.* May 23, 1123). In the case of a patient eighty years of age, with granular kidneys and a dilated heart, a 30 grain dose of chloralamide has always produced refreshing sleep and a sense of well-being, without headache in the morning; it has also apparently abolished the desire to micturate in the night. But on each morning after the chloralamide has been taken there has been profuse epistaxis and a great deal of congestion of face and neck on the following day.

A preparation described as being a homogeneous compound of egg albumen with quinine, possessing

Quinine Albuminate. the remarkable property of not being decomposed by the strongest alkalies, has been recently introduced by M. Carozyi (*Union Pharm.*, May, p. 196). It is claimed hat the preparation is easily absorbable by the mucous membrane of the stomach and passes into the circulation, where it exercises its therapeutic properties without undergoing decomposition, under conditions in which the ordinary salts of quinine are broken up by the alkaline liquids of the system. This "albuminate of quinine" is stated to be prepared by double decomposition between sulphate of quinine and albuminate of soda, but the manner of operating is not indicated. The product s a white amorphous bitter substance, said to contain 56 per cent. of quinine; it is alkaline in reaction, dissolves more readily in hot water or alcohol than in cold, and more freely still in water aciduated with lactic or hydrochloric acid. It may be distinguished from other salts of quinine by treatng it with water acidulated with sulphuric acid, which forms with the quinine soluble acid sulphate, the albumen being precipitated after standing.

M. Raoul Pictet, whose name is associated with the liquefaction of oxygen, has recently brought

Liquefaction of Gases. some interesting demonstrations of the liquefaction of gases before the Berlin Physical Society (*Pharm. Cent.*, March 14, p. 275). As a first source of cold he uses a liquid mixture obtained by pressure of carbonic acid and sulphurous acid, which is already known as "Pictet's liquid." By the cold produced in the volatilization of this liquid and the application of a pressure of four to twelve atmospheres nitrous oxide is liquefied. The evaporation cold of the liquid nitrous oxide is then used in the liquefaction of oxygen, nitrogen, hydrogen and atmospheric air, strong pressure being simultaneously applied, in the case of air amounting to two hundred atmospheres. It is stated that upon the opening of the cap of the vessel in which the liquefaction of air has been effected, the air escapes in a splendid blue jet, which immediately changes into a bluish cloud and then quite disappears. The temperature of the liquefied air reaches - 200°. Solidified quicksilver is said to present some beautiful tree-like crystalline forms.

The artificial production of cold is about to be practically applied by M. Pictet, under a patent,

Chloroform Purified by Cold. in the purification by congelation of various liquids, and amongst others chloroform. It is stated that when the temperature of the purest brands of commercial chloroform is lowered to - 70° C., partial crystallization takes place. If the crystals be removed and the refrigeration increased, at a temperature below - 100° C. the chloroform itself crystallizes out, and can be removed from a residuary impure fraction. The chloroform so purified is described as being at a temperature of 15° C. a clear liquid of specific gravity 1·51, which can be preserved unaltered for an indefinite time, even in daylight, in white bottles and without any addition of alcohol. Upon shaking it with concentrated sulphuric acid no coloration of the latter occurs even after a long time. When shaken with chromic acid mixture no reduction takes place, the mixture remaining yellow.

The oil from the seeds of the *Schleichera trijuga*, Willd., from the Sunda islands, where it passes

Macassar Oil. under the name "macassar oil," and enjoys a great reputation as a hair dressing and means of removing scurf and eczema, has been submitted to examination by Messrs. Thümmel and Kwasnick (*Pharm. Zeit.*, May 20, p. 314). It was found that the seeds, which contained no starch grains, yielded to petroleum ether 68 per cent. of fixed oil, but from the seeds freed from epidermis only 45·8 per cent. was obtained by pressure. The oil was in both cases of the consistence of butter, yellow, mild in taste, and with an odour of bitter almonds. It melted at 21° to 22° C., but after long standing the more solid glycerides separated, melting first at 28° and appearing under the microscope as fine needles. The fatty acids, with the exception of 3·14 per cent. of free oleic acid, were present as glycerides. Of those in combination 70 per cent. consisted of oleic acid, and of the solid fatty acids 5 per cent. was palmitic acid and 25 per cent. arachic acid, the characteristic acid of the ground nut. Lauric acid was not present, and of the volatile fat acids only acetic acid and no butyric acid could be detected. Hydrocyanic acid was found in the oil and in the seeds, being determined as 0·03 per cent. in the former and 0·62 per cent. in the latter. No amygdalin could be detected in the seeds, but hydrocyanic acid, benzaldehyde and grape sugar, possibly the decomposition products of it, were found. A small quantity of cane sugar was also separated in the crystallized form.

It will be remembered that the "kesso," or so-called "Japanese Valerian root," from *Valeriana*

Japanese Valerian. *officinalis*, var. *angustifolia*, was not long since examined for its essential oil by Messrs. Schimmel, who reported that the oil was practically identical with that obtained by distillation of the European valerian root, though containing in addition a constituent heavier than water, boiling at 300° C. and lævogyre, which they named "kessyl alcohol" and represented by the formula $C_{14}H_{24}O_2$ (*Pharm. Journ.*, [3], xx., 837). The root has now been examined especially for its acid contents by Messrs. Shimojama and Hyrano, who report (*Tokyo Mitteilungen*, i., 347) that by neutralizing an acid aqueous distillate after the removal of the oil, evaporating to dryness and distilling the residue with dilute sulphuric acid, they obtained an almost colourless oily liquid, having the characteristic odour of valeric acid, from which they prepared a silver salt that left upon incineration approximately the theoretical quantity of silver corresponding to that acid. As, however, the liquid had a slightly dextrorotatory action upon polarized light it is assumed by the investigators that, besides the inactive isovaleric acid characteristic of ordinary valerian root, a little optically active valeric acid (methylethylacetic acid) was present; but it seems quite possible that the optical action might have been due to a derivative from the lævogyre kessyl alcohol.

In Japan the "panther fungus" (*Amanita pantherina*, D.C.) enjoys a high reputation as a fly

Amanita pantherina. killer and also holds a prominent position among the indigenous poisonous fungi. The European "fly fungus," *A. muscaria*, also occurs in Japan, but appears to be decidedly inferior in toxic properties to *A. pantherina*. The latter is used as a fly poison in the fresh state, since it becomes inert when dry, which points to the property being due to a volatile fat acid as in the former. In an examination of the dried *Amanita pantherina*, Dr. Inoko, of Tokio University (*Mitteilungen*, i., 313), obtained about 0·1 per cent. of a mixture of alkaloids, the greater part of which was choline and the remainder muscarine.

Absorption by the Skin.

In a communication from the pharmacological institute of the University of Prague, Dr. R. Winternitz records some experimental data that considerably modify Parisot's statements concerning the rapid absorption of compounds in chloroformic, ethereal and alcoholic solutions by the healthy skin. Parisot's view that these volatile vehicles penetrate the skin in gaseous form appears to be by no means at variance with the laws regulating the diffusion of gases, or even with some biological experiences, and the capability possessed by these menstrua of dissolving fatty bodies also favours their absorption. Parisot remarked that aqueous solutions are absorbed on the palms of the hands and soles of the feet, where no fat glands exist, and therefore concluded that fatty solvents will convey bodies dissolved in them into the "derma." Röhrig advanced still further and said that by spontaneous evaporation of ether, the rapid passage of which through the epidermis in the gaseous condition is fully proved, fine suspended particles of foreign bodies are carried with it into the succulent tissue. Yet the conclusions of Parisot appear to have been deduced from the occurrence of mydriasis after the application of chloroformic or alcoholic solutions of atropine to the forehead, whilst many negative results have been obtained by other investigators. Dr. Winternitz experimented upon rabbits with different solutions of strychnine, both before and after treatment of the skin with chloroform and alcohol, and also upon human beings with solutions of atropine, cocaine and lithium chloride. He found that a chloroformic solution of strychnine is rapidly absorbed by the skin of a rabbit, and that an aqueous solution of strychnine nitrate is readily absorbed after treatment of the skin with chloroform, less readily after alcoholic treatment. In experiments on the human skin Dr. Winternitz observed that absorption occurred only very slowly to a very slight extent, and then only after continual application of the respective solution, whilst aqueous solutions of lithium chloride (10-15 per cent.) and of cocaine (10 per cent.) were not absorbed. The conclusions of Parisot and Röhrig he considers to have been impaired by accidental circumstances, such as a slight wound, or to be due to a capillary flow of the solution into the conjunctiva. The greater sensitiveness of the rabbit skin doubtless arises from the thinness of the horny layer and the larger size of the hair pouches, but the greatest stress must be laid on the readiness with which the skin admits of wetting and the consequent phenomena of capillarity. In deciding the question as to the absorption of a solvent by the skin, Dr. Winternitz therefore institutes an inquiry as to the readiness with which the surface or horny layer may be wetted, and as to the possibility of the entrance of the solution into the pores of the skin. In the extreme case in which the skin is not wetted, but a thin layer of air always remains between the skin and the liquid, neither absorption due to gradual soaking nor to capillarity can take place, whereas if the solvent readily wet the skin it can not only gradually saturate the epidermis, and so finally reach parts around which lymph and blood stream, but the partial vacuum occasioned in the capillaries of the skin by the rapid absorption of gases by the epithelium drags the closely adherent liquid also into these pores. On these grounds the previous application of chloroform or ether would theoretically increase the chances of absorption of aqueous solutions. The connection between the rate of absorption and volatility of the vehicle observed by Röhrig is therefore confirmed, but the conclusions of the latter are considered incorrect. The above remarks only refer to the normal skin, but of course in cases where the skin has undergone pathological changes, the character of the superficial surface may afford more favourable opportunities for absorption, whilst further, the antibacterial action of chloroform, ether and alcohol may be of importance under these circumstances.

Formation of Starch from Formic Aldehyde.

Notwithstanding the important experimental support afforded to Baeyer's plant assimilation theory by Fischer and Passmore's synthesis of α-acrose, or inactive fruit sugar, from formic aldehyde (*Pharm. Journ.*, xix., p. 702), all attempts to promote the formation of starch from formic aldehyde in the chlorophyll corpuscles have at present failed, probably owing to the poisonous character of the free aldehyde. Bonorky has already attempted to solve the question as to whether the carbonic acid absorbed by the plant is first reduced to formic aldehyde and then saccharine bodies result from the molecular condensation of the latter, by substituting methylal, which readily splits up into methyl alcohol and formic aldehyde. Although the formation of starch has been observed upon the introduction of methylal, yet the result is scarcely conclusive, since plants are capable of manufacturing starch from methyl alcohol; but even if all the starch be derived from the alcohol, it appears more probable that oxidation to formic aldehyde rather than to carbonic acid is an intermediate process. A new material, the sodium salt of methyl-oxy-sulphonic acid, $CH_2(OH){\cdot}SO_3Na$, to whose attention was first called by O. Loew, appears under favourable conditions to be readily assimilated and converted into starch by spirogyra, in which process it splits up into formic aldehyde and sodium sulphite. Bonorky (*Ber. d. deutsch. chem. Ges.*, ix., 103) finds, however, that it is necessary to add dipotassium or disodium phosphate to the solution in order to convert the liberated acid sulphite into the neutral salt, as the former exercises a deleterious influence. The plants selected for experiment were *Spirogyra majuscula*, and $\frac{1}{10}$ to 1 per cent. aqueous solutions of sodium methyl-sulphonate, containing also the necessary inorganic constituents, were employed. After observing the formation of large quantities of starch when the plant was supplied with the organic salt and exposed to air and light, and that a much smaller quantity obtained in control experiments without the sulphonate, the experiment was repeated with exposure to light and exclusion of carbonic acid gas, with like results. In the absence of light no apparent formation of starch occurred, and it was noticed that the presence of potassium was necessary to the process of assimilation.

The Pharmaceutical Journal.

SATURDAY, MAY 33, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed " Pharm. Journ."*

THE SOCIETY'S MEETINGS.

THE lengthy reports which this number of the Journal contains of the proceedings connected with the celebration of the Society's Jubilee, the annual meeting, the special meeting for the adoption of the amended Bye-laws, and of the dinner, render it impossible, even if it were not unnecessary to say much in reference to those proceedings in this place on the present occasion. We may, however, mention that the Jubilee celebration afforded opportunity for a most brilliant ovation to the Pharmaceutical Society, which cannot fail to be gratifying to all its members as well as to the Council, and especially to the PRESIDENT, by whom the work of the Society has been conducted. The highly complimentary addresses and congratulations that were presented on that occasion show that in this country the Society's work in promoting education and the advancement of pharmacy is appreciated, both by learned Societies and by medical corporations, in a manner that justifies what has already been done, while it furnishes encouragement to continue in the same direction the efforts of the Society in the future.

But is not only from such bodies, more or less remotely or intimately connected with pharmacy, and from pharmaceutical associations in this country, that there has been a hearty expression of approval of the objects and work of the Society. What is, if possible, still more gratifying, is the unanimity with which the representatives of pharmacy in almost every civilized country have come forward to offer their congratulations and to manifest their hearty admiration. From most of those countries delegates of the pharmaceutical associations and individuals engaged in the practice of pharmacy have taken the trouble to come to London for the purpose of being present at the celebration of the Jubilee, and to take part in the proceedings ; but when it is remembered that in most of the countries which have been thus represented the position of pharmacy as an occupation and of those who are engaged in it is much more favourable than it is yet with ourselves, the fact that the Pharmaceutical Society of Great Britain has been made the recipient of such cordial manifestations of approval and good will becomes the more noteworthy and pleasing.

That gratifying result may be to some extent attributed to the increased cordiality of the personal relations that have of late years been established between the pharmacists of this country and those of continental countries, as well as the United States of America. We have long endeavoured by every means to promote such friendly intercourse, and there is reason for believing that it is not only agreeable to those who have opportunity for it, but that it is also practically useful. It is only by the aid of such a ground work as may thus be established that it can, for instance, ever be hoped that advance can be made towards the construction of an international pharmacopœia. This has long since been recognized as a want especially characteristic of present conditions, and it is probable that the difficulties by which its realization is surrounded can only be overcome by a largely increased personal acquaintance between the pharmacists of various countries.

It is with much regret, which we feel sure will be shared by many of our readers, that we record the death of Mr. William Scott Brown, of Manchester, which occurred suddenly last Monday. Mr. Brown was for several years a member and for one year Vice-President of the Council of the Pharmaceutical Society, and he took a prominent part in pharmaceutical politics as well as in the promotion of scientific education of chemists and druggists. He was also for a long time President of the Manchester Pharmaceutical Association, and until about ten years since an active member of the Manchester City Council. For some years past Mr. Brown has been in very feeble health, and a sufferer from heart disease. The immediate cause of his death was an attack of the prevailing epidemic of influenza.

* * *

While the Annual Meeting of the Society was in progress intimation was received of the sudden death of Mr. W. L. Bird, late of Castle Street, Oxford Street, one of the founders of the Society, also a former member of Council and three years Vice-President.

* * *

One of the features of interest in connection with the celebration of the Society's Jubilee was the exhibition of a collection of portraits of founders, past presidents and members of Council, together with other objects of historic interest associated with the Society. We have not space to do more than mention this collection now, but several of the exhibits will be referred to more particularly hereafter.

Transactions of the Pharmaceutical Society.

CELEBRATION OF THE JUBILEE.

A large gathering of members and friends of the Society, including a goodly array of ladies, assembled in the lecture theatre, 17, Bloomsbury Square on Tuesday evening, to celebrate the Jubilee of the Society. Mr. Michael Carteighe, the President, received the visitors at half-past seven and at eight o'clock took the chair in the Lecture Hall.

In commencing the formal proceedings, the President said: Ladies and gentlemen,—I am sure you will all be gratified to hear that you will not have to-night to listen to a presidential address. So many of our good friends in various parts of the world have sent us congratulations that the President of the Local Society, if one may so call it, is obiiged to remain silent. But I feel that on this interesting occasion, one which cannot very well be rehearsed many times in the course of an average lifetime, it would be unrighteous not to record the names of the relatively small number of men who were the active founders of the Pharmaceutical Society of Great Britain. Of course, when a society is conceived by a few men, a number of others are induced to join—in most cases are very glad to do so—on the basis put before them, and we have a very considerable number of founders in the list of original members of the Society. But I venture to think that the actual founders of the Society were those who, looking at the condition of things pharmaceutical fifty years ago, associated themselves together in a committee with a view of forming this Pharmaceutical Society, and the names of those men are well known to many of you. I am sorry to say that very few are now living, and those who are still left to us are at that age when the excitement of a meeting like this, or of the dinner which we contemplate holding to-morrow, is a thing not to be lightly entered upon. Consequently, although our desire would be, especially from the point of view of the younger members and associates, to see amongst us the few founders who still remain, I think you will all agree with me that it would have been cruel to press any of those brilliant men—for brilliant they are in the pharmaceutical sense—to come to our meeting this evening, at even the slightest risk of taking cold, or anything which would detract from the possibility of their living to be 100 or 150. I now want to place on record the fact that the active founders of the Pharmaceutical Society were the following:—

Allen, William, F.R.S., Plough Court.
Alsop, Robert, 15, Sloane Square, Chelsea.
Barron, Charles, 6, Giltspur Street.
Barry, John T., Plough Court.
Battley, Richard, 32, Lower Whitecross Street.
Baxter, George, 144, High Holborn.
Bell, Jacob, 338, Oxford Street.
Briggs, Edwin, 48, Wigmore Street.
Butler, Thomas, 4, Cheapside.
Davy, Charles, 100, Upper Thames Street.
De Castro, Samuel, 25, Great St. George's Place, Knightsbridge.
Dinneford, Charles, 172, New Bond Street.
Ellis, John, 225, Upper Thames Street.
Farmar, Robert A., 40, Westminster Road.
Foulger, Samuel, 133, Ratcliffe Highway.
Gifford, Joseph, 104, Strand.
Green, Samuel, 1, Harleyford Place, Kennington.
Hanbury, Daniel B., Plough Court.
Herring, Thomas, 40, Aldersgate Street.
Horner, Edward, 20, Bucklersbury.
Hudson, William B., 27, Haymarket.
Ince, William, 31, Southampton Street, Covent Garden.
Keating, Thomas, 79, St. Paul's Churchyard.
Lescher, J. S., 4, Cripplegate Buildings.
Lowe, William, 47, Blackfriars' Road.
Mayhew, Samuel M., Camberwell Green.
Morson, Thomas, 19, Southampton Row.
Payne, Charles James, 5, St. Martin's Court.
Pigeon, Richard Hotham, 31, Throgmorton Street.
Pound, Matthew, 198, Oxford Street.
Savory, John, 143, Bond Street.
Simkin, Edward, 2, New Cavendish Street, Portland Place.
Smith, Joseph, 29, Haymarket.
Smith, George W., 125, Lower Thames Street.
Squire, Peter, 277, Oxford Street.
Stamper, Ralph, 140, Leadenhall Street.
Toller, John, 18, Conduit Street.
Walker, Thomas, 48, Tooley Street.
Waugh, George, 177, Regent Street.
Winstanley, Edward, 7, Poultry.

Those who are my fellow members and those ladies amongst us who are not members—for we have some lady members of the Pharmaceutical Society—and those who are comparatively strangers amongst us, I ask you all to sympathize with me when I say on behalf of the body I represent to-day, that we pay the very highest respect to the men who founded the Society.

RECEPTION OF ADDRESSES.

The reception of addresses of congratulation was then proceeded with, commencement being made with the oldest Society represented at the meeting, the President calling first upon the representative of—

THE ROYAL COLLEGE OF PHYSICIANS.

Sir Dyce Duckworth (Treasurer of the Royal College of Physicians) said:—Mr. President, the words I have to address to you this evening will be very few, but I count myself happy to have the honour of representing Sir Andrew Clarke, the President of the College, on this auspicious occasion, and I bring from him words expressing everything that is kind and sympathetic to your Society on this interesting occasion. The relation between pharmacy and medicine is close enough, indeed, and it needs no more than that I should say that the College of Physicians, which I represent, always has taken, and ever will take, the greatest interest in all matters pharmaceutical. This is an occasion on which I am quite sure the College of Physicians could not be silent, and I therefore have the greatest pleasure in coming as one of the oldest corporations—for we date from the time of Henry VIII. —to bring you words of welcome and hearty sympathy on this most auspicious and happy occasion.

THE ROYAL SOCIETY.

Sir William Thomson, F.R.S., said: As President of the Royal Society I have the honour to congratulate you on the fiftieth anniversary of the foundation of your Society. The Royal Society regards with satisfaction the great applications of the natural knowledge which it is the business of the Royal Society to cultivate, and which, since the foundation of the Society, has done so much for the welfare of the country and of the world; and no application is so full of beneficence as that of chemistry and the science of materia medica generally to the relief of mankind from illness and to the improvement of the public health. On behalf of the Royal Society I congratulate you and wish you all possible success in the excellent efforts to make still further advance in your science.

The following is the address received from the Royal Society:—

"The Royal Society,
"Burlington House.
"May 26, 1891.

"Sir,—I am directed by the President and Council of the Royal Society to convey their congratulations to the Pharmaceutical Society on the happy occasion of their Jubilee.

"The Royal Society has watched with interest the energetic and successful exertions of the Pharmaceutical Society to promote the progress of a most important branch of natural knowledge, one which has engaged the attention of the Royal Society from the earliest times of its history, that of the nature and composition of the drugs used in the healing art; and, recognizing the scientific aspirations of the Pharmaceutical Society, the Royal Society now offers its congratulations on the past, and its best wishes for the future.

"I am, sir,
"Your obedient servant,
(Signed) "M. Foster, *Secretary R. S.*
"To Michael Carteighe, Esq.
"President of the Pharmaceutical Society."

The Royal College of Surgeons.

The **President** then said he had to apologize for the absence of the President of the Royal College of Surgeons, who was unable to be present, but who had written him a letter of congratulation in the most cordial terms.

The Chemical Society.

Professor **Armstrong**, one the Secretaries of the Chemical Society, then read the following address:—

"The Chemical Society offers its most hearty congratulations to the Pharmaceutical Society of Great Britain on the occasion of its Jubilee.

"All who have studied the history of chemistry are aware that among the names appearing on the roll of fame, not a few are those of pharmacists, that of Scheele standing pre-eminent, and that many most distinguished investigators have owed their introduction to chemical science to the education they received as a preparation for the practice of pharmacy.

"The connection of chemistry with pharmacy, especially in early times, has indeed been most intimate; and in coming forward on the present occasion to congratulate the Pharmaceutical Society of Great Britain on the completion of the fiftieth year of its existence, the Chemical Society, as representing chemical science, is but fulfilling the obligations of a child to its parent.

"In the meanwhile chemical science has advanced in so marvellous a manner that it has for a long time outstripped its parent, pharmacy, and the ties of relationship may have become somewhat slackened and obscured; but the signs are now numerous that we are entering on a new period, and that pharmacological research is destined to secure most important results.

"The Chemical Society, which has for its primary object the advancement of chemical science, has to congratulate the Pharmaceutical Society not merely on having accomplished most valuable work in the past, but also on the fact that it has now recognized the need for, and importance of, research, by establishing on a permanent basis a laboratory for the investigation of problems in chemical pharmacology.

(Signed) "Alex. Crum-Brown, *President.*
"Henry E. Armstrong, } *Secs.*"
"John M. Thomson, }

The Pathological Society.

Dr. **Dickenson**, President of the Pathological Society, then read the following address:—

"To the President of the Pharmaceutical Society of Great Britain.

"The Pathological Society of London desires through the President and Council to convey to the Pharmaceutical Society of Great Britain congratulations on the completion by the Pharmaceutical Society of its fiftieth year of corporate existence.

"The Pathological Society, though occupied with matters widely different from those which interest the Pharmaceutical Society, nevertheless fully recognizes the importance of pharmaceutical science, appreciates the manner in which this has been supervised and promoted by the Society, whose Jubilee is now celebrated, and trusts that it may have before it very many years of similar utility and distinctions.

"W. Howship Dickinson, M.D., *President.*"

The Institute of Chemistry.

Mr. W. D. **Howard**, Treasurer of the Institute of Chemistry, then read the following address:—

"To the President, Council and Members of the Pharmaceutical Society of Great Britain.

"The President, Council and Fellows of the Institute of Chemistry of Great Britain and Ireland offer to the members of the Pharmaceutical Society of Great Britain hearty congratulations upon the celebration of the fiftieth anniversary of the foundation of the Society, together with an expression of their wishes for its uninterrupted prosperity, and the earnest hope that the Pharmaceutical Society may continue, during many future generations, to exercise for the advantage of the community the powers which have been wisely entrusted to it by the State.

(Signed) "William A. Tilden, *President.*
"May 26, 1891."

The British Pharmaceutical Conference.

Mr. **Martindale**, President of the British Pharmaceutical Conference, read the following address:—

"To the Pharmaceutical Society of Great Britain on its Jubilee.

"London, May 23, 1891.

"We, the President, Treasurer and Secretaries, on behalf of the Executive of the British Pharmaceutical Conference, heartily congratulate the Pharmaceutical Society of Great Britain on the completion of the fiftieth year of its existence.

"No public body is in a position to appreciate equally with the Conference, the work so ably performed by the Pharmaceutical Society, with which the Conference has been intimately associated for the last quarter of a century. During this period the Conference has rejoiced to witness the great progress that has been made by the Society.

"In passing the Pharmacy Act, 1868, Parliament conferred upon the Society important powers and extensive privileges.

"The trust confided to the Society by the Legislature in the qualifying examination of candidates, has been carried out with zeal and impartiality.

"Its School of Pharmacy has been successfully maintained and its Library and Museum have been considerably developed with great advantage to the general body of pharmacists.

"The endowment of the Research Laboratory has demonstrated the active interest the Society continues to take in the progress of chemical investigation.

"The Conference hopes that mutual emulation may further the advance of pharmacy by the encouragement of original work, and confidently looks to the Society enjoying many years of continued prosperity.

"William Martindale, *President.*
"Robert H. Davies, *Treasurer.*
"W. A. H. Naylor } *Secretaries.*"
"Francis Ransom }

THE LIVERPOOL CHEMISTS' ASSOCIATION.

Mr. **SYMES**, on behalf of the Liverpool Chemists' Association, begged to congratulate the Pharmaceutical Society, to which the Liverpool Chemists' Association owed its existence. It was founded about eight years later than the Pharmaceutical Society, largely through the efforts of Jacob Bell, in endeavouring to promote organizations of pharmacy in the provinces. He was wise and far-seeing enough to conclude that one of the best methods was that of decentralization. The Liverpool Chemists' Association recognized the efforts of the Pharmaceutical Society for the advancement of pharmacy, and also the results [of those efforts, and still looked forward to more complete organization on the part of the Society, greater power, and better results in the future even than in the past.

The following is the address received from the Association:—

"Chemists' Association,
"Royal Institution,
"Liverpool, May 20, 1891.

"To the President of the Pharmaceutical Society of Great Britain.

"Dear Sir,—The Liverpool Chemists' Association offers hearty congratulations to the Pharmaceutical Society on the attainment of its fiftieth anniversary.

"The Association recognizes the efforts which have been made by the Society for the advancement of pharmacy, and looks hopefully to a more complete organization and greater attainments in the future.

"Faithfully yours,
(Signed) "CHARLES SYMES, *President.*
"ANTHONY S. BUCK, *Hon. Sec.*"

THE BRIGHTON ASSOCIATION OF PHARMACY.

Mr. **MARSHALL LEIGH**, President of the Brighton Association of Pharmacy, read the following address:—

"To the Council of the Pharmaceutical Society of Great Britain.

"The Brighton Association of Pharmacy desires to offer its cordial congratulations to the Council of the Pharmaceutical Society at its Jubilee celebration, on the success which has attended their efforts during the past fifty years.

"W. D. SAVAGE, *President.*
"J. R. GWATKIN, *Treasurer.*
"MARSHALL LEIGH, *Hon. Sec.*"

THE NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

Mr. **MARTIN**, President of the North of England Association, read the following address:—

"To the President, Vice-President, and Council of the Pharmaceutical Society of Great Britain.

"We, the President and officers of the North of England Pharmaceutical Association, most heartily congratulate the Pharmaceutical Society of Great Britain on the completion of the fiftieth year of its existence. We are fully cognizant of the eminent services which, as an educational body, the Pharmaceutical Society has rendered to the art and science of pharmacy, and of the many advantages which have sprung from the examination and registration by the Society of all those who practice it. We felicitate the Pharmaceutical Society on its unrivalled Library and Museum, and that the recent addition to the Society's premises afford the increased accommodation which was so greatly needed. We congratulate the Pharmaceutical Society on the possession of the *Pharmaceutical Journal*, which being the first publication devoted to the interests of pharmacy issued in this country, has been during the long period of the existence of the Society the storehouse of papers and discussions which are of incalculable value. In the present age of intellectual activity no society can be satisfied to
rest its claim to recognition upon the achievemen
the past; we therefore congratulate the Pharma
tical Society upon the establishment of a Labora
for the prosecution of research. This must exe
an important influence upon the higher educa
of pharmacists, and doubtless many discoveries of
highest value to science as well as to medicine will
the future result therefrom. We refer with plea
to the practical recognition which the past labour
the Pharmaceutical Society have received in
association of members of the Society with the Ph
macopœia Committee of the Medical Council in
production of the Addendum to the Pharmacop
1885. As a provincial association we are deeply s
sible of the interest the Pharmaceutical Society h
taken in the question of local schools of pharm
and we look forward with hopefulness to the t
when a regulated and compulsory system of educa
will cause these schools to become important fa
in the work of the Pharmaceutical Society. In c
clusion we venture to express the hope that the t
is not far distant when all those who are engag
the practice of pharmacy throughout the country
co-operate with the Pharmaceutical Society of G
Britain in carrying to a successful issue the obj
for which the Society was established, and for w
it has successfully laboured since its foundation.

(Signed) "N. H. MARTIN, *President.*
"J. W. HARRISON, *Vice-Presid*
"CHARLES B. FORD, *Sec.*
"T. RHEEDER, *Treas.*"

THE SHEFFIELD PHARMACEUTICAL ASSOCIAT

Mr. **BRADWELL**, President of the Sheffield Ph
ceutical Association, read the following address:—

"To the President, Vice-President, and memb
the Council of the Pharmaceutical Society of G
Britain.

"Gentlemen,—We, the Council of the Sheffield
maceutical and Chemical Society, desire here
tender you our most hearty congratulations o
attainment of the Jubilee of the Pharmaceutic
ciety.

"The Pharmaceutical Society, since the year
has been successful in largely banding togeth
common ties the body of men practising phar
both at home and in foreign countries.

"The Society has accepted the grave respon
of being answerable to the Government and t
country at large for the effectual carrying out o
examination clauses of the Pharmacy Acts of 18
1868, and that the confidence reposed in it has
most amply justified, has been proved from y
year by the approval of the Privy Council, a
satisfaction of the members of our calling a
public.

"The Society has held itself largely responsi
pharmaceutical education, and most ably has it c
out the duties devolving on this responsibili
evidenced in the Society's replete library and m
its School of Pharmacy and Research Laborator
especially in the staff of efficient professors
whose direction this great educational work is
conducted.

"The thanks of the pharmaceutical world are
the Society for its inauguration of a Benevolent
the management of which has been an addi
burden to the already heavy labours of the Coun
which has been most nobly carried out.

"As we review the history of the Pharmac
Society, and especially such land-marks in that h
as its Charter of Incorporation in 1843, and the
macy Acts of 1852 and 1868, and the influence b
to bear by the Society from time to time, on h
tion, we feel assured the Society has ever had it
the advancement of pharmacy, and has been ac

mittee. It was considered that the preferable mode of legislation was that which adopted for a basis the Pharmaceutical Society with the Pharmacy Bill of 1852. The Bill promoted by that Society was thought to be well fitted to attain important objects and reasonable in its demands for powers and privileges. It was suggested that a clause should be added compelling chemists and druggists to follow the formularies of the British Pharmacopœia in compounding prescriptions, unless otherwise directed by the prescriber. It was also thought that the terms on which the promoters of the Bill proposed to admit into their Society practising chemists and druggists not then belonging to it, were too easy. Admission by a certificate from a qualified medical practitioner of having been in the practice of dispensing medicines from prescriptions before January, 1866, was regarded as implying a facility of admission apt to lead to abuse, and more satisfactory evidence of qualification was thought to be requisite. A further suggested defect in the Bill was the absence of any adequate provision for preventing registered pharmaceutical chemists from converting themselves into unqualified medical practitioners. In that respect reference was made to the history of medical practice in this country as indicating the danger to the interests of the public, and of the medical profession, that might be apprehended if the Bill were passed as it then stood. In view of the facts that some chemists and druggists practised medicine, though unqualified by law and not competent by education, and that the practice could not be prevented, it was considered that its existence would give peculiar facilities and temptations to pharmaceutical chemists to embark largely in irregular medical practice as unqualified practitioners, and that if the creation of a new race of unqualified practitioners should be thus inadvertently encouraged by an Act of Parliament, the endeavours of the Medical Council to raise the qualifications of legally qualified medical practitioners would have been in vain. A question was raised whether the danger thus apprehended might be averted by extending the jurisdiction of the Medical Council so as to include control over pharmaceutical chemists as well as practitioners in medicine; but that plan was admitted to be attended with difficulties, and it was considered unwise to seek to alter the relations between the Medical Council and chemists and druggists. Another suggestion to the same end was that there should be a specific provision that nothing in the contemplated Pharmacy Act should entitle any person registered under it to practice any branch of medicine or surgery. Lastly attention was called to the fact that the right of dispensing and selling medicines was to be conferred on the whole body of chemists and druggists without any control on the part of the Government, except such as was exercised over pharmaceutical chemists under the Pharmacy Act, 1852. It was shown that the medical profession had not been so dealt with in the Medical Act, and that the Medical Council was properly restricted in its action by the medical corporations and universities and also controlled by the Privy Council. Hence it was suggested that the whole practice of pharmacy ought to be subjected to similar control.

Practically the result of the action taken by the United Society amounted only to the postponement of legislation. After some months, application was made to the President of the Pharmaceutical Society to ascertain whether the Council would be willing to co-operate with the United Society for the introduction of a Bill based on the recommendations of the Select Committee. Mr. SANDFORD replied that whenever opportunity offered the Council would be ready to assist the Government in arranging an efficient and liberal measure, but that a mere Poison Bill, imposing registration of sales and other formalities, would only be an encumbrance to the statute book, inoperative as to the public, and especially objectionable to men who, if properly qualified to deal in dangerous articles, would each, according to the special circumstances of the case, adopt precautions far more conducive to the public safety. In regard to the liberal nature of such a measure Mr. SANDFORD stated that the Home Secretary was in possession of the views entertained by the Pharmaceutical Society, and he believed no chemist and druggist properly so called could fairly object to them. In that respect he added that the desire of the Council was to make the compulsory provisions of the Bill entirely prospective, and to give all persons registered under it equally easy means of access to the Society which was to regulate the examinations, etc. Lastly he repudiated the oft-repeated charge, made against the Pharmaceutical Society, of a desire to subjugate all chemists and druggists to its authority, and stated that as he regarded the union of all men in the calling to be an important means of elevating the standing of the whole body he was in favour of a voluntary registration of men already in business.

In order to keep the subject under the notice of the Government the Council of the Pharmaceutical Society early in 1866 sent to the Home Office a brief outline of such a measure as was thought to be in accord with the recommendations of the Select Committee and with the views of chemists and druggists, stating: (1) That in future, before assuming the name or title of chemist and druggist or keeping open shop for the compounding of medicines under physicians' and surgeons' prescriptions, or for vending, dispensing or compounding certain dangerous drugs and chemical or other poisonous substances to be enumerated in a sche-

ASSOCIATION GÉNÉRALE DES PHARMACIENS DE FRANCE.

M. PETIT, President of the Association Générale des Pharmaciens de France, read the following address:—

"Paris, May 22, 1891.

"The Association Générale des Pharmaciens de France, assembled at its fourteenth annual meeting, sends to the Pharmaceutical Society of Great Britain an expression of its lively and cordial sympathy on the occasion of the jubilee of the fiftieth year of its foundation.

"The Association is happy to bear testimony that thanks to the continued efforts and persevering labour of the eminent men who have directed and still direct that Society it has been able to conquer a position of respect, from moral and scientific points of view, not only in Great Britain but throughout the world.

"The Association Générale is certain that the present responds to the future, and that English pharmacists, under this learned and able direction, will maintain and still further ameliorate the honourable situation that they have conquered by their energetic initiative.

"Le President de l'Association Générale
des Pharmaciens de France.
"A. PETIT."

SOCIÉTÉ DE PHARMACIE DE PARIS.

M. PATEIN, on behalf of the Société de Pharmacie de Paris, warmly congratulated the Society on the accomplishment of its Jubilee.

SOCIÉTÉ DE PHARMACIE DU DAUPHINÉ ET DE LA SAVOIE.

M. Verne, Professor in the School of Medicine and Pharmacy of Grenoble, and President of the Société de Pharmacie du Dauphiné et de la Savoie, said: Allow me in a few words to convey to you the sincere good wishes which the Société de Pharmacie du Dauphiné has towards the Pharmaceutical Society of Great Britain on the occasion of its Jubilee. From a distance we follow with intense interest your efforts, crowned to-day with so much success. I do not know how to thank you for the kind reception I have found among you. I live in a mountain country, dear to the English, and particularly so to your President, whom I have had the pleasure to meet there, with his gracious companion, on his return from the ascent of one of our highest peaks, La Meyer. I hope that this circumstance will allow me to acquit myself of the debt that I have contracted towards you with so much pleasure, and to give you meanwhile the hand of brotherhood.

SOCIÉTÉ DE PRÉVOYANCE DES PHARMACIENS DE LA SEINE.

M. HOUDÉ, Secretary of the Société de Prévoyance des Pharmaciens de la Seine, then read the following address:—

"Paris, 23rd May, 1891.

"To the Members of the Pharmaceutical Society of Great Britain.

"Messieurs et chers confrères.

"The Société de Prévoyance et Chambre Syndicale des Pharmaciens de 1^{re} classe de Paris et du Département de la Seine have confided to me the distinguished honour and agreeable duty to address to you to-day their warm and sincere thanks as well as the expression of their lively gratitude for the kind invitation you have forwarded to their President on the occasion of the official celebration of the Jubilee of the Pharmaceutical Society of Great Britain. They rejoice in the good feelings of confraternity that you have evinced towards them on this important occasion.

"In the name of the pharmacists of Paris I would present now, as a sign of friendship, the address which they consider the most evident manifestation of the sympathy that they profess towards their *confrères* on the other side of the Channel.

"Permit me to say that they have preserved the imperishable remembrance of the generous contributions received by them from your Society after a succession of very painful events. It is my duty to thank you once more for the valuable assistance lent them by the Pharmaceutical Society of Great Britain, and to bear to you the tokens of their sympathetic recognition.

"That this address may be the perpetual witness of our excellent relations, that it may contribute to bind more closely the bonds of friendship that unite the two Societies, that it may be the symbol of our confraternal solidarity, that by science and philanthropy pharmacy may preserve the social rank which it has the right to occupy in the concert of useful sciences: such are the sincere wishes that the pharmacists of Paris have charged me to formulate here at this [illegible] family gathering.

"It is fifty years since your Society was founded. May your descendants celebrate another equal jubilee half a century hence! Also may the same harmony then reign between the pharmacists of France and England.

"Let the memory of Hanbury, the benefactor whose name it is desired to perpetuate by the creation of a medal, receive the homage of our respects.

"In conclusion, the honorable President, Vice-President, the entire Council and all the members of the Pharmaceutical Society, receive from the Société de Prévoyance a friendly and fraternal salute, while from this place I hear reverberating as an echo, in a thousand hearts of the pharmacists of the department of the Seine.

"A. HOUDÉ,
"*Secretary to the Société de Prévoyance.*"

DEUTSCHER APOTHEKER-VEREIN.

HERR KAUERT, Vice-President of the Deutscher Apotheker-Verein, said: The Council and Members of the Deutscher Apotheker-Verein have specially commissioned my friend Froelich and myself to convey the heartiest and most sincere congratulations to the Pharmaceutical Society of Great Britain on the occasion of its Jubilee celebration. In Germany your efforts are watched with the liveliest interest and your success in obtaining such a high position for your calling in this great land is a matter of rejoicing. In order to afford the Pharmaceutical Society of Great Britain a visible sign of the high esteem in which it is held by the Deutscher Apotheker-Verein, and also [illegible] of regard for the services rendered to pharmacy [illegible] your President, M. Carteighe, your late President, [illegible] Greenish and Dr. Paul, we have been further requested to hand to the two first named diplomas of Honorary Membership, and to the last a diploma of Corresponding Membership of the Deutscher Apotheker-Verein. In conclusion, we express the wish that the Pharmaceutical Society of Great Britain may increasingly flourish and prosper.

PHARMACEUTISCHE GESELLSCHAFT, BERLIN.

Dr. THOMS, President of the Pharmaceutische Gesellschaft mit dem Sitze in Berlin, then read the following address:—

"The Pharmaceutical Society looks back to-day upon a past half-century rich in work and full of honour.

"The youngest sister-society of Germany—die Pharmaceutische Gesellschaft mit dem sitze in Berlin—craves the especial privilege and high honour to be allowed to present its congratulations and benedictions on this festival day. On the 20th of March in the year 1841 men of definite aims planned in private co the foundation of the Pharmaceutical Society, and gave effect to their deliberations on the 15th of April of the same year. A membership of 1598, reached in the first year of the existence of the Society, not only indicates that the Pharmaceutical Society, as an association for the conservation and extension of the material and ideal interests of pharmacy, was a national want, but also that the right men took the foundation of the Society in hand.

"Honour and blessings to their memories!

"In the course of the past fifty years the hopes and wishes of these men have been brilliantly fulfilled, and the success of the Pharmaceutical Society has been fully valued and ungrudgingly acknowledged far beyond the confines of Great Britain. Above all, to the Pharmaceutical Society of Great Britain is accredited the service of having assured complete independence for pharmacy in a professional sense, and of having procured for it a representative rank,—a deed that will always be a spur to pharmacists of other lands to attain the same position.

"Good fortune to all your undertakings, blessings on all your labours—these are the wishes brought to the Pharmaceutical Society of Great Britain at the Jubilee festival of its fifty years existence by

"Die Pharmaceutische Gesellschaft mit dem sitze in Berlin."

"The Council:

"Dr. H. Thoms, *President.*
"Dr. Ed. Ritsert, *Vice-President.*
"Dr. J. Holfert, *Secretary.*
"M. Goeldner, *Treasurer.*
"P. Gutzkow, *Assist.-Secretary.*
Berlin, May 26, 1891."

Union Pharmaceutique des Flandres, Gand.

M. Gys, President of the Union Pharmaceutique des Flandres, read the following address:—

"To the Pharmaceutical Society of Great Britain.

"In associating itself with this day's ceremony the Union Pharmaceutique des Flandres has not only in view the performance of an act of good fellowship, but it has desired, above all, to associate itself in heart and spirit with one of the premier scientific societies in all Europe.

"Thanks to the perseverance of men who are illustrious in the various sciences upon which our useful art, among others, is based, thanks especially to the agreement that the *esprit de corps* has always maintained among us, the Pharmaceutical Society of Great Britain has become a power respected not only by the pharmacists of the entire world, but by public authorities.

"During the fifty years that have just finished you have known how, not only to maintain the level of realized progress in our art, but your publication, the *Pharmaceutical Journal*, so appreciated throughout he world, has co-operated in a large degree to extend t everywhere. Not content with that part, a numerous phalanx among you have had the honour of publishing in the columns of your Transactions original memoirs of the highest value.

"More fortunate than your *confrères* of the continent, you have been able, using the grand liberties hat are the honour and glory of your country, to monopolize the teaching of the sciences and yourselves o train that pleiades of practitioners, whose reputaion has extended far beyond your frontiers.

"But if you have always marched at the head of those who enlarge daily the limits of human knowledge, you ave also known how, in all circumstances, to maintain high and firmly the standard of professional dignity.

"Thanks to the influence exerted by your Society, Great Britain, perhaps, of all the European countries, s the only one where the sad conflicts that destroy the fraternal spirit are not produced. Therefore, it is with happiness that we have seized the opportunity to transmit to you the tribute of our felicitations upon the joyous event that you celebrate to-day, our thanks for all the progress realized under your inspiration, and our wishes for all those that you may render in the future.

"During the half century that has just passed, marching at the head of similar institutions, you have accumulated some noble examples. They will not be lost to us. The Union of Flemish pharmacists especially will always be actuated by the principles that have made you successful.

"Glory to the Pharmaceutical Society of Great Britain.

"Glory to those who were called to direct it, and among whom memory recalls with pleasure the Hanburys, Allen, Morson, Davenport, Greenish, and those worthies who bear the name of Carteighe, Martindale, and Smith.

"Glory to those who have stood by them with their labour and moral support.

"Taking our stand upon the past we are enabled to hope that in the time to come your prosperity as well as your consideration will increase.

"Such are the wishes of the Union Pharmaceutique des Flandres.

"Le Président,
"J. Gys."

The President then said he believed these were all the addresses that were to be presented personally, but that a large number of other addresses of congratulation had been transmitted to the Society from all parts of the world. He then read the following:—

From the Medical Society of London.

"Medical Society of London,
"11, Chandos Street, Cavendish Sqr., W.
"April 21st, 1891.

"Dear Sir,—We have much pleasure in requesting you to be good enough to communicate to the Pharmaceutical Society of Great Britain the following vote of congratulation which was unanimously adopted at a meeting of this Society held yesterday.

"The President and Fellows of the Medical Society of London send cordial greeting and felicitations to the Pharmaceutical Society of Great Britain on the occasion of its Jubilee celebration, and they desire to record their grateful recognition of the value of the services rendered to the medical profession and to the public in the fifty years during which it has fostered and encouraged among its members the best knowledge and the highest technical skill in the preparation and dispensing of remedies, the prescription of which brings the science of medicine in closest touch with the needs of the sick.

"We are, dear sir,
"Yours faithfully,
(Signed) "T. Colcott Fox } *Hon. Secs.*"
(Signed) "A. Marmaduke Sheild }

From the Society of Arts, London.

"Society of Arts, May 19, 1891.

"We have been requested by the Council of the Society of Arts to ask you to convey to the Council of the Pharmaceutical Society the hearty congratulations of the Society of Arts on the occasion of the Pharmaceutical Society's Jubilee.

"In many respects the work of the two societies is of a kindred nature, and in former years, before the foundation of your Society, the Society of Arts was the medium by which many new products of a medicinal, as well as of an industrial, value were given to the world.

"In the promotion also of education both Societies have, each in its own sphere, done very valuable work, and it is to be hoped that their relations may be as harmonious, and their work as effective, in the future as in the past.

"The Society of Arts, while congratulating your Society on the high position it has attained, as the representative body of an important profession, and on the completion of its educational machinery by the foundation of a Research Laboratory for original investigations in pharmacology, desires also to add an earnest expression of its hope that in future years its career of usefulness may be as fruitful of good results as it has been during the fifty years of its existence.

(Signed) "RICHARD E. WEBSTER,
Chairman of Council.
(Signed) "H. T. WOOD, *Secretary.*"

From the LINNEAN SOCIETY.

"Linnean Society,
"Burlington House, London, W.
"May 25, 1891.

"The President,
"The Pharmaceutical Society,
"17, Bloomsbury Square.

"Dear Sir,—On behalf of this Society, I beg you to accept our hearty congratulations on the Pharmaceutical Society attaining its fiftieth year of existence.

"I am, dear sir,
"Yours faithfully,
"B. DAYDON JACKSON, *Secretary.*"

From the ROYAL MEDICAL AND CHIRURGICAL SOCIETY.

"On behalf of the Council and Fellows of the Royal Medical and Chirurgical Society I have much pleasure in offering you our hearty congratulations on the occasion of the fiftieth anniversary of the foundation of the Pharmaceutical Society.

"The objects of the Pharmaceutical Society are the same as those of our Society, namely, to combat disease and to relieve suffering, we can therefore only view with the greatest gratification the approach of a day which marks the accomplishment of fifty years of honourable scientific labours, so eminently beneficial to all classes of the community.

(Signed) "TIMOTHY HOLMES,
"*President of the Royal Medical and Chirurgical*
"*Society.*"

From the MANCHESTER PHARMACEUTICAL ASSOCIATION.

"The Pharmaceutical Association,
"Manchester,
"May 7th, 1891.

"Dear Sir,—At a meeting of the Council of the above Association held on Monday, April 27, we were requested to address you on the occasion of the Jubilee of the Pharmaceutical Society of Great Britain. It was the unanimous desire of the members of Council present that we should respectfully offer you our hearty congratulations on the honourable and useful position which the Pharmaceutical Society has attained, and on the improvement which has taken place during the past fifty years in the education and social standing of those who practise pharmacy in this country, this improvement having been largely due to the direct and indirect influence of the Pharmaceutical Society.

"We cordially wish you success in your efforts to further amend the Pharmacy Acts, feeling confident that the provisions of the Bill now before Parliament will conduce alike to the safety of the public and the advancement of pharmacy.

"In conclusion, we venture to express our sincere admiration of the able and painstaking manner in which for many years you have presided over the deliberations of the Council of the Pharmaceutical Society, and our earnest hope that you may long enjoy a continuance of health and energy.

"We are, sir,
"Yours very respectfully,
(Signed) F. BADEN BENGER, *Vice-President.*
H. WILSON, *Hon. Sec.*,
On behalf of the Council of the Manchester
Pharmaceutical Association.

"To M. Carteighe, Esq., President of the Pharmaceutical Society of Great Britain."

From the MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

"To the President, Vice-President and Members of the Council of the Pharmaceutical Society of Great Britain.

"The President, Vice-President and Members of the Midland Counties Chemists' Association desire to offer their hearty congratulations to the Pharmaceutical Society of Great Britain on the attainment of its Jubilee.

"The past fifty years in the history of Pharmacy in the United Kingdom and the Colonies, show it to have made great progress as a Profession, and also in its relation to the Medical Profession and the Public.

"This is mainly due to the wisdom of the founders of the Pharmaceutical Society and their successors.

"The Members of the Midland Counties Chemists' Association recall with pleasure the fact that their Association was founded by the late Jacob Bell, in 1847, and from that time until now it has been their privilege to co-operate with the Pharmaceutical Society in their endeavours to advance the best interests of pharmacy.

(Signed) "ALFRED SOUTHALL, *President.*
"CHAS. THOMPSON, *Vice-President.*
"CHARLES J. ARBLASTER, *Treasurer.*
"FRANK H. ALCOCK, *Hon. Sec.*"

From the PHARMACEUTICAL SOCIETY OF AUSTRALASIA.

"Pharmaceutical Society of Australasia,
"Established 1857,
"Melbourne, April 7, 1891.

"To the President and Council of the Pharmaceutical Society of Great Britain.

"Gentlemen,—On behalf of the Council of the Pharmaceutical Society of Australasia, we beg to offer you our heartiest congratulations on the completion of the fiftieth year of the existence of the Pharmaceutical Society of Great Britain.

"It would be impossible for us to enumerate all the good work done by your Society during the past fifty years. And we sincerely hope that in the near future you may secure such legislative enactments as to render a recognized curriculum compulsory, and to obtain the recognition by law of the principle that companies, etc., should stand on the same footing as individuals with regard to the sale of poisons.

"We beg to express our feeling of admiration of the self-sacrificing work done by your Society in the past, our appreciation of your present efforts, and a hope that these efforts may be crowned with success, that pharmacy may receive its right and proper recognition by the State, and that the future of the Pharmaceutical Society of Great Britain may be a truly great one.

"For and on behalf of the Council.
"We are, yours faithfully,
(Signed) JOSEPH GEORGE, *President.*
H. T. TOMPSITT, *Vice-President.*
HARRY SHILLINGLAW, *Secretary.*"

From the PHARMACEUTICAL SOCIETY OF QUEENSLAND.

"On behalf of the Council and members of the Pharmaceutical Society of Queensland, I have the honour to tender their cordial and hearty congratula-

Quinine Albuminate.

the remarkable property of not being decomposed by the strongest alkalies, has been recently introduced by M. Tarozyi (*Union Pharm.*, May, p. 196). It is claimed that the preparation is easily absorbable by the mucous membrane of the stomach and passes into the circulation, where it exercises its therapeutic properties without undergoing decomposition, under conditions in which the ordinary salts of quinine are broken up by the alkaline liquids of the system. This "albuminate of quinine" is stated to be prepared by double decomposition between sulphate of quinine and albuminate of soda, but the manner of operating is not indicated. The product is a white amorphous bitter substance, said to contain 56 per cent. of quinine; it is alkaline in reaction, dissolves more readily in hot water or alcohol than in cold, and more freely still in water acidulated with lactic or hydrochloric acid. It may be distinguished from other salts of quinine by treating it with water acidulated with sulphuric acid, which forms with the quinine soluble acid sulphate, the albumen being precipitated after standing.

Liquefaction of Gases.

M. Raoul Pictet, whose name is associated with the liquefaction of oxygen, has recently brought some interesting demonstrations of the liquefaction of gases before the Berlin Physical Society (*Pharm. Cent.*, March 14, p. 275). As a first source of cold he uses a liquid mixture obtained by pressure of carbonic acid and sulphurous acid, which is already known as "Pictet's liquid." By the cold produced in the volatilization of this liquid and the application of a pressure of four to twelve atmospheres nitrous oxide is liquefied. The evaporation cold of the liquid nitrous oxide is then used in the liquefaction of oxygen, nitrogen, hydrogen and atmospheric air, strong pressure being simultaneously applied, in the case of air amounting to two hundred atmospheres. It is stated that upon the opening of the tap of the vessel in which the liquefaction of air has been effected, the air escapes in a splendid blue jet, which immediately changes into a bluish cloud and then quite disappears. The temperature of the liquefied air reaches - 200°. Solidified quicksilver is said to present some beautiful tree-like crystalline forms.

Chloroform Purified by Cold.

The artificial production of cold is about to be practically applied by M. Pictet, under a patent, in the purification by congelation of various liquids, and amongst others chloroform. It is stated that when the temperature of the purest brands of commercial chloroform is lowered to -70° C., partial crystallization takes place. If the crystals be removed and the refrigeration increased, at a temperature below -100° C. the chloroform itself crystallizes out, and can be removed from a residuary impure fraction. The chloroform so purified is described as being at a temperature of 15° C. a clear liquid of specific gravity 1·51, which can be preserved unaltered for an indefinite time, even in daylight, in white bottles and without any addition of alcohol. Upon shaking it with concentrated sulphuric acid no coloration of the latter occurs even after a long time. When shaken with chromic acid mixture no reduction takes place, the mixture remaining yellow.

Macassar Oil.

The oil from the seeds of the *Schleichera trijuga*, Willd., from the Sunda islands, where it passes under the name "macassar oil," and enjoys a great reputation as a hair dressing and means of removing scurf and eczema, has been submitted to examination by Messrs. Thümmel and Kwasnick (*Pharm. Zeit.*, May 20, p. 314). It was found that the seeds, which contained no starch grains, yielded to petroleum ether 68 per cent. of fixed oil, but from the seeds freed from epidermis only 45·8 per cent. was obtained by pressure. The oil was in both cases of the consistence of butter, yellow, mild in taste, and with an odour of bitter almonds. It melted at 21° to 22° C., but after long standing the more solid glycerides separated, melting first at 28° and appearing under the microscope as fine needles. The fatty acids, with the exception of 3·14 per cent. of free oleic acid, were present as glycerides. Of those in combination 70 per cent. consisted of oleic acid, and of the solid fatty acids 5 per cent. was palmitic acid and 25 per cent. arachic acid, the characteristic acid of the ground nut. Lauric acid was not present, and of the volatile fat acids only acetic acid and no butyric acid could be detected. Hydrocyanic acid was found in the oil and in the seeds, being determined as 0·03 per cent. in the former and 0·62 per cent. in the latter. No amygdalin could be detected in the seeds, but hydrocyanic acid, benzaldehyde and grape sugar, possibly the decomposition products of it, were found. A small quantity of cane sugar was also separated in the crystallized form.

Japanese Valerian.

It will be remembered that the "kesso," or so-called "Japanese Valerian root," from *Valeriana officinalis*, var. *angustifolia*, was not long since examined for its essential oil by Messrs. Schimmel, who reported that the oil was practically identical with that obtained by distillation of the European valerian root, though containing in addition a constituent heavier than water, boiling at 300° C. and lævogyre, which they named "kessyl alcohol" and represented by the formula $C_{14}H_{24}O_2$ (*Pharm. Journ.*, [3], xx., 837). The root has now been examined especially for its acid contents by Messrs. Shimojama and Hyrano, who report (*Tokyo Mitteilungen*, i., 347) that by neutralizing an acid aqueous distillate after the removal of the oil, evaporating to dryness and distilling the residue with dilute sulphuric acid, they obtained an almost colourless oily liquid, having the characteristic odour of valeric acid, from which they prepared a silver salt that left upon incineration approximately the theoretical quantity of silver corresponding to that acid. As, however, the liquid had a slightly dextrorotatory action upon polarized light it is assumed by the investigators that, besides the inactive isovaleric acid characteristic of ordinary valerian root, a little optically active valeric acid (methylethylacetic acid) was present; but it seems quite possible that the optical action might have been due to a derivative from the lævogyre kessyl alcohol.

Amanita pantherina.

In Japan the "panther fungus" (*Amanita pantherina*, D.C.) enjoys a high reputation as a fly killer and also holds a prominent position among the indigenous poisonous fungi. The European "fly fungus," *A. muscaria*, also occurs in Japan, but appears to be decidedly inferior in toxic properties to *A. pantherina*. The latter is used as a fly poison in the fresh state, since it becomes inert when dry, of the world, by favouring in an eminent manner the scientific side of the profession, the Pharmaceutical Society of Prague presents the heartiest wishes and hopes that in another fifty years it will have a yet more splendid jubilee on the hundredth anniversary.

Prague, May 21, 1891.
"The Pharmaceutical Society of Prague.
"O. SCHREIBER, *Secretary.*
"F. SCHNÖBLING, *President.*
"JOSEF DITTRICH, *Member of Council.*"

From the DANMARKS APOTHEKERFORENING.

"The honourable President has been so kind as to inform the Directory of 'Danmarks Apothekerforening' that the celebration of the fiftieth anniversary of the foundation of the Pharmaceutical Society will take place on May 26 in London, for which information the Directory sends its best thanks.

"It must be a source of great satisfaction and pleasure for the Pharmaceutical Society of Great Britain to look back on its great and useful past, especially with reference to the great difficulties it has had to surmount in reforming only by its own means the position of pharmacy in Great Britain, in the same way as in other countries where the pharmaceutical matters have been regulated by governmental decrees.

"The large and imposing building in Bloomsbury Square, with its laboratories, its large collections, and richly furnished, as it is, with all attributes of science, is the best proof of the splendid result of the work of the Society in this long space of time, and the Danmarks Apothekerforening therefore takes this opportunity to congratulate the Pharmaceutical Society of Great Britain on the prosperous fulfilment of the Jubilee, and tender the most sincere greetings and best wishes for future prosperity in the interest of pharmacy.

"While remembering with gratitude the splendid hospitality shown to the representatives of the Danmarks Apothekerforening at the last Congress in London, the Directory regrets very much that it cannot be represented at the Jubilee, as the general assembly of the Danmarks Apothekerforening takes place the 25th and 26th of May, on which occasion the celebration of the Jubilee certainly shall be remembered by us, connected as we are, not only professionally but also by the family ties that bind the countries of Great Britain and Denmark together.

"We are, Gentlemen,
"Your faithful and obedient colleagues,
"'DANMARKS APOTHEKERFORENING.'"

From the APOTEKARE-SOCIETETENS DIREKTION, Stockholm, Sweden.

"Dear Sir,—We have had the honour of receiving your invitation to the President of our Pharmaceutical Society to be present at the official celebration of the fiftieth anniversary of the foundation of your Society, and also to attend the banquet to be given on the same occasion. Whilst regretting that our President is prevented from having the pleasure of being present, we beg to tender you our cordial thanks for the attention shown him and at the same time our Society. With sincere wishes for the continued success of the Pharmaceutical Society of Great Britain,

"We have the honour to remain,
"Dear Sir,
"Yours faithfully,
"Apotekare-Societetens Direktion,
(Signed) "WILHELM SEBARDT, *President.*"

From the NEDERLANSCHE MAATSCHAPPIJ TER BEVORDERING DER PHARMACIE.

"Amsterdam, May 24, 1891.

"R. Bremridge, Esq., Secretary of the Pharmaceutical Society of Great Britain.

"Sir,—The Nederlandsche Maatschappij ter Bevordering der Pharmacie (Dutch Pharmaceutical Society) begs us to offer you its warmest congratulations on the memorable occasion of the fifty years' existence of your Society. May the Pharmaceutical Society of Great Britain, in the new era that opens before it, continue its useful course with the same unabated zeal as it has hitherto shown.

"We are, Sir,
"Yours respectfully,
"Dr. P. ANKERSMIT, *President.*
"VAN LEDDEN HULSEBOSCH, *Secretary of the Dutch Pharmaceutical Society.*"

The PRESIDENT then announced that the following addresses had also been received, but time would not allow of their being read:—

From the CERCLE PHARMACEUTIQUE DU HAINAUT.

"Cercle Pharmaceutique du Hainaut.

"To the President of the Pharmaceutical Society of Great Britain.

"We are glad to address to you, on the occasion of the fiftieth anniversary of the foundation of your Society, our lively and sincere congratulations.

"We wish to express our most earnest wishes that your Society may continue to develop with a growing prosperity, and that it may maintain yet for many years the high position that it so justly occupies in the pharmaceutical world.

"We recall with pleasure the cordial reception given by you at the time of the Congress in London to all the members generally and to our delegates in particular.

"We avail ourselves with alacrity of this formal occasion to express our thanks and our appreciation.

"Be pleased to accept, Mr. President, together with all the members of your Society, the homage of our best sentiments of good fellowship.

"*Secretary,* "*President.*
"VICTOR MIRLAND." "ALFRED MARTIS."

From the ILLINOIS COLLEGE OF PHARMACY.

"The Illinois College of Pharmacy heartily congratulates the Pharmaceutical Society of Great Britain upon the conclusion of the fiftieth year of its honourable and useful career, its devotion to sound pharmaceutical education, and its work in promoting the pursuit of knowledge in the field of pharmacy. May your great Society continue for many centuries to come in its noble activity.

"President, DAVID R. DYCHE."

From the MASSACHUSETTS STATE PHARMACEUTICAL ASSOCIATION.

"The President of the Massachusetts State Pharmaceutical Association has the honour and pleasure of transmitting to you and to the Society the warmest congratulations of the Massachusetts State Pharmaceutical Association on this golden anniversary, with a sincere hope that as its years increase its strength and influence may wax and never wane, and that the first celebration of the Society's Jubilee may be but the precursor of many others. We feel a deep interest in our brother pharmacists of Albion, the ties that bind us together are close and firm, we feel that if not of one country we are brothers of common blood, race and kin, that your celebrations are our celebrations, your joys our joys, your traditions our traditions, your fathers our fathers.

"Let us hope that these close bonds of sympathy that should unite all the English-speaking peoples together may, as the years roll on, increase in substance and strength until the time shall come when Anglo-Saxons from Alaska to Van Dieman's Land will feel that community of interest and regard for each other such as is warranted by their common origin.

"E. C. MARSHALL, *President.*"

From the Minnesota State Pharmaceutical Association.

"The Pharmaceutical Society of Great Britain is the parent of all kindred societies in the world, and we rejoice with you at the attainment of your Jubilee. To the members of the Society we send fraternal greetings, with our earnest wishes that you may ever continue the same healthy growth, stimulating the progress of pharmacy and science, and assisting by your wise counsels the deliberations of your younger brethren throughout the world.

"Accept our assurances of friendship,

"G. A. Gotwald, *President.*
"W. K. Hicks, *Secretary.*"

From the College of Pharmacy of the City of New York.

"At a stated meeting of the Board of Trustees of the College of Pharmacy of the City of New York, held in its rooms in the college building, on Thursday, April 2, 1891, the following resolutions were offered by Charles Rice, Ph.D.:—

"'It is with great pleasure that I offer the following resolutions. The Pharmaceutical Society of Great Britain, founded on April 15, 1841, intends to celebrate its Jubilee, the fiftieth anniversary of the foundation of the Society, on April 15, 1891.'

"'Resolved: That the hearty congratulations of our College be extended to the officers, Council, faculty and members of the Pharmaceutical Society of Great Britain, at this time of its grand record (an existence of half-a-century.)' And be it further

"'Resolved: That our Secretary, Mr. J. Niven Hegeman, be instructed to send our best wishes for the future prosperity of the Society, and the hope that the powerful influence exerted in the past fifty years may be doubly felt in the advancement of pharmacy, chemistry, materia medica and botany in the next half century.'

"The above resolutions were seconded by Mr. Hegeman, and unanimously adopted by a rising vote.

"Yours respectfully,
"J. Niven Hegeman, *Secretary.*"

From the Ontario College of Pharmacy.

"To the President, Vice-President, Council, and Members of the Pharmaceutical Society of Great Britain.

"Gentlemen,—On behalf of the Ontario College of Pharmacy, we desire to extend our hearty congratulations to your Society on the event of the Jubilee celebration of the foundation of the Pharmaceutical Society of Great Britain. We would also express the satisfaction we experience in observing the potent influence on the practice of pharmacy exerted by what we are proud to consider the parent society and the official exponent of English pharmacy.

"John A. Clark, *President.*
"John J. Hall, *Vice-President.*
"John McKee.
"C. K. McGregor.
"W. B. Sanders.
"J. W. Slaven.
"L. T. Lawrence.
"C. S. Hobart.
"J. H. Mackenzie.
"A. B. Petrie.
"Henry Walters.
"G. M. Everest.
"C. D. Daniel.
"Isaac T. Lewis, *Registrar.*"

From the Pennsylvania Pharmaceutical Association.

"The Pennsylvania Pharmaceutical Association of the United States of America having learned through its presiding officer that you are about celebrating your semi-centennial anniversary Jubilee, the undersigned, in the name of the Association, take pleasure in extending you hearty congratulations, recognizing, as we do, your long life of useful influence in promoting and extending the science of pharmacy; and in conveying this congratulation, we also wish you enlarged success, hoping that your Society will continue to lead where others may safely follow.

"The Pennsylvania Pharmaceutical Association was organized thirteen years ago; it has tried faithfully to elevate the cause of pharmacy, and is ever ready to recognize the same good work prosecuted in so commendable a spirit.

"We are, therefore, pleased hereby to tender this tribute to the Pharmaceutical Society of Great Britain.

"J. H. Stein, *President.*
"J. A. Miller, *Secretary.*"

From the Pharmacy Board, Queensland.

"On behalf of the Pharmacy Board of Queensland, let me assure you of our hearty congratulations and good wishes for the continued success and increased usefulness of the parent of all pharmaceutical bodies on the occasion of the celebration of its Jubilee. Doubtless looking back to your early days you will remember the many difficulties with which you had to contend, and we feel sure you will not forget to extend a helping hand to those endeavouring to follow in your footsteps.

(Signed) "A. W. Field, *President.*"

From the Victoria Pharmacy Board.

"Pharmacy Board, Victoria, Melbourne,
"April 7, 1891.

"To the President and Council of the Pharmaceutical Society of Great Britain.

"Gentlemen,—On behalf of the Pharmacy Board of Victoria, I offer the warmest congratulations to the Pharmaceutical Society of Great Britain upon its having completed its fifty years of existence, and fervently hope that its future career may be as distinguished as in the past. The great work done by the eminent members of the Pharmaceutical Society of Great Britain has had its beneficial influence in Australia, the pharmacists in this distant portion of the empire taking interest in and watching all movements for the advancement of pharmacy in the mother country with the warmest sympathy.

"I have the honour to be,
"Gentlemen,
"Your obedient servant,
(Signed) "C. R. Blackett, *President.*"

From the Syndicat des Pharmaciens de L'Arrondissement de Carcassonne (Aude).

"The pharmaciens of the arrondissement of Carcassonne, united in *séance*, Tuesday, April 21, address to their brethren of London their thanks and the expression of their sympathies in assuring them, that they will be with them in thought May 26.

"Believe us, President and Members,
"Yours very faithfully,
(Signed) "Gourdon, *President.*
"Ch. Regi, *Secretary.*"

LETTERS OF CONGRATULATION.

The President then said that a large number of letters of congratulation had been received from eminent pharmacists and other scientific men living in all parts of the world. He would not, however, trespass upon the patience of his audience to do more than read extracts from a few of them, taking them in alphabetical order. He then read the following:—

M. Blanc, President of the Société de Prévoyance et Chambre Syndicale des Pharmaciens de 1re Classe du Department de la Seine, writes:—"My Society has been much flattered by the honour done to it in my person, in inviting me to take part in the official celebration of the fiftieth anniversary of the foundation of the Pharmaceutical Society of Great Britain. I would say further that it has been touched by this invitation, which it has not received as a mere confraternal courtesy, but rather as a mark of lively sympathy. Since 1871, in fact, our Society has been joined to yours by the powerful bond of recognition, and your present invitation creates a new tie, a bond of sympathy that will strengthen the earlier one. Moreover, has it not already given a proof of its sentiments towards French pharmacy in awarding, quite recently, the Hanbury Medal, the presentation of which will be one of the principal attractions of your festival, to the learned Professor Planchon, the beloved Director of the Ecole de Pharmacie de Paris? It would have given me great satisfaction to have been the bearer to you of the warm expression of our feelings, our sincere congratulations upon the remarkable position held by the Pharmaceutical Society of Great Britain, and our wishes for its increasing success and long prosperity. Detained by professional duties, I greatly regret that I am unable to respond to your kind invitation. But our Society, very desirous of being represented at your Jubilee, has delegated M. Houdé, our Secretary, in my place. It is he who will have the honour of addressing to you our congratulations, and it is for him you will kindly reserve your welcome."

Herr Josef Dittrich, of Prague, President of the First International Pharmaceutical Congress, writes:—"I am much obliged to you for your kind invitation to the Jubilee festival of your highly celebrated Society. But I very much regret not being able to participate in it personally. The obstacles are the great distance and different official and private circumstances. Nevertheless I will be on the 26th and 27th May among you and take part by a hearty remembrance."

Professor Flückiger writes:—"Strassburg, April 13, 1891. Dear Sir, I beg to return my hearty thanks for the kind invitation with which I am honoured by your Society, being fully aware that it would be my duty to be present on such a memorable occasion. I have indeed every reason for the most thankful feelings with regard to the Society and have also witnessed with increasing interest, for a number of years already, their flourishing evolution for the benefit of mankind and the honour of the profession. Please inform the Society that I most sincerely wish, and with perfect assurance expect, that at the end of their first century they will have to record a full story of success in every department of their activity. As to myself, allow me to state with much regret that it would be altogether impossible to leave my lecture duties just on the days under notice; kindly excuse me and accept my best wishes for the celebration."

Professor Gille, Honorary President of the Association Générale Pharmaceutique de Belgique writes:—"I would have wished to have told you *vivâ voce* with many others, who will not need me to proclaim it, that your Society will mark a memorable advance in the history of pharmacy, not only of Great Britain, but of the entire world. You have shown to pharmacists of other countries, by a well conceived union, what can be done for humanity, for science, and for themselves. Honour to the choice men who have directed this admirable movement, and to the pharmacists of Great Britain who have seconded them, within the limits of their powers, in this ever memorable victorious campaign. I thank you (with chagrin) for your kind invitation, but I am with you heart and soul, and I hope, during the few years that remain to me, still to recognize your new successes in the road that you follow so worthily, and that your Government will not fail to encourage you more and more."

Dr. N. P. Hamberg, Honorary Member, Inspector of the Pharmaceutical Institution, Stockholm, writes:—"I am sorry that an incurable disease of the eyes denies me the pleasure of going to England; but although absent, I shall with great interest follow the proceedings. The first half of this century has indeed been for the Society both glorious and satisfactory, as well in scientific as in practical points of view. I hope that the second part of this century may bring forth such members as Jonathan Pereira, Jacob Bell, Daniel Hanbury, Robert Christison and John Moore Neligan."

Professor J. U. Lloyd, Cincinnati, writes:—"The occasion is one that would be peculiarly delightful and important to me, were it in my power to avail myself of the kindness of your honoured Society. It is with no ordinary regret that I notify you of my inability to be present, on account of professional engagements. With my sincere regrets allow me to offer heartiest felicitations on the auspicious event which you celebrate, and most cordial wishes for a future worthy of your honoured past."

Professor John M. Maisch, Honorary Member, Philadelphia, writes:—"The invitation kindly extended to me, to participate in the proceedings at the official celebration of the fiftieth anniversary of the foundation of the Pharmaceutical Society of Great Britain, is a cause of sincere regret to me owing to my inability of being present on that memorable occasion; memorable not only on account of the celebrated scientists present at the organization or since then connected with the Society, but also on account of its aims and objects, and the manner in which these have been fostered. It must be a source of great satisfaction for the Society to look back upon the results of a half century's earnest and disinterested labours, and I beg to join with all who have the elevation of pharmacy at heart in the sincerest congratulations concerning the past work, and in the heartiest wishes for continued eminent success in the future."

M. Pasteur writes:—"I have the very great regret to inform you that the state of my health will not permit me to be present at the Jubilee of the Pharmaceutical Society of Great Britain. It would have been to me an honour and a great satisfaction to be present at the presentation of the gold medal awarded in memory of the learned naturalist, Daniel Hanbury."

Professor Dr. Poleck, University of Breslau, writes:—"For the honour done me in sending me an invitation to the Jubilee festival of the Pharmaceutical Society of Great Britain, I beg to express to the President and Council of the Society my grateful thanks, but at the same time my lively regret that my official duties in the university do not allow me to give effect to it. Permit me, however, to express my hearty sympathy and warm wishes in connection with the festival of the fifty years' existence of a Society which, as scarcely any other, has known how to worthily and successfully represent the honour and scientific interests of pharmacy in your country, and which through its *Pharmaceutical Journal*, with its valuable communications, has afforded to other countries a knowledge of its active scientific life and of its earnest strivings for the advancement of pharmacy in every direction."

Professor A. B. Prescott, University of Michigan, writes:—"For some time there was nothing better for the courage of the American pharmacist, while striving for the good of his craft, than to look backward upon the history of the Pharmaceutical Society of Great Britain. I know no better instance of the staying qualities of good Anglo-Saxon character than that given us by the early workers of your Society. Let there be honour to the forethought of the few who called a meeting at the Crown and Anchor Tavern, Strand, on February 15, 1841 (if I have seen the dates aright), honour to the bravery of the men who toiled for the Act of 1852, and still honour to the perseverance of all those who every year made demand for the better Act which was obtained in 1868. The name of Jacob Bell, of blessed memory, is the name of one to whom is due a tribute of respect from every civilised country. And I desire to present, from this school, and from the Michigan State Pharmaceutical Association, sincere acknowledgments of lasting gratitude to the Pharmaceutical Society of Great Britain for its services to all pharmacy everywhere. Adding wishes for the continued prosperity of the Society in its School, in its service of examinations, and in its serial publication coming to us all —prosperity in multiplied measure."

Professor Ernst Schmidt, of the University of Marburg, writes:—"You have done me the honour to invite me to take part in the festival of the fifty years' Jubilee of the Pharmaceutical Society of Great Britain. While expressing my grateful thanks for the distinction I must also unfortunately add my regret that my official duties on the 27th of May will not allow me to be present at the festival. If, however, it is not permitted me to express all my good wishes to the President and members of the Pharmaceutical Society, I must not fail to communicate my congratulations. May the Pharmaceutical Society, which can now look back upon fifty years of honourable activity, also in the future be destined in like estimable manner to contribute to the prosperity and welfare of pharmacy and serve as a brilliant example to the younger pharmaceutical associations established with similar aims. As a modest indication of my esteem I wish to transmit to the Pharmaceutical Society the accompanying volume, 'Miltheilungen aus dem pharmaceut. chem. Institut zu Marburg.'"

Mr. G. J. Seabury, Vice-President of the American Pharmaceutical Association, writes:—"The American Pharmaceutical Association has elected me their first Vice-President, and having perfected, let us hope, a plan to confine the disposition of medicines to our own craft, they expect me to stand as censor and soldier to fight their battles. Ordinarily I would not have accepted the honour, but in this instance I have listened to the cry of distress in order to infuse confidence and aggressiveness in our *confrères*. While I regret my inability to be a co-partner in your festivities, I will take great pleasure in celebrating your event by contributing twenty guineas to the Benevolent Fund of your Society, not as a contribution from my firm, but as a personal contribution in the interest of the progress of pharmacy and those who are dependent upon its charity. Our profession is a universal one, a brotherhood; therefore in reflecting on the possibilities of your Jubilee, may unity and fraternity rampantly exhibit itself, in good fellowship and an untrammelled welfare in each other's interests, scientifically and commercially."

The following are extracts from the other letters referred to by the President:—

Dr. P. Ankersmit, President of the Pharmaceutical Society of the Netherlands, writes:—"I beg you to accept the assurance that, as well personally by myself, as by the Pharmaceutical Society of the Netherlands, we wish a bright festivity to your Society, but especially an existence as much respected in the future as during the past fifty years."

Professor D. Barnsby, President of the Société de Pharmacie d'Indre-et-Loire, writes:—"I should have been the more pleased to be with you since I am connected with your Society in the sense that I have attended your School, and in 1844 obtained the diploma of pharmaceutical chemist."

Professor Beckurts, Brunswick, writes:—"Allow me to send by this letter my heartiest congratulations upon the celebration of the fifty years' Jubilee of the Pharmaceutical Society, with the wish that the honorable corporation may continue to work in future, as hitherto, for the glory of English pharmacy."

Professor A. Bor, President of the Syndicat des Pharmaciens de la Somme, writes:—"We recall, with the greatest satisfaction, that our venerated master, Dr. Planchon, has received the Daniel Hanbury Gold Medal."

Mr. A. A. Culver, President of the Illinois Pharmaceutical Association, writes:—"In the name of the Illinois Pharmaceutical Association I extend cordial greetings to the brothers 'over the water,' with the wish that their Jubilee dinner may prove a very enjoyable one, and an occasion long to be remembered by all concerned. I understand that steps are being taken to have the International Pharmaceutical Congress meet in Chicago in 1893, during the world's fair. If the plan proves successful I hope to participate with many of you in another Jubilee dinner planned on a scale commensurate with the occasion."

Mr. Arthur H. Elliott, New York College of Pharmacy, writes:—"I may say that my heart is with you far more than many would suspect, for my first notions of pharmacy and practical chemistry were received from two of your members, W. Y. Kingdon, of Notting Hill, and J. R. Faulkner, of the Ladbroke Grove Road. The former of these has long since passed away, but I see from your calendar that the latter is still on your roll of members. The precepts and practical lessons in life that I obtained from these gentlemen have served me well, and any honours I may have obtained are due to the seed then sown and the kindly encouragement received at their hands. As an Englishman born, as an American by adoption, I send most hearty and sincere greetings, hoping that this Jubilee over the achievements of the past will also be the advent of yet brighter days to come."

Mr. W. Kirkbride, Pharmaceutical Chemist, Penrith, writes:—"This being the Jubilee year of the Pharmaceutical Society, I thought it was only my duty to acknowledge it on paper if I could not do it in person. I should very much have liked to have done it in person but that cannot be. I joined the Pharmaceutical Society at its commencement in the year 1841, when I was an apprentice, so I fancy I will be one of its oldest members. I sincerely hope that the meetings will pass off well and in a genial spirit, so that a foundation may be laid for a centenary."

Mr. T. B. Melhuish, Sydney, Vice-President of the Pharmaceutical Society of New South Wales, writes:—"As late President of the Society of New South Wales I must congratulate your Society personally on the completion of your Jubilee. Although I have left the mother country for some twenty years I still take great interest in all matters pharmaceutical that take place in England. My father, I believe, was one of the Founders of the Pharmaceutical Society of Great Britain."

Professor J. P. Remmington, of the Philadelphia College of Pharmacy, writes:—"In expressing my regret at my inability to join in your celebration personally, permit me the privilege of conveying through you my heartiest congratulations upon the completion of your fiftieth anniversary, and my highest regard for the admirable work accomplished by the Society during the last half century in elevating pharmacy in Great Britain and America through the well-directed labours of its many distinguished members who have so long enjoyed the incomparable leadership of its illustrious President."

Dr. J. v. Sachs, Honorary Member, Professor of Botany in the University of Würzburg, writes regretting his great regret at having to decline the honour on account of his professorial duties.

Dr. Schär, Professor of Pharmacy in the Polytechnicum, Zurich, writes:—"I should have liked very much to attend on that festival day and to congratulate personally your Society, which has ever and ever worked and done so much for the scientific position, the honour, and the true welfare of English pharmacy and English pharmaceutical chemists. Unfortunately my duties as a lecturer on materia medica and pharmaceutical chemistry, Director of the pharmaceutical laboratory, and President of the Commission for the new Swiss Pharmacopœia interfere in such a manner with the date of the celebration and Jubilee dinner of your Society that I shall not be able to attend. Still I would not fail to present to the Society—of which to be a honorary member I feel altogether happy and proud—my best and most sincere felicitations on the occasion of this festival anniversary, as well as my hearty wishes for further welfare and a long period of equally good and noble work and real success, as has been done and arrived at till now. "Societas pharmaceutica britannica vivat, floreat, crescat!"

Dr. J. Léon Soubeiran, Honorary Member, Professeur à l'Ecole de Pharmacie de Montpellier, writes:—"I should have been very glad to have been able to be present at the Jubilee of the Pharmaceutical Society of Great Britain, to which I have had the honour to belong for nearly twenty years. It would have been to me an opportunity to see again old friends and to make acquaintance with the younger members of our profession. Unfortunately, at the time of your festival I shall be detained by the exigencies of my professorial duties, and it will be impossible for me to take the few days' leave that would be required for the journey to London."

Mr. A. B. Taylor, late President of the American Pharmaceutical Association, writes:—"I regret that I will be unable to be present, and the near approach of the annual meeting of the American Pharmaceutical Association, which meets April 27 at New Orleans, as well as the meeting of the American Medical Association, which meets May 5, and the short length of time remaining between the close of the latter meeting, and the beginning of your Jubilee, will doubtless prevent some of our members from being present at your festal occasion. It may be of interest to know that for the first time in the history of pharmacy in this country, a successful effort has been instituted to establish cordial relations between the two professions of medicine and pharmacy, and the national representative body of physicians, the American Medical Association, has officially invited twenty-five members of the American Pharmaceutical Association to form a permanent part of their organization, by establishing a section of their body, termed a section on materia medica and pharmacy. The objects of this new section are clearly stated, to discuss subjects of mutual interest, establish more cordial relations, and to develop by mutual effort the best interests of both professions. As stated before, the section will be organized in the City of Washington, on the 6th day of May, 1891. Your younger *confrères* on this side of the broad Atlantic have long profited by your example of unselfish, earnest devotion to the advancement of all that is best in pharmacy, and they look forward in confidence for your approval and encouragement in the substantial progress made here. In this connection it may be of interest to state that the final Committee of revision of the United States Pharmacopœia elected last year, consisted of seventeen members of the American Pharmaceutical Association and nine physicians, and the friends of pharmaceutical progress are greatly encouraged. In conveying again to you my most hearty congratulations, may I be permitted to express the hope that the centennial anniversary of the foundation of your honourable Society, fifty years hence, will witness a development a hundred fold greater than it has had in the past, and is coupled with the sincere wish that to the Society's President may be vouchsafed a happy continuance of the life of usefulness and devotion to the best interests which have ever characterized his most successful efforts for its advancement."

M. Vande Vorst, President of the Société de Pharmacie d'Anvers, writes:—"The Society of which I am the President charges me to communicate to you its most hearty congratulations and its most ardent wishes for the prosperity of your great Society."

Dr. Vulpius, Professor in the University of Heidelberg and Chairman of the Pharmacopœia Committee of the Deutscher Apotheker-Verein, writes: "I always follow the scientific work of my English colleagues with great interest and often have to thank the same for stimulating my own activity. It is, therefore, my heartfelt wish that the Pharmaceutical Society, which has been able to assist so powerfully the progress of scientific pharmacy, may continue to grow, flourish and prosper."

Herr A. von Waldheim, Honorary Member, Vienna, writes:—"The official celebration of the fiftieth anniversary of the foundation of the Pharmaceutical Society of Great Britain is a heartily welcome opportunity to me to express my best wishes for the further growth, progress, and success of this most renowned Society. There scarcely exists another pharmaceutical society with so many able and scientific men, who have worked with such zeal and skill for the prosperity of the pharmaceutical profession. Of the great number of these excellent men I will only recall the names of Jacob Bell, Daniel Hanbury, Peter Squire, Thomas Hyde Hills, Thomas Greenish and Michael Carteighe. The glorious example which these men gave by their work for the best interests of the Society and profession, will at all times be a leading star for the Council and all future presidents of the Society."

The President said that similar communications had also been received from the—

Association Chimico-Farmaceutica Fiorentina (Guglielmo Romei, President).

Association des Pharmaciens du département de l'Oise (M. Streiff, President).

Association Générale Pharmaceutique de Belgique (E. D. A. Van Bastelaer, President).

Association Médicale et Pharmaceutique et Syndicat des Pharmaciens des Pyrenées-Orientales (F. Testory, President; E. Boix, Secretary).

Associazione Chimico-Farmaceutica Veneta (Girolamo Dian, President).

Baden Branch of the Deutscher Apotheker-Verein (W. Schaaff, President).

Bavarian Branch of the Deutscher Apotheker-Verein (L. Haiss, President).

Brandenburg Branch of the Deutscher Apotheker-Verein (F. Hobe, President).

Cercle Pharmaceutique de la Marne (M. Henrot, President).

Cercle Pharmaceutique du Hainaut (A. Martin, President).

Hesse, Grand Duchy of, Branch of the Deutscher Apotheker-Verein (Th. Kühn, President).

Kansas Pharmaceutical Association (J. T. Moore, Secretary).

Kentucky Pharmaceutical Association (J. J. Brooks, President).

Maine Pharmaceutical Association (C. K. Partridge, President).

Massachusetts College of Pharmacy (S. H. D. Sheppard, President).

Mecklenburg Branch of the Deutscher Apotheker-Verein (Otto Rümker, President).

Nebraska State Pharmaceutical Association (Mr. C. J. Daubach, President).

New Jersey Pharmaceutical Association (M. Abernethy, President).

New York State Pharmaceutical Association (W. G. Gregory, President).

Pennsylvania State Pharmaceutical Association (J. H. Stein, President).

Pomerania Branch of the Deutscher Apotheker-Verein (F. P. Jonas, President).

Posen Branch of the Deutscher Apotheker-Verein (A. Retzlaff, President).

President of the Edinburgh Chemists Assistants and Apprentices' Association.

St. Louis College of Pharmacy (C. Klie, Secretary).

Saxony (Kingdom) Branch of the Deutscher Apotheker-Verein (G. Hofmann, President).

Saxony (Province) Branch of the Deutscher Apotheker-Verein (C. Blell, President).

Silesian Branch of the Deutscher Apotheker-Verein (Herr Weber, President).

Société de Pharmacie de Bordeaux (M. E. Valade, General Secretary).

Société des Pharmaciens de Seine-et-Marne (M. Berquier, President).

Sociéte de Pharmacie de la Vendée (A. Bertault, President).

Société de Pharmacie d'Orléans et Loiret (G. Renault, President).

Société des Pharmaciens de l'Aveyron (M. Albenque, President).

Société de Pharmaciens de l'Est (E. Ferrand, President).

Société de Pharmaciens du Morbihan (R. Perrin, President).

Société Syndicale des Pharmaciens de la Nièvre (M. Ascagne Cary, President).

Syndicat des Pharmaciens des Ardennes (M. A Loret, President).

Syndicat des Pharmaciens des Basses Pyrénées (M. L. le Beuf, President).

Syndicat Général des Pharmaciens des Bouches-du-Rhone (Y. Maurin, President).

Syndicat des Pharmaciens de l'Aube.

Syndicat des Pharmaciens de la Charente Inférieure (M. Oui, President).

Syndicat des Pharmaciens de la Côte-d'Or (M. L. Verneau, President).

Syndicat des Pharmaciens des Deux-Sevres (M. Saché, President).

Syndicat des Pharmaciens de la Haute-Vienne (J. Soumy, President).

Syndicat des Pharmaciens de l'Heraut (A. Ricard, President).

Syndicat des Pharmaciens du Cher (M. Morin, President).

Syndicat des Pharmaciens d'Ille et Vilaine (F. Montier, President).

Syndicat des Pharmaciens de l'Indre (A. Duret, President; H. Anthoine, Secretary).

Syndicat des Pharmaciens du Jura (A. Vincent, President).

Société et Syndicat des Pharmaciens de la Loire Inférieure (M. J. B. Cesbron, President).

Syndicat des Pharmaciens de Nimes et du Gard (M. Bellile, President).

Syndicat des Pharmaciens de la Vienne (G. Rambaud, President).

Virginia Pharmaceutical Association (R. H. Stratton, Ex-President).

Washington National College of Pharmacy (N. E. Kalmowski, Secretary).

Washington State Pharmaceutical Association (A. C. Clark, President).

Württemberg Branch of the Deutscher Apotheker-Verein (Dr. G. Leube, President).

Governor of the Apothecaries' Hall of Ireland.

Mayor of Birmingham (Mr. Frank Clayton).

President of the Aberdeen and North of Scotland Chemists' Association.

President of the Faculty of Physicians and Surgeons of Glasgow.

President of the Institute of Chemistry.

President of the Pharmaceutical Society of Ireland.

President of the Royal College of Physicians of Edinburgh.

President of the Royal College of Physicians of Ireland.

President of the Royal College of Surgeons of Edinburgh.

President of the Royal Medical and Chirurgical Society.

Registrar of the General Medical Council.

Acland, Sir Henry W., Bart., K.C.B., M.D., F.R.S., etc.

Bedford, P. W., late Professor in the New York College of Pharmacy.

Cleghorn, Dr., Honorary Member, St. Andrews.

Crinon, M., General Secretary of the Association Générale des Pharmaciens de France.

Culbreth, Dr. M. R., Professor of Materia Medica, Maryland College of Pharmacy.

Curtman, Professor C. O., St. Louis.

Danckwortt, Dr. W., Magdeburg.

De Vrij, Dr. J. E., C.S.I., Honorary Member.

Dyer, W. T. Thiselton, M.A., C.M.G., F.R.S., Honorary Member, Director of the Royal Gardens, Kew.

Eve, Mr. H. W., Dean of the College of Preceptors.

Finckh, Hofrat Dr., Member of the Pharmacopœia Committee of the Deutscher Apotheker-Verein.

Groves, Mr. C. E., F.R.S.

Jahns, Herr E., Member of the Pharmacopœia Committee of the Deutscher Apotheker-Verein.

Jassoy, Herr L. W., Member of the Pharmacopœia Committee of the Deutscher Apotheker-Verein.

Ladenburg, Dr., Honorary Member, Professor of Chemistry in the University of Breslau.

Leuken, Herr, Member of the Pharmacopœia Committee of the Deutscher Apotheker-Verein.

Lister, Sir Joseph, Bart., F.R.S.

Martenson, Herr, St. Petersburg.

Maclagan, Sir Douglas, M.D., F.R.C.P., F.R.S.E., etc.

Madsen, H. P., Copenhagen.

Maw, Mr. Charles.

Meldola, Professor, City and Guilds of London Institute.

Patch, Professor E. L., Massachusetts College of Pharmacy.

Peel, Sir C. Lennox, K.C.B.

Rusby, Dr. H. H., Professor of Materia Medica, New Jersey.

Sanderson, Professor Burdon, F.R.S., Honorary Member.

Sadtler, Dr. S. P., Professor in the Philadelphia College of Pharmacy.

Schacht, Dr. Carl, Treasurer of the Deutscher Apotheker-Verein.
Schneider, Herr, Member of the Pharmacopœia Committee of the Deutscher Apotheker-Verein.
Shuttleworth, E.B., late Professor in the Ontario College of Pharmacy.
Simon, Sir John, K.C.B., F.R.S.
Trapp, Dr. Julius, Honorary Member, Professor Emeritus Academicus, St. Petersburg.
Trimble, Professor Henry, Philadelphia College of Pharmacy.
Tyndall, Professor, F.R.S., Honorary Member.
Vogl, Dr. August E., Honorary Member, Professor of Pharmacology in the University of Vienna.
Wentzel, W. T., Professor of Chemistry in the California College of Pharmacy.
Wimmel, Medizinal-Assessor Dr., Member of the Pharmacopœia Commission of the Deutscher Apotheker-Verein.

PRESENTATION OF THE HANBURY MEDAL.

The PRESIDENT then proceeded to the presentation of the Hanbury Medal. After giving a brief history of its foundation he said it was awarded once in two years to the most eminent living man, in the opinion of the adjudicators, in the department of the chemistry and natural history of drugs, those being the special lines on which Daniel Hanbury worked. It might be said that there were many very distinguished men who produced artificial alkaloids and other products of organic chemistry. But they did not practically come within the field, and in truth a large part of the work done in organic chemical synthesis would have been almost impossible, had it not been for the researches of those who had previously laboured in the field of crude drugs. After enumerating the former recipients of the medal, the President said the award this year had been made to a gentleman whose work was of a unique character, to whose name in the Royal Society's catalogue were appended no less than forty-eight papers. He began by a research on the fermentation products of yeast, which he followed up by one on the ammoniacal bases of guano, and then went on to a variety of other subjects, but eventually, from a general chemist he became a specialist and was now best known probably as the highest authority on the chemistry of the alkaloids of the cinchona barks. He had also done valuable work on the quinone group, on the Calabar bean, on the acid of santonin, on many varieties of barks, and especially on the coca leaf. He had very much pleasure, on behalf of the Presidents of the Chemical and Linnean Societies, and of the British Pharmaceutical Conference, of Mr. Greenish and himself as the adjudicators under the deed, in presenting the Hanbury Gold Medal personally to—

DR. OSWALD HESSE.

Dr. Hesse said: Mr. President, allow me to express my thanks and obligations for the highly esteemed distinction which you have just conferred upon me by the investment with the Hanbury Medal. This mark of distinction has all the more surprised me because I carried out my investigations for my own pleasure, and have communicated the results without the thought of rendering a service. If you, however, recognize a service in these labours which I have spent upon the investigation of drugs, I would remark that these researches have been to no small extent suggested and aided by the scientific discussions that have taken place in the meetings of the Pharmaceutical Society and of the British Pharmaceutical Conference. I would refer especially to the communications made from various quarters with respect to opium and cinchona barks and their alkaloids. In my case this high distinction is extremely delightful to me, and will be a spur to fresh efforts and labours. As a witness of my feelings, permit me to hand you, honoured president, this monograph concerning coca, which ought to prove a reliable guide to further investigations of coca. The reading of it here to-day would however occupy too much time; allow me therefore to give a short sketch of its contents. In the first place I have described the different sorts of coca, and given particulars respecting the alkaloidal contents of the same, briefly recapitulated the decomposition and synthesis of cocaine, and then considered cocamine, which I found in a coca from Paris in 1886. Cocamine yields cocaic acid by its decomposition with hydrochloric acid, whilst by the same treatment the mixed alkaloids, referred to by Liebermann as isatropylcocaine, yield not only cocaic acid but also isococaic, homococaic, and homoisococaic acids. The last two acids contain a methyl group and are converted into the corresponding homologous acids by further treatment with hydrochloric acid. Besides cocamine, therefore, isococamine, homococamine, and homoisococamine must be recognized as constituents of coca leaves, whilst, on the contrary, the hygrine briefly described by Wöhler and Lossen must be excluded. I certainly believed some time ago that I had isolated hygrine; further investigation, however showed that coca contains no volatile alkaloid, but that such a body is formed during the extractive and subsequent manipulative processes. All the coca alkaloids are derived from ecgonine, and since the latter contains two asymmetrical carbon atoms, three optically isomeric cocaines are possible. The cocaine occurring in nature turns the plane of polarized light to the left, whilst a second, synthetically prepared, rotates it to the right, and a third should stand with respect to its optical activity in an intermediate position. I hope shortly to be able to communicate further information with respect to the last, but at present I have only prepared the corresponding ecgonine.

Professor ODLING then proposed a hearty vote of thanks to the President, who was a worthy successor of the distinguished men who for fifty years had occupied the position of President of the Pharmaceutical Society. The Society had been very fortunate in its Presidents, and no small measure of its success was due to them. This was only another way of saying that it was due to its own wisdom in the selection of its presidents. Of course the Society existed mainly for the sake of pharmacy, and it claimed honour for what it had done on behalf of pharmacy and pharmacists; nevertheless, it was associated in so many different ways with so many kindred societies, more particularly with the different medical, chemical and natural history societies, that on an occasion like that they were all glad to come round and express their common interest in its welfare. Speaking for himself, it was on its chemical side that it presented its greatest interest, and he could not but reflect with pleasure on the old ties subsisting between chemistry and pharmacy. For some hundreds of years, in fact, the best and most honest work in chemical science, the work most free from charlatanry, was done by pharmaceutists. And not only so, but there was another special point, to which on such an occasion it was only right that some reference should be made, viz., that among the three or four greatest names in chemical science, one which was of almost equal rank with Lavoisier in France, and Priestley in this country, was that of the other discoverer of oxygen, Scheele, who during his whole life was nothing more nor less than a pharmaceutical chemist. Even yet his name lingered, not only on the chemical, but also on the pharmaceutical side, for notwithstanding the efforts of the Medical Council and the new Pharmacopœia Committee, one still occasionally met with the prescription

"Prussic acid, Scheele's." Dr. Odling concluded by a humorous reference to the fact that pharmacists are the only persons in this country who were legally entitled to call themselves chemists. The Chemical Society included nearly two thousand members, but amongst them there were only a very few, about a dozen or so, among whom he was proud to reckon himself as one, being an honorary member of the Pharmaceutical Society, who had a legal title to call themselves chemists, all the rest being only called such by courtesy.

Mr. E. RIDER COOK (President of the Society of Chemical Industry), in seconding the motion, said he must take blame to himself that the Society he represented had not sent a congratulatory address, for he was sure every member of his Council would desire to tender their very heartiest felicitations on this auspicious occasion.

The vote of thanks having been carried by acclamation and very briefly acknowledged by the President, the company separated to examine the various objects of interest exhibited in the Council and other rooms, and to listen to the music provided by the band of the Grenadier Guards.

Among the guests present, besides those who took active part in the proceedings, were the following:—

Master of the Society of Apothecaries of London
President of the Hunterian Society.
President of the Ophthalmological Society.
Treasurer of the College of Preceptors.
Bell, Dr. W. J.
Bentley, Emeritus-Professor.
Delchevalerie, F. (Brussels).
Dieterich, E., Member of the Pharmacopœia Committee of the Deutscher Apotheker-Verein.
Down, Dr. Langdon.
Frankland, Dr. E., F.R.S.
Hicks, Mr. Braxton.
Jacobi, Herr Richard (Elberfeld).
Lee, Dr. Robert.
Thomson, Professor John M., Secretary of the Chemical Society.
Herr Rehe, Cologne.
Howard, Mr. W. Dillworth.
Froelich, Herr, Deutschen Apotheker-Verein.
Stevenson, Dr. Thomas.

TELEGRAMS.

Before the company separated the President read telegrams of congratulation that had been received from—

The President of the Medical Council (Sir Richard Quain, Bart.).
Austrian Pharmaceutical Society, signed by Scheffner, President, and v. Waldheim, Vice-President.
Dutch Pharmaceutical Society, signed by Van Ledden Hulsebosch, Secretary.
Hungarian Pharmaceutical Society, signed by Zboary, President.
Members and Faculty of the Maryland College of Pharmacy, signed by Louis Dohme, President, and D. R. W. Simon, Dean.
Pharmaceutical Society of Bologna.
Pharmaceutical Society of Christiana, signed by Hoel, President, and Eckel, Elected Representative.
Verein der Apotheker Berlins, signed by Spisky, President.
Dr. Brunnengraeber, President of the Deutscher Apotheker-Verein, dated Homburg.
Professor Dragendorff, Dorpat.
Professor Hamberg, Stockholm.
Mr. H. P. Madsen, Copenhagen.
Professor Reichardt, Jena.
Mr. F. R. Squire, San Remo.

MEETING OF THE COUNCIL.

Wednesday, May 27, 1891.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.
MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Cross, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martindale, Newsholme, Schacht, Storrar, Warren and Watt.

Several members were restored to the Register.

The Council then settled the order of business for the Annual Meeting.

FIFTIETH ANNUAL MEETING.

The Fiftieth Annual Meeting of the Pharmaceutical Society was held on Wednesday, May 27, at 12 o'clock precisely. The PRESIDENT, Mr. Michael Carteighe, in the Chair.

The SECRETARY read the notice convening the meeting.

The report was agreed to be taken as read.

The PRESIDENT: Gentlemen, I beg to move—

> "That the annual report and financial statement submitted by the Council be received and adopted."

With reference to the financial statement, I do not think that I need say very much. The paragraph at the head of the report represents substantially our comments upon that statement. Some of the items may be criticized in detail, probably or possibly, and I may be able to reply to them if necessary afterwards. I may say generally, what is perfectly obvious, that we have spent a good deal of money upon these new buildings and alterations, and in saying that I mean that we have spent a good deal of our capital. To a certain extent we have converted capital which was invested in Goschens into a house in Bloomsbury Square, which brings us a very good return for our money; but in the other case we have converted Goschens into the business premises next door, which of course will not bring us in any income in the future. So that during the past financial year we have been in a process of change, in which we have been spending our capital, and have not had time to reap any serious benefit from it. Still, it is of course important that we have got our house in order, and I hope we are practically now in a position to say that we have, and that we shall be able to go along in a somewhat regular fashion and be able to do what we can for the various departments over which we have control. You know perfectly well, gentlemen—I have said it over and over again in this room—that I am not anxious to save money for a future generation of pharmaceutical people; they must take care of themselves. The founders of this Society and their successors have done an enormous deal for the trade, and they have had very little support from the trade as a trade, and therefore the position that my colleagues and I have taken is that the best we can do with our money is to turn it into something which will give us power both direct and indirect, and that power direct and indirect is not to be measured in pounds, shillings and pence. That is my general statement as regards the finances, gentlemen, but I shall be happy later on to answer any questions which may be put to me with regard to it. It may be remarked in regard to the capital account that we have a very nice investment in Paddington, which was bought some nine or ten years ago, in freehold ground rents, for a short term, which cost only some £7000, and which when we come into it in from fifteen to twenty years time, will give us a property which in rental will be a very considerable item in the future. I mean to say the value of the property now has risen in rental, and is surprisingly greater than what was contemplated originally; when we take charge of those rentals, therefore, the Society from that source will have a very good income. It may be said what are we going to do until they come in, but I think perhaps the Council you will elect to-day and in succeeding years will probably be able to steer the ship, to do its work, to pay its way, at least until that time, and if it is necessary at any time that money should be forthcoming for any particular purpose, political or otherwise, I have no doubt that amongst those who have worked for this Society, and those who have put their hands in their pockets for this Society, there will be found plenty of money with which to fight the battle if need be. The next few paragraphs in the report refer to the examinations, but with regard to them one cannot say more than the Government visitor says. We do not want to go into statistics as regards the number of candidates, all I want you to bear in mind in any discussion upon this point is, that the word "candidate" in the paragraph represents a person coming up each time, but does not necessarily mean separate persons. Consequently, although we have 1157 candidates, we do not have 1157 separate persons during the year. There is a little hope with regard to that, I think, for some of us, for it would be positively appalling if 1157 fresh men presented themselves each year. Some present themselves for the first time, some for a second, some for a third, and some for the fourth time. I cannot, of course, do more in addressing a meeting of the Pharmaceutical Society than to re-echo what the Government visitor says with regard to these examinations. It is perfectly appalling for an outsider, who is perfectly unbiassed, who is not influenced by any internal motive at all, but a man of good practical common sense, to read what Dr. Stevenson says of this examination, and what Sir Douglas Maclagan says of the examination in Edinburgh. It is perfectly astounding that, with this report before them, so many members of the trade should declare that we are unjust in the examination, that there is no need to propose a better examination, and that a better training is not required. References are made to the Preliminary examination, as to which possibly something may be said later on, and I will say nothing more about that now, but I would just like to say with all deference to those of my friends who take an active interest in preliminary education that the important part of preliminary knowledge for our purposes is to be able to get it at the right age—that it is important, for instance, that you should examine a lad at 14, 15 or 16, according to circumstances, in the ordinary school knowledge of that particular age, and that you should not introduce into your examination subjects which would be fit for a young man of 18 or 19, but not of 15 or 16. What we want is a test of school knowledge at school-time, not a test of school knowledge at 19 or 20, not a test of school knowledge obtained by an examination which has been prepared for in the shop of a pharmaceutical chemist, but which is done before the man goes into the shop. Therefore, the subject is not quite so easy as some of our friends who write to the Journal fancy. I quite sympathize with the movement, but it is important to bear in mind that until we have the powers that we are seeking for in Parliament to introduce a period of time between the Preliminary and the Minor, we are not in a position to insist that the man should pass that Preliminary early in life, and therefore the question of subjects is rendered much more difficult for a Council or an executive body to deal with on that account. If you go into any examination room in the large towns, you will find amongst the younger men a large percentage of older youths, and even grown up men, and in a much larger degree than in most other professions, consequently, until we have the power to insist on the Preliminary examination being passed at, or about the period of entering upon apprenticeship, it is just a question which you will probably discuss later on as to how far additional subjects may or may not be advisable. You will see that has nothing to do with the subjects, but has a great deal to do with the relationship. Clearly, a lad of 15 or 16 who passes in the present examination creditably, is in a position before 21, and would, as a matter of course, acquire much knowledge which would supplement his Preliminary in entering upon his scientific career. I mean to say, what has been put by my friend Mr. Schacht more than once, that an apprentice of the right standing does acquire certain educational knowledge outside the special technicalities which are required in the examination as a matter of course in his ordinary training. You know that in the schemes we have propounded to you from time to time we have proposed to have an intermediate examination; to have a written examination throughout the country as part of the Minor or qualifying examination, and probably, as it strikes me at the moment, that intermediate would be the place to put in certain other subjects of what might be called an educational character alongside of the elementary chemistry, botany, and so on. What I would ask you to consider in discussing this matter is this, that the question of what shall be the subjects for an examination, although of considerable importance, is not so essentially important as the particular age and time and condition at which the examination is passed. I think I may pass the formal paragraph with regard to the library and museum, and also the report of the executive of the North British branch, which you will be glad to see is progressing satisfactorily, and go straight on to the paragraph which refers to cases of infringement. During the past year, and in fact during a part of the present year, we have had a great many cases to deal with. You will observe that we do not give any figures; it is not expedient to do that. We are getting to that condition of business men that we are not afraid to say that we have a reason for not giving names or figures. But I may state it as a fact that during the last eighteen months we have been particularly successful in protecting the public against those forms of bogus companies which are very often started in provincial towns and carried on by a grocer as proprietor, who constitutes himself into a company. We have recovered a good many penalties, four, five and sometimes six, in some cases without going into court, in other cases by going into court. In two cases the whole business has been actually closed and shut up, and we have had a judgment summons and got the remainder of our money out of the proprietor. I do not want to be vindictive, gentlemen, when I say this I only want to point out to you the fact that it has been my duty as President to say that the prosecution of the unqualified seller of a company was a means of protecting the public which might be used with advantage, and so far as we have carried out that form of prosecution in such cases I have reason to believe that while it protects the public it does justice to those who are registered, and if one may judge from results—it is impossible, of course, to say what are the reasons—but those of you who have followed the formation of new companies connected with pharmacy will have noticed that the number formed during the last six months is practically *nil*; that whereas they were constantly being formed, there are now none being formed. I do not know whether the prosecutions under the Pharmacy Act instituted by this Society have anything to do with that or not, but still that is the fact. I will leave, if you please, the paragraph with regard to the Pharmacy Act Amendment Bill in the House until the close of my observations. In the report we then refer to the Pharmacopœia, and those of you who were not present last night will be gratified to know that the chairman of the Pharmacopœia Committee, Sir Richard Quain, is now President of the General Medical Council, and sent his congratulations to us last night in that capacity; so we have reason to hope that the relation between the representatives of pharmacy in this country and the medical profession in its highest aspect, are at the present moment on the most friendly and cordial terms. I remember well when I first became a member of the Council, shortly after passing my examination, that the question at that time for the Council of the day to consider was whether the Medical Council would swallow us up and make us a department of themselves, or whether we might go on alone. That was the important question then, because in fact the Medical Council was actually considering, notwithstanding that Jacob Bell had passed the 1852 Act, whether it should not go to Parliament, and arrange for a compulsory qualification in pharmacy, the control of which was to be vested in it. I should like to remind you of this, gentlemen, because some of you complain of the President and the Council. You must remember that we have duties to perform, and you must not do anything or engage in anything to drive us into the position that we should neglect the public interest, and give outsiders an opportunity of taking hold of us and saying you are not doing your work properly. Then the paragraph with regard to the schedule of subjects I think I need not refer to. It has been very generally accepted as being a desirable thing, and the next paragraph referring to the bye-laws is more preliminary to the special general meeting which comes later on, but we thought it would be courteous to give you in the report our reasons for the chief changes proposed. Then we come to the paragraph with reference to the peregrinations of the Council, and various members through the country, and I may say, gentlemen, that the courtesy and kindness which was shown to your President in the various places that he went to was of such a character as I shall never forget, and that courtesy was distinctly shown to the President of the Pharmaceutical Society of Great Britain. I know some people have a notion of separating an individual from his office, but I want to say that in this particular case I know that feeling and respect was for the President of the body wholly, solely, and completely, and that there always will be I am sure throughout this country, in every large town, a large number, perhaps not the whole number in all cases, but a very large number who will always welcome the President of the Pharmaceutical Society, and listen to him with patience, even if they differ from him in certain views. The net result of the meetings which I had the honour of attending, and the observations I made, were very broadly these: that while one was able to give a certain number of explanations of our powers, and to enlighten, in a sense, those who had not taken the trouble or who had never had the opportunity of knowing what our powers were, there was this disadvantage, which I found in the lobby of the House of Commons during the present session, that in educating ourselves we are also educating our enemies, and the more we talked about the powers we wanted, and the influence those new powers would give us, and the advantages they would give us, the more acutely the ears of our opponents were opened, and the more carefully they put down and noted certain observations. It is something comical for your President to find in the lobby of the House of Commons, as he has had to do within the last six weeks, that the observations he has made on the the subject of the Pharmacy Bill here travestied and almost annihilated by a series of statements which were absolutely untrue. What I was going to say was this, that the danger of all such things is that in educating the trade we are also educating those who wish to oppose us in trade, so that the experiment from the point of view of political wisdom is one that will have to be carried on in future with a certain amount of discretion. It is very well of course for you to ask the President to tell you all he knows. I am disposed to be generous, and sometimes probably one says too much, but I want, if you will allow me, to ask you once again not to press us who are in office, not to ask us for too much explanation, because the very explanation that we have to give to you is the very thing which will tend to defeat the object which we have, as your generals, to carry out. Now with regard to these meetings, another point which struck me very forcibly was that which was noted and observed by Jacob Bell some years ago, the tendency of those meetings to waste their time and brains on matters of detail, wanting to furbish up a sketch of an Act of Parliament, and to amend words, and in fact literally to hash the whole concern. Meetings of this sort, gentlemen, even here of you members, are not places at which Acts of Parliament can be drawn. You must trust to the executive, and must not waste your time—you will excuse me putting it that way, for it is waste of time—you must not waste time in dealing with small things. I was sorry to find at many of the meetings that the general discussion went rather on little things, and not on general principles. But one thing has gratified me more than all things, and that is that the strong feeling which existed amongst our brethren with regard to going to Parliament to stop the formation of limited companies trading as chemists and druggists is very much moderated, if it has not died out altogether. I think I have been able to show that there are certain courses open to us which are beneficial, and I was also able to show that whatever opposition we might meet with by ordinary modes, and that is strong enough, heaven knows, anything that interferes with freedom of trade is a difficult thing to have to fight in the House of Commons. It is a principle which has become part of the daily life of everyone in this country, that of the associating together for the carrying on of business. Why limited liability companies are so numerous, I was going to say, that almost everyone in the country is interested in some one or another, and if you talk about interfering with them in any way you raise such a storm of ridicule as to scout the Pharmaceutical Society or anybody else out of the Houses of Parliament. When it is said that you can provide and regulate those companies and see that those who are called the officers are qualified persons, from the point of view of the layman who does not understand the subject, there is an argument which is much more difficult to answer than you suppose. At any rate I am supposed to be gifted with a certain amount of versatility, I have had to conduct a losing case as well as a winning one, and I know how very difficult it is to fight it. I am impressed very much with this, that concurrently with the progress of this Society and the advancement of the trade, or concurrently with any process which will retard any tendency to go backward on the part of the trade, you must not lose sight of the fact that we are custodians of the public interest, and as such, your president must regard the public in the first place, and the members of the Society and the trade in the second. Well, gentlemen, that remaining paragraph I think I may pass over in view of the fact that we have a long day before us, and that I shall probably have a long evening to-night; and moreover, on this jubilee occasion, probably you would desire that I should not say too much. I had a good deal to say last night, or to read, and I hope it will be understood, if I do not make any observations on the other part of the report, that I do so out of consideration to you, and you will not consider me disrespectful if I do not refer to them. But now, referring back to the paragraph with reference to the Pharmacy Act Amendment Bill, the opposition to that Bill is very determined on the part of a certain small section of the country against one clause of it, and it is very determined on the part of a few individuals spread over a larger area with regard to another clause. I mean to say that that clause which we regard as being beneficial to the trade at large, the dispensing clause, and a matter of very great consequence, is attacked, and the Bill is blocked and threatened with opposition, because we do not provide for assistants of "a certain standing"—that is the expression used. If you please, I will deal with that first. You have heard me say before how curious it is how the wholesale element is mixed up with the retail element in our affairs, and how difficult it is sometimes to know where one is. It appears that one gentlemen who is associated in some capacity, either as assistant, manager, or otherwise with the Glasgow Apothecaries' Company, conceived that it is a great injustice, especially in Glasgow, that unqualified assistants of a certain standing should not be allowed to continue to dispense and sell poisons, and to dispense prescriptions, and he has drafted a very ingenious circular which he is sending to various members of Parliament which appeals to their sympathies. Directly you talk about wives and families the average member turns round, but I never yet found anybody to cry out for the wives and families of the registered chemist and druggist, who has been fighting all his life to obtain his qualification. But there it is—there is a long story, and the members are catching hold of the President's coat and saying to him, "Look here, you do not mean this, do you?" and all the rest of it. What I want to point out is that what Mr. Walker asks for on the part of these men is this—not only that men of a certain grade or certain standing, say 10 or 15 years, should be practically allowed to become registered assistants, and to have all the rights of a registered man short of opening a shop, but he wants also to get over that Wheeldon judgment and give them the power to sell and dispense poisons in the absence of their principals. This is a thing which the medical man of Glasgow and some other large towns, who never attends to his own business, would very much like. He wants as a medical man to open a number of branch shops, and to go round from one to the other and see patients, without having a competent qualified man in any one of them, because he does not want that man to go into business for himself and take away a portion of his ordinary retail business. And the wholesale element naturally comes to the relief of the medical man, and assists him and the unqualified man in putting pressure on the Pharmaceutical Society to get rid of this obnoxious clause. That is really the exact position of affairs, and I want to say from this chair that so far as I am concerned I would rather not have a clause of the sort than to create a sort of spurious qualification called a registered assistant. We are better as we are than with anything of that kind. That is the answer I have to give from this chair, and that I have given to all who raise it. Mr. Walker himself knows perfectly well what the real rights of the case are. He may, of course, take what position he wishes, as he is perfectly entitled to do, but he is asking practically not only for certain rights to be given to these men. But I want especially to point out that it is a very convenient thing for certain medical men as masters, and for certain chemists and druggists as masters, to have their managers at branch shops registered for all time as competent persons to keep and manage a shop, provided somebody else is declared to be owner; but I say if that sort of thing is to be done we are better off as we are. The other objection to this draft Bill is the old one about the curriculum questions, and the expense, and the statement that the trade is not worth it, and that we are trying to keep apprentices out of the trade—in other words it is the old question of cheap labour. It is said many houses cannot get apprentices if you do this, and all the rest of it. Many do not quite understand what is required, and I am bound to say that in Scotland especially, and in the North of England, it is perfectly surprising what very decent lads the chemist and druggist gets as apprentices. In fact it has often been said in this room that those outside the large towns are always in a difficulty with regard to apprentices. Now the statements made to me during those rambles I have recently made have been quite the contrary. There is much less difficulty in getting good apprentices in outlying districts than there is in very large towns, I mean of the right class. There are certain difficulties that will crop up in regard to a curriculum, but these difficulties are very much more imaginary than real. Nearly every one I have spoken to at meetings or privately outside London, and many in it, have been under the impression that a curriculum would mean a great deal more than it does. In fact they have an impression, which is of course fostered by those who are opposed to the Society as a corporate body, that we want to bring every student into the Society's school. I need not tell you that every additional student brought into this school is an additional cost to the body corporate. As a matter of business we do not want a large number of students. We carry on this school at a considerable loss because we want it to be a typical school. We want to have educated men in pharmacy directing its affairs and producing a high moral effect on medical and scientific men, without which the poorest chemists and druggists cannot advance. I say it emphatically that the highest man in pharmacy to-day, and the lowest man in pharmacy to-day, in regard to position and income, are closely associated together, and that the worst thing that could happen to the poorest pharmacist is that his leader at the top of the tree should desert him and go to his own affairs. It is commonly said that those who take an interest in carrying on this Society do not know what the trade in the country is like; but from what I have learned recently it appears to me the state of affairs is broadly this: that in the country proper the pharmaceutist is doing a good deal better than those in the large towns. I believe that. To say that any curriculum policy would interfere with him is, I think, altogether a mistake. I hope and believe that we all in large towns, including London, are getting a little better than we were. I think we have seen the worst of certain things in trade matters. Of course, there are waves of trade, waves of public opinion, with regard to certain things, especially with regard to physic and dispensing, but I believe the tendency at the present moment is in favour of a regard for the educated qualified chemist and druggist, and that his services are valued. I believe that the process of education is going on rapidly, and when that is complete I believe the individual chemist and druggist may then snap his fingers at any great corporation of individuals who try to carry on by means of others a business which can only be carried on satisfactorily by a qualified man himself. Those are the observations, which I have thought it my duty to make to you now. I ought to say that I cannot induce, at the present moment, members of Parliament who have taken an antagonistic course to our Bill to remove their blocks. I cannot do that, short of cutting away the very principle that we want to insist upon, and of actually deserting the men who have borne the heat and burden of the day in getting qualified, educated, and registered. I cannot do that, gentlemen. I cannot consent, and I am sure the Council cannot consent, to allow a number of men, who have been in the business for years, who knew what they were entering into, to lose what they have obtained, for the sake of a number of men who want to get the very last pound of flesh out of them. Some of you will say, "You have been about, you have got us into enthusiasm about the Bill, but you have not asked us to do any work for you, you have not asked us to fight." Well, the reason is this, that any amount of pressure that can be brought to bear by you, gentlemen, throughout the country in favour of the President and his colleagues is absolutely powerless to remove blocks. I am perfectly certain that if we can get our Bill on the floor of the House, we can carry it by a large majority in a day, but in the present state of political parties, and in the present state of public business, with the desire of every private member to have some form of private legislation introduced and if possible passed, it is simply a race in which we are heavily handicapped. Who cares about pharmacy except those in it? How many of us sacrifice our political principles and ask a man whether he will support the Bill for the amendment of the Pharmacy Acts before they will vote for him? Not a bit of it. Even lawyers think it desirable, even publicans and others take care to close their ranks and to show their power; even teetotalers unite to bring influence to bear; but where are the pharmaceutical chemists and the chemists and druggists? Instead of banding together to support the President, and practically compelling members of the House to listen to him, they are bickering at the President of the Society for doing his best to carry them along. That is the position of affairs of to-day, and I fear it will remain so for a considerable time. But I do hope the chemist and druggist who is not with us, I mean who is not a member of our body, will recognize the truth of what I have said to you, that I and my colleagues on the Council are not antagonistic to the trade—that the trade of the chemist and druggist has been benefited by the efforts of this Society, and that therefore any attempt to regard us as an unfriendly body or as seeking for powers which would do harm to him is altogether a mistake and contrary to the fact. I beg to thank you for the courtesy with which you have listened to me, and to move the resolution which I have read.

Mr. GILES: I do not know whether I may be allowed to second the motion, or whether a certain routine has been arranged.

The PRESIDENT: I shall be very glad if you will second it.

Mr. GILES: Then sir, not as a founder of this Society, but as one who joined it at its formation in the capacity of Associate, I think that was the name then, I may perhaps presume with your indulgence to ask the meeting to allow me to say the few words I have to say before the general discussion takes place. I will just emind you that in the ecclesiastical year, the great estivals, such as Christmas Day and so forth, take precedence of Sundays and swallow them up, so to peak. Now I am anxious that this Jubilee celebraion should in a similar manner swallow up the annual meeting of the Society. Pray understand me first. I am simply following out that which your President uttered with your approbation apparently. I certainly do not recollect the words, but there was a suggestion that we should avoid anything like minor details on this occasion. Now I admit that when any corporate body, whether it be a trading body incorporated for the purposes of trade, or a Society of this kind, meets once a year only, there are a great many small matters which have been fermenting in the minds of individuals which they take the opportunity of discussing, and sometimes they are very small matters indeed. But it is quite proper that that should be so on ordinary occasions. On this occasion I would very much rather that we should address ourselves to larger subjects. In the first place I should like to allude to that to which you very cursorily alluded, the magnificent demonstration of last night. I admit, sir, that as I sat in this room, and heard you reading the series of addresses, that the superficial aspect of the case was distinctly tedious, but I was sustained by the feeling of the magnificent substratum that there was beneath. What a testimony it was to the achievements of this Society, all those addresses that were received from so many leading scientific bodies in this country, and also I should think from all the pharmaceutical societies existing all over the world. I do think that that was a gratifying circumstance upon which too much stress cannot be laid. It is really a glorious testimony to that which we have achieved, and in thinking of that I should like to ask your permission to dwell a moment upon those illustrious dead to whom we owe it. Ordinarily, to dwell upon the dead is a melancholy matter, but we are now dwelling on their successful action, and I think that without any feeling of pain we can contemplate their merits, and the successes they have achieved. In the first place, and beyond all others, stands the name which you mentioned yesterday, of Jacob Bell. He appeared to be a man who was created for the occasion. He was utterly indifferent, as I firmly believe from an intimate knowledge of him, to any personal aggrandizement in the progress of the cause which he instituted and carried to a successful issue. He was in private life one of the most charming of men, kindly and unselfish to the last degree. He did what you seem to have done lately—he tramped the country, he held meetings, he excited sympathy and enthusiasm, and he was the class of man who was essentially needed for the organization and first formation of this Society. Then, sir, I think of the really grand men whom I knew around the Council table of that day. There was another member of the Society of Friends. Mr. Jacob Bell, when I knew him, was no longer a formal member of the Society, but it was in his blood most distinctly, and occasionally we saw it come out; but another member of that Society, a very splendid man, was the elder Mr. Daniel Hanbury. Another man who also belonged by birth to that Society was Henry Deane, a man for whom I had very great veneration and esteem. There was also Mr. Thomas Morson, who in his day was quite a leader. (Question.) If I weary you I will discontinue at once.

The PRESIDENT: You are quite in order, Mr. Giles.

Mr. GILES: Mr. Thomas Morson in his day was a leader in the manufacture of the most delicate chemicals, alkaloids, and so on, and in fact in those days the name of Morson was the *cachet* which answered for the quality of everything that came from that house. Of course I make no suggestion about there being any difference now. We will not speak of rival traders at present. Then there was Mr. John Savory, who happened to be the President of the Society at the time I was at this school, and Mr. Peter Squire, who has only recently been taken away from us, a very grand man certainly, a leader in pharmacy and in the sciences connected with pharmacy in his day. Pharmacy has advanced since then, and the standard is higher, and none of those men possibly would take now as high a rank amongst the present leaders in pharmacy as they undoubtedly did in those days. Well, sir, I have no doubt omitted the names of many, but it is not from any disrespect, but I pass from those whose epitaph is already written in the word *fui*, to one to whom I especially wish to call your attention, and for whom I invite your sympathy, who although not absolutely taken from us, has been, by the inscrutable and inexorable laws of Providence, obscured from us for a long time, and whom we shall never see in his old place again, I mean my much venerated friend Thomas Hills, a man who had great qualities, sir, qualities which I do not think have always been quite clearly recognized, but which are very well known to me. Mr. Hills had formed a very large circle of friends, amongst whom were some men of very high standing, a thing which is not accomplished without some merit on the part of the person who makes such friends, and I do not think that Mr. Hills has ever lost one. Mr. Hills is, perhaps, more generally known by a pecuniary liberality, which I will venture to say is very often a vulgar feature, but Mr. Hills was characterized by much higher liberality and generosity than that. He was a man who was absolutely devoid of any feeling of jealousy. I have never heard Hills say one unkind word of any living man. He was always delighted in the successes of those whose scientific abilities perhaps he recognized as being beyond his own; and he had a wonderful amount of judgment and tact. It occurs to my mind that I have said it here before, but I will say it again, that he was a man whose opinion and advice I valued beyond that of any other man. We shall undoubtedly never see him again, but we are glad to find that we have not lost his name from amongst us. I have little more to say than that I think this should really be an occasion of honest jubilation. We have very much indeed to be gratified and pleased with. You have explained the difficulties which have assailed you, and they have been very great, we all know, but difficulties assail every institution of this kind, which has to obtain certain trade powers against the instincts of a very democratic and free trade legislature. That you have done so much as you have, I think must be really, when it is calmly reflected upon, a gratification and satisfaction to everybody. No doubt there have been a good many who have not seen how it benefited them. I am sorry when I hear people talk in that way. I am an old-fashioned man. I am a man who may say *fui, vixi;* my time has passed. But I have always felt and been actuated by a very old-fashioned virtue, for I venture to think it a virtue, patriotism, and any day I would have sacrificed my own personal interest for the good of the body to which I belonged. One cannot look back upon a life whose activity is spread over something like fifty years without feeling that there have been many opportunities lost and much that one would regret, but I never yet regretted, and I do not now regret, any failure which may have related merely to the advancement of my own personal interests. I hope the spirit which I believe is truly the spirit of a republican country, as England is in fact if not in name, will always actuate those who call themselves Englishmen, and that those younger gentlemen who generally occupy the higher benches, who are succeeding me, will not be ashamed of the same feeling, or ashamed of the old-fashioned virtue of patriotism. I have nothing more to say, and I do not wish to multiply words without meaning, but I very cordially second this resolution. I hope that those who will follow will take a large and generous view of the occasion, and will not waste time upon trivial details.

Mr. LOMAS: Mr. Chairman and Gentlemen,—Mr. Giles said he desired to shorten this meeting. I understand—

Mr. GILES: No.

Mr. LOMAS: I understood you to say so—to shorten it as much as possible, but as regards what Mr. Giles said with regard to the founders of this Society I quite agree with him, but that was most ably put by our President last night, and therefore to a certain extent it was simple repetition.

The PRESIDENT: One moment. Allow me kindly to explain. I am sure you would not do an injustice. The fact is, I was prepared last night to have said very much that Mr. Giles has now said, but our friends from abroad sent so many congratulations to ourselves that I had to say nothing, and, therefore, I feel indebted to Mr. Giles for his remarks to-day, because I do not know exactly how I could bring the matter up again from this chair.

Mr. LOMAS: I thought you had left nothing to be desired and that you did it very ably last night, but I may be mistaken. I am sorry to see that this meeting is the poorest meeting I have seen for many years, but that is easily accounted for, and I may refer to it in the conclusion of my remarks. There is one thing that was suggested at one of the meetings, I think two years ago, and I consider it is a very important matter, next in importance to the Research Laboratory which is the scientific part of your work, but what I allude to is looking after the business interests of this Society. You cannot separate the two, the two must go together. One or two suggestions have been made, and I was in some doubt whether I should take it as a compliment or a joke. I am not joking. I am in earnest. I say it is the most important matter that can be undertaken by this Society, and especially after what has fallen from the President, that he was not going to make funds for a future generation, but going to spend it in the interests of this Society, and for consolidating and strengthening it, because that is the proper thing to do. My remarks are to this point. This Society has been represented in Parliament by one of the founders of the Society, if I remember rightly, Mr. Jacob Bell, and why has that gap been allowed to remain unfilled all these years? You may laugh, but it is not a laughing matter. It is the most important business you can undertake. [Go yourself.] I will if you will send me. A suggestion is nothing unless you are prepared to do something to carry it out. I suggest that you gentlemen on the Council should take this into your urgent consideration. You know perfectly well what you have to do now when you have any business in the House of Commons. One of your members has to go and dance attendance in the Lobby of the House of Commons and button-hole any member you can get hold of. Is not that so? I am sure of it. Is that the proper thing for a Society like this? I say it is most improper. It is derogatory to a Society like this, and the sooner the Council, and you, gentlemen, insist on the Council acting in this matter the better. Sooner or later it will be done, you may rest assured of that. Of course you cannot send a member to the House in a day. It is a question of time and expense, but you are well off for funds. You have let the house next door. There is plenty of money, and what you have to do is to formulate some scheme. If you are too stingy to spend your money, very well; devise some means whereby you can obtain the money from another source, and I might point out one way in which I think you will be able to raise some money. That is, appeal by an advertisement in the Journal, when you have formulated some scheme, for funds, and ask every member, outsiders and all, to contribute a shilling. That would be a very considerable sum added to what the Society could afford. In this way you may be able to send a member to Parliament, and the sooner you do it the better, and I do hope the Council will formulate some scheme this year, that this state of things should not remain much longer. It may be months or years before you get a member in, but the sooner you set about it the better. You cannot do it in an hour, it requires time. You know how difficult it is unless you have tip-top aristocrats to assist you. Now, gentlemen, I say it is a most important thing, and why do I say so? Look in the House. The legal gentlemen there will tell you that they are well represented in both Houses, both in the Commons and the Lords; and then look again, there are the brewers. Are they more important than us? Physic is as necessary as beer. Therefore I say that our calling is quite as important as the brewers, and I could go to the medical profession and every other. We are always behind. Therefore I say the sooner you make up for it the better. I am not saying this in a joking way. I am in earnest. It is the best way, when you have matters in the House, to have a man on the spot who will take it in hand, and not be bamboozled in the way you are. I quite agree it was a magnificent meeting last evening. Everything was arranged well, and great credit is due to those who had the management, and I do hope that the matter will be taken into consideration, whether we cannot have a conversazione, an extra one, instead of an evening meeting, with objects of interest. The medical profession take an interest in our calling, and I do not see why we should not take interest in what they are doing, and have microscopes with different germs of disease and anything to interest us. I think that would be the correct thing to do. Then there is another point. This is the Jubilee year, the most important year, as Mr. Giles says, but what have we done? I am afraid there has been too much high pressure and doing things in haste. You, gentlemen, the members of the Council, have arranged for the Jubilee year, but what have you done? You commenced last evening with the conversazione, which is a very proper thing, and then to-day there is the most important meeting of the year, and the only opportunity we have to make our views known, and then we are invited to shorten our discussion so that gentlemen may get away to dress for dinner. Now I say to you that as a Council you are against cramming, but if this is not cramming I do not know what is. Some of you on that side of the table are past middle age. You go to a conversazione, and get home at two in the morning, and many of you not so early as that. You get up at o'clock and you are here at 11, and a good many of them have not come. What is the consequence? Then you go to a dinner. Many gentlemen come rom long distances. They are not accustomed to this excitement. [Time.] It is time I am talking about. You go to this dinner. There is speech-making at the dinner, and how the President can stand it I do not know. Then there are the rich dishes and wines. I say t is not desirable that persons past middle age should go in for this sort of thing. Ask your medical man. I trust the arrangements that the Council will make n future will be more in accordance with medical cience, and there will not be so much of this racing. protest against it. If you hear of a sudden death r ill health you will not attribute it to anything of his kind, but I say it is just the proper thing to do if you want to bring on disease.

Mr. **Symes** (Liverpool): I quite agree with Mr. Giles hat this is an occasion on which we should be jubiant, and should not be hypercritical about the affairs f the Society. I take it, however, that on a jubilee ccasion it would be unwise to look smilingly on what we have accomplished, and to feel satisfied hat nothing more could be done, and that if there re any matters connected with the Society or with this meeting which will require looking into, that you yourselves might perhaps welcome any suggestion thereupon. I have not the report before me, but I remember you made a remark with regard to the Pharmacopœia. We have grown very jubilant over the fact that the Council and this Society have been invited to nominate certain persons to join in assisting in the preparation of the additions to the Pharmacopœia. There is nothing very novel about that. If I remember rightly, the Medical Council, ever since it has had the duty of framing the Pharmacopœia, has invited pharmacists, individuals, and bodies to assist them in carrying out the work; and very properly so. The position which the Council took for a number of years, and which many of us have always stood up for, and I hope always shall stand up for—I shall certainly, until I see it is wrong—is that we as pharmacists shall have a legal standing in framing the Pharmacopœia. As I understand in other countries, pharmacists are elected by the Government, or by those who have the ordering of the Pharmacopœia, and that they in their own personal right, or collectively as societies, have the power to assist and to vote on matters connected with the Pharmacopœia, and that they are not merely invited, as it were, to assist in framing it, and then very nicely thanked and patted on the shoulder, and told you have done very well, and we are much obliged to you. That is not a dignified position, and not a position that we should hold. I do believe that in accepting the position we have done we have rather drifted away from the position we have fought for for so many years, and I am sorry to see it. I do not say this from any disrespect to the Medical Council. I do not cavil at all at the courtesies which have passed between the two bodies, but I do say that the principle which was enunciated here, and which has been held by the Council for many years is that we should have a legal standing in framing the Pharmacopœia, and that we are gradually drifting away from it. I quite hoped that when you referred to the Pharmacy Act you would have answered the question which has come up publicly in connection with it: Why the Council have not thought it worth while to retain the right of calling a registered man a chemist and druggist? that is to say, why have we practically abandoned the title of chemist and druggist? At the present moment I believe any person who calls himself a chemist and druggist, but is not registered, is liable to prosecution. The large stores do not require to call themselves chemists and druggists. They are not interested in the question. They open a large store and make a chemist's and druggist's department, and their customers know quite well that they can get drugs from that department, and so they are not interested in the matter; but the man who is not qualified you prosecute, perhaps, and get a penalty from, and he converts himself into a store by taking unto himself seven other spirits worse, or at any rate, more ignorant of the business than himself, and to that man it is a great thing that he can call himself a chemist and druggist, because, otherwise, he would not be recognized as such. He has no store in reality. He is a man unqualified, who has taken another process than that of examination to convert himself into a chemist and druggist. He has a perfect right, as I understand, to write up chemist and druggist over his door, which is very valuable to him; and I understand the amended Act does not claim to prevent that man doing anything of the kind. I say it is obviously dishonest that he can do so. I do not say the Council have not considered the matter, because I know from my former experience of the Council that they give a great deal of consideration to matters of this kind which do not always appear, but I will ask the President to be good enough to explain why the Council have not thought it well to retain this title or fight for it. The other matter I would refer to is one of opinion probably; it may be only my own opinion, but I look at the Pharmacy Bill as I am afraid very many do, not with very much enthusiasm. I should not oppose it in any way, but I am bound to say I look on it as a weak measure, and I am rather surprised that a strong President like yourself should be satisfied with what is in that Bill. You call one clause in the Bill a consolidation clause, a clause for consolidating the Pharmaceutical Society. I do not think it does. I should have liked to see a real consolidation clause. I should have liked to have seen the whole craft consolidated. My view of the case is that until we can get the whole of the craft into the Society or into one body, we shall do very little good. As long as we are a minority, no matter how much we give ourselves credit for being important and all that sort of thing, numbers go for a great deal nowadays. A man is a man, whether a lord or a peasant, to a great extent. I am not speaking on political matters, because I am not a politician at all outside pharmacy. Still, numbers go for a great deal when any important matter is on the move. We find we have three or four thousand men who are members of this Society, and we have something like ten thousand outside, and we cannot get the ear of the Government, we cannot get the ear of anybody. If we had 14,000 members and associates—if the whole trade were consolidated, then I think we should get the ear of the Government, and we could demand our rights, and insist upon them in a great measure. If you had every man who is on the register a member of the Pharmaceutical Society of course there would be some black sheep amongst the flock, and some opponents, but still, nominally we should be one body, and very frequently those malcontents would do nothing. We shall come to that matter presently at the Special General Meeting, and I do not intend to speak on that, so that if I am trespassing in my remarks on that point now you must stop me. But I do believe the time has come when we should charge sufficient for our examinations. You have told us to-day it has been the hope of the Council for many years that we should have three examinations, or have the examination in three parts. A lad should go in for the Preliminary examination, or the Arts examination before apprenticeship; then there should be an Intermediate examination which should be passed by the youth during his apprenticeship, or as a junior assistant, which would be a most valuable examination that might be passed in the provinces, because it would be encouraging to him to go on with his studies. The great evil now in my experience is that a student passes his Arts examination, and has no encouragement for five or six years to study at all, because he knows he cannot go in for his Minor until he is twenty-one—he cannot pass before. But if you have an intermediate examination, and then the qualifying examination—I would not call it the Minor, I would call it the qualifying—and then you could have a Major for honours, if you please. But if you have a qualifying examination you should charge 8 or 10 guineas. I do not think it would be objected to. Men pay a great deal more to be crammed for the examination than as fees for the examination. They do not grumble about the cramming fee, and they do not grumble about the fees for the examination; they grumble because they have not the brains to pass, and they do not pass because they are not sufficiently qualified. I do say that sufficient fees ought be charged that when a man passes a qualifying examination he should be elected a member—he should not be asked if he would be a member—just as if he passes the College of Surgeons or Physicians, he is elected a member of that college, and no further charge is made. If whenever a man passes the examination he were elected a member (you might create a Fellowship for Major men, if you please), we should get the whole body into the Society, and we have a perfect right to ask for that. There is nothing wrong about it; there is nothing over-reaching. I believe it is mainly a question as to the Journal. We say it does not pay when a man has passed his examination to elect him a life member and give him the Journal for his £5. Why should you give him the Journal? I do not say it out of any disrespect to the Journal, but it should stand on its own merits. A member of the Society should be able to get the Journal for 10s. a year, and if he got it he would read it. We should not get men boasting here as they do sometimes that they do not take the wrapper off the Journal. A man who does not take the wrapper off the Journal does not know what is in it, and therefore he has no right to come here and say there is nothing in it worth reading. If the circulation were a few thousands less than it is it would not hurt us very much, but I do believe that if we could come to some arrangement by which without asking a man for an annual subscription we could elect him a life member of the Society, that would be a consolidation of the Society, and I do hope I may yet live to see the day when that may be accomplished.

The PRESIDENT: I should like to interpose for a moment just to appeal to my friend Mr. Symes what a splendid illustration this is of the fact that he does not quite mean what he said at the commencement of his speech. He said he felt lukewarm about the Bill, and he has been telling us about the advantages of having several stages of the examination. Now it is the power of getting those things which is the very thing we have in the Bill, and yet he says he is not enthusiastic about it.

Mr. BARNARD: I have been very much pleased with Mr. Symes's speech. It has always been my impression that the Society should consist of apprentices, assistants and qualified men in business. So far as the two classes and two sections were concerned, the real object of the founders of the Society was that we should have assistants, and they should be men of business, but unfortunately we have heard from our President to-day that he positively sets his face against qualifying in any shape or form of assistants.

The PRESIDENT: No, no, I beg your pardon.

Mr. BARNARD: Barring the Minor.

The PRESIDENT: No. It is a claim on the part of certain persons not examined to become registered assistants capable of carrying on shops in the absence of the principal.

Mr. BARNARD: Then the suggestion of Mr. Symes is still further to the point. Could not the Council set itself to work to create some kind of examination whereby all assistants should be examined and registered as assistants? I do not advocate that outside men should come into the Society, but what I do say is that as there is a large body of men outside who would probably pass easily an examination which would render them well qualified as assistants. This would virtually assist members of the Society in selecting their assistants. The difficulty is for a man to get an assistant. You may think it right or wrong, but I myself am now seeking amongst three of the large wholesale houses to obtain a qualified man in a branch business as a junior assistant, and I have been doing that for the past three weeks, and have not had a single applicant apply to me, and I offer a very fair salary too. Therefore you see absolutely in the interests of members of the Society it is necessary that an examination for assistants should be created. There is a great amount of ill-feeling created in the case of men who might be members of the Society, who are looked upon as black sheep, because they are employing what I call unqualified assistants. I feel certain—and I am one of the divisional secretaries, and speak from knowledge of the fact—that they seem to think in this way:—If I join the Society I must comply to the very letter with the whole of the regulations and conditions that are legally laid down by the Society, and I dare not—I should not wish to be a member of the Society and then employ in my shop assistants who are not legally qualified to act as assistants. This is where the great difficulty comes in. I feel quite certain if the Council could see its way clear to make some qualifying examination for assistants and apprentices, or to create some new qualification for assistants, then every man would become an apprentice of the Society and an assistant of the Society, and virtually he would follow on and become a member of the Society, and every man then in the employ of a chemist and druggist would hold one of the qualifications, and be connected with the Society. I do really hope the Council will very earnestly consider this question of creating some examination, whereby young men should be recognized as competent to act as assistants to chemists and druggists, and have the necessary qualification given them through this Society.

Mr. Symes: You excited a little laughter, sir, by saying I was lukewarm about the Bill, and yet somewhat enthusiastic about the examinations. My lukewarmness is because it is not a sufficiently thorough Bill to accomplish what I advocate. If the Bill passes it does not purport to bring every man into the Society.

The President: Without the Bill passes you cannot get what you are asking for.

Mr. Symes: And even if it does pass you cannot.

The President: We are asking in that Bill for the very powers you have been eulogizing. That is my answer.

Mr. Long: I am afraid it is almost too late to propose that we should adjourn for the Derby, is it not? One gentleman was lamenting the small number that we have here to-day, but perhaps the grand national carnival may have something to do with it, and so I would suggest that perhaps you would be kind enough to avoid having the general meeting on Derby Day in future. I dare say a great many of you gentlemen have received this little brochure, "How do I stand?" This is our Jubilee year, and how do we stand? That is the question. I do not want to be a pessimist, and I wish as far as I possibly can to do everything I can for the Society; but at the same time I do not think, Mr. President, we are any better off than we were before the Society was established. In this way. I say each individual member of the Society has greater difficulty in getting his living. At that time the chemist was the man who supplied the physic, and although everybody could be a chemist, nobody ever thought of doing so unless they had previously been through the mill and understood it. Now that the Society has done good it would be perfectly futile to attempt to deny; but there were four things put before us. There was education, qualification, benevolence and trade interests. Now trade interests have never entered the heads of any Council that ever sat in this house; they ignored it altogether. If they had stuck more to trade interests it would have been better. Other interests were represented, but the chemist is not. Now I declare at the present day that the majority of chemists are not more thought of than crossing-sweepers or chimney-sweeps; they are not respected, not paid any attention to. Of course the thing about it is this; if the Society had been more energetic it would have attracted the members; the great curse we suffer under is apathy. What we want and what I have endeavoured to promote is unity, that is the thing. If, as Mr. Symes and other speakers have said, all men would come in, if they would only join the Society, they could stand up and demand anything they liked. We do not occupy our proper position. We have no business to go bothering about this Bill; the Government ought to introduce the Bill. The fact is we have such an uninterested lot to deal with, who do not care what happens, that until apathy is swept away, and men do take an interest in their calling, the improvements we seek will never take place. In the past we have done splendidly scientifically, but commercially we have done very badly. You talk about free trade, but it is nothing of the kind. Free trade means importing articles without duty; it does not mean that one man shall trespass on another man's ground. Why should not I go and collect the Duke of Wesminster's rents, if the Duke of Westminster has a right to go and interfere with me, and take my business away which I am legally entitled to: therefore I hope it will go forth to those who are not in connection with this Society that they must join it. It is no use talking about what has the Society done for me. Mr. Fitch, of Hackney, asked a gentleman in his district, "Do you belong to the Society?" "No," he said, "What has the Society done for me?" Then he said, "What has the noble Order of Foresters done for you?" and he said, "Nothing," but he did not belong to it. Mr. Fitch said, "Do you belong to the Pharmaceutical Society?" He said, "No." "Then what can you expect the Society to do for you?"

Mr. Shenstone: I will not occupy much of your time, gentlemen, but I should like to make a few remarks. In the first place, one point spoken of in the report, and also by several speakers, is the advantage which will accrue by consolidating the Society and by enlarging its scope and including as many members as possible. Now I hope you will not think it intruding on your time, though possibly it may savour of conceit, if I mention that I happen to be the president of a society, a small one it is true, but one which I think I may possibly claim to have set an example to provincial pharmacists at any rate which can scarcely be equalled. It is a very small society, but, like this Society, it has reached its Jubilee. Amongst the founders of that Society was my predecessor in my own business, and I am not sure it was not founded a few weeks before this Society, and that we did not claim the privilege of congratulating this one upon the foundation. In the town in which I live I believe the greatest number of chemists during fifty years has been ten, but it has never gone below six, and seldom below eight. Our meetings are held twice a year, and we have always had at least two-thirds present at those meetings; they have always been very much appreciated, and those who were away have not been absent from want of interest. We have never attempted anything very high, for after all what can ten men do in lecturing, in writing, or in matters of that kind; but we have seen exactly what we could do, and have done our best to accomplish it. I venture to think that so far as it goes it has not been altogether futile, for it certainly has done this; it has not prevented competition, for competition is healthy and right, but it has prevented unfair competition, and it has done away with a great deal of that heart-rending feeling among our smaller members whenever any change has been necessary—that feeling that they may be crushed out by the larger ones, because it has enabled them to estimate exactly the true value of the change. It has enabled us to watch the greater changes going on in the country at large which materially affect us, and helped us by comparing notes to obtain useful knowledge about any such change and to test its true value, and I believe it has done considerable good in that way. I believe also that it is due to this Society that from our town considering its size the Pharmaceutical Society has received very strong support. I believe the large majority if not all have been connected with the Society. I will not take up more time about that, but I thought that you would excuse this little sketch of what our small society have done in the past. Now one or two words with regard to the business in hand, and if they are trifling I hope you will take it as a proof that there is not much to find fault with. I strongly support the policy recently adopted by the Society, but in the first place I should like to make a slight suggestion in connection with the curriculum. I am entirely in favour of the Preliminary proposition, that is to say, I believe it would be doing a great kindness to many young men in insisting upon its being properly shown them that it is hopeless to come into our business unless they have a proper basis of education to go upon. I believe this is becoming more pressing, because I find in my own experience in business the details in our business are so enormously increasing, the number of medicaments are so many that our young fellows have less and less time and brain power to give up to things outside the actual business. That is to say it becomes more necessary that their attention should be concentrated on the business or upon technical subjects which can assist them in business, and therefore there should be an extension of the Preliminary examination. I also attach great importance to the Intermediate examination, but there is this difficulty, for some time at any rate in provincial towns, that after all they are lacking and must be for a time in the necessary means for young men to obtain the training necessary, and that being so, I should not give up the curriculum, but I should make it to a certain extent, not absolutely, compulsory. I would rather encourage it by making the third course which they must pursue at the Laboratory a longer one to those who have not passed the Intermediate than to those who show that they given attention to those subjects during their apprenticeship, and therefore require less preparation. In that way I would distinctly encourage them to go in for intermediate study rather than make it absolutely compulsory. One other point I may just allude to, which perhaps has not escaped the attention of our excellent President, though he has not alluded to it, for we know that sometimes when matters are suggested we find that they have already been well considered. Still there is no harm in my mentioning it. It seems to me very desirable if possible, and as soon as possible, to throw the same regulation over all medicinal compounds of the Pharmacopœia that at present apply to poisons, and my reason for that is simply this. The President alluded to the fact that we seemed rather to have turned the corner. I think we have done a little more, but at the same time in provincial towns at any rate we find that in some matters our scope is somewhat limited, and it is best to look the thing straight in the face. Now on those points, which the public have learnt through pharmaceutical laws to regard as the things which we professionally know about, namely, poisons, analytical work, and the more responsible parts of our business, the public have recognized the fact that if they go to the best man they must be prepared to pay higher fees, as they do to the doctor, lawyer, or other professional man than they do to a man they have less confidence in. But I do not find yet that that feeling has spread to the mere selling of pharmaceutical preparations, outside dispensing in the higher branches. We find still a leakage of that kind of thing into the hands of men not qualified for it. In all towns now you find a west end and an east end, and the consequence is a great deal of the business is done by carts and touters, who go round from house to house and take orders. The grocer's cart calls at a house, and if the people think they have not got a certain pharmaceutical preparation which they want, they will ask him to let them have it. The touter goes back with the order, and the grocer perhaps sends to the chemist for it, but when this is repeated several times he takes to getting it direct himself. The public are ignorant of the necessity for the man being responsible for these preparations, and thus the intention and spirit of the Pharmacopœia are entirely set at naught and this branch of the business is slipping away from us. I know we cannot ask the public really to grant us that as a protection, but I do feel now that we are reorganizing our curriculum and the public are beginning to realize the fact that it is necessary that the pharmacists should be educated in their business beyond other men, that they should go through a training. I do think that we should show the public how absolutely futile it is to insist on that, and then having provided educated men to say to them, Now you must enter into competition with the grocer, who knows nothing whatever about it; and after all we have to enter into competition with a man who simply keeps outside the Adulteration Act, and competes with you in price and so on, thus practically stultifying any benefit which the public may get from the curriculum.

Mr. ATKINSON: I think the Society has some reason for congratulation that it has arrived at a happier phase of pharmaceutical policy. Some reference has been made to the somewhat empty benches that we have here to-day. Well, gentlemen, last year a great many assembled here, many perhaps for the first time, for there had been a considerable amount of agitation throughout the country antecedent to the meeting, and that led up to that evangel of trade interests which we heard so much about. A number of us undoubtedly attended at the meeting with the idea that we should see something of quite a different character to what we had ever seen or heard before; it was supposed that the President and Council of the Society were going to be arraigned for all their misdeeds and for not doing a multitude of things which they never had the power to do. But those great warriors who should have attended the meeting were like other great warriors we have heard of before, they were sulking in their tents, they certainly were not here. There was no fight, no blue fire and no red fire, and so far as I can see the *personnel* of the Council remains pretty much as it was before. But I do think that some real good was done by that antecedent agitation. I believe in a certain manner it broke up the ground, and it prepared us also for that movement through the country which Mr. Carteighe so very nobly undertook. Whether we agree with Mr. Carteighe or not, gentlemen, I think there is no one of us who can withhold our commendation from him for the very handsome manner, at the sacrifice of time, energy, and money in which he upheld our interests. Now, gentlemen, I think there is one thing which is perhaps a little important. A certain amount of interest undoubtedly has been created throughout the country. I believe there has been more interest during the last twelve months in matters relating to the business than ever you saw before, but there is just this to consider. After this interest is excited there is too often a reflex action which leads to a greater condition of inertia than prevailed before, and I would like the meeting to take into consideration some measure by which you could prevent that. Keep up your agitation, and if you do that you will bring about that unity which is so necessary for our future welfare. A great deal has been said at many of the meetings held throughout the country, and a number of ideas have been promulgated, but I think we may safely say that they were all such chimerical matters it was not of the slightest use presenting them to a British House of Commons. I often think that perhaps the less legislation we have the better. Acts of Parliament we have found are very dangerous things to deal with. I think an Act of Parliament is very often like that curious weapon the boomerang handled by an unskilful man. You throw it out with the idea that you are going to deal a very deadly blow, but unfortunately it recoils, and you suffer the greatest injury. Therefore, gentlemen, I think perhaps the less you have to do with legislation the better, and rely a little more on personal effort. There are some things which have been called "trade interests" which the President has very properly said the Society as a Society has nothing whatever to do with. I think he rather deprecates the idea that it should ever sink into what I may call a trade protection Society. I think he is quite right there, but I do think there are some matters which are of trade importance, in which we do not get that enlightenment that we have a right to look for from the Society. I am not going to adduce a number of examples and trespass on the time of the meeting, but I will give an idea of what it is I do mean from a case that occurred, I think, two years ago, a somewhat important case. A chemist was summoned at the Mansion House for the sale of cough mixture which bore a proprietary stamp, but was not labelled "poison." I think we know pretty well what Mr. Gill had to say at the Mansion House on that occasion. He laid it down pretty emphatically what the legal opinion of the Treasury was with regard to that. I do not know that we have had any statement from the Council as to what our position is in relation to these things. There was a common understanding that the proprietary label really did away with the necessity for a poison label, but I think the contrary opinion appears to prevail now; but what I do consider is that we should have some definite information from the Society in relation to a matter of this importance. It is the custom in one house, perhaps, to send out a potent preparation without a poison label, whilst others will label it "poison." I think it would be to our own advantage as traders, and to the public advantage, if we had more uniformity, and it is in this sense I think the Council might frequently be of great advantage to us in giving us an opinion on matters of common interest.

Mr. **Russell**: I would venture, sir, to ask one or two questions. Why the proposed Pharmacy Act does not extend further, I mean why it does not include the vendors of scheduled poisons, because it simply applies, as far as I read it, to dispensing poisons without any reference whatever to scheduled poisons. In my neighbourhood I was prepared to call meetings, and to put our heads together, and to have as strong a meeting as possible to enforce greater restrictions on the vending of scheduled poisons.

The **President**: You mean scheduled poisons with a stamp on.

Mr. **Russell**: No, not that alone. The Act does not include any vendor of poisons; it simply refers to a dispenser of poisons.

The **President**: This is simply an extension of the former Act; I think you are under a misapprehension. It does do what you were saying. It does not repeal the other; it simply leaves the other Act in force.

Mr. **Russell**: I am sorry to say that wiser heads than mine read it in the same way that I did.

The **President** At all events it is not the intention.

Mr. **Russell**: We were prepared to meet and argue the point how far we could make the Act more stringent, and not only my constituents but medical men, and some higher in authority still, were prepared to meet and argue upon the point that more stringent measures should be made as regards the vending of poisons. I need only say that when I had your answer to my inquiry that the Act could not extend further I quashed the meeting, and let things stand as they were. We are willing to support the Bill in every possible way, but it does not go far enough for us.

Mr. **Campkin** (Cambridge): May I be permitted as a country member to say a word or two, and I will not detain you long. I have had some experience in connection with the history of this Society, and also a Society which has been defunct for some years—the old United Society. There was a time when this Society was not looked upon with the favour by the trade that it is at the present time, but speaking on behalf of a great number of chemists in many parts of the country with whom I have had the pleasure to mix I may say that it is hoped that this being the Jubilee year of the Society it will become more thoroughly representative of the trade than it has been in the past. A gentleman here has spoken of the number of members and alluded to the numbers outside. With reference to legislation he pointed out that in going to Parliament (which is sometimes rather a dangerous thing to do, because once having begun to bring in Acts you open the floodgates to a series of amendments which may be very vexatious), it is necessary to endeavour to secure a consensus of the entire trade before proceeding to any legislation. It may be said, and is said, that the Society does not represent the trade. Of course, as it was well put by a gentleman here, the trade have no reason to complain if they are not members of the Society. They should be members; but then how are we going to secure that? I would impress upon the Society the necessity, if possible, of urging—through the local secretaries and in other ways—upon every member of the trade in every part of the country to join the Society under one name or the other. There are a great number who would probably be only too glad to come in, and if the local secretaries would apply themselves to this matter in their localities, those who are not members might enter. There are, too, large numbers of assistants who would doubtless like to become members under some name or other, so as to be brought more directly in touch with this Society. Another means of bringing apprentices more directly into touch with the Society might not operate favourably to the existing members; but we are not legislating for to-day alone, but for all time, and the sooner we begin to extend the operations of the Society the better, so that within perhaps the next generation there shall not be a chemist in the country who is not a member in some way or other. It has been pointed out that if we were a united body of some 14,000, we could then, if we wanted, go to Parliament with greater strength than we can as a minority of the members of the trade. There are many other matters, some of which you mentioned in your speech this morning, and which have been mentioned by others with reference to the trade; and perhaps the majority of gentlemen present belong to London, in which case they probably have not a knowledge of the difficulties that beset country chemists. Hence we ought to be able to bring to bear our influence, and see if we can obtain a general understanding among the members as to what is required in the way of legislation. Of course, we have much to contend against in the way of competition, and the sale of poisons by those who are outside the trade, and who have no qualifications or experience, and also the vending of patent medicines in the same way under our very noses in all parts of the country, are growing evils. These things are vended by grocers' assistants and errand boys, and the public may go and purchase of an errand boy a bottle of some dangerous patent medicine. I know that this question has interested you in times past, and you have had it under your consideration. I will not further detain you. I rose more for the purpose of asking a question on a point which I gather will be discussed at the special meeting to be held presently, and so perhaps I must reserve any further questions with reference to the desirability of modifying or altering the existing bye-laws. Those are details that I take it we do not bind ourselves to by passing the report now. I thank you very much for the kind and courteous attention you have given to me. I trust our Jubilee will be one of general rejoicing, and I do look forward to the time—it may not come in my time—when the chemists of England, whether as pharmaceutical chemists, as ordinary members, chemists and druggists or otherwise, shall be as united a body as the medical men and physicians.

Mr. **Bland**: Long speeches are not required at a meeting of this kind, which we look upon as our annual parliament, when subjects of legislation, and also of judicature come under consideration. I am very happy to say that the counter attraction of which some have already spoken, and some have, no doubt, thought of, has not prevented you from being in your accustomed chair, which would have been quite a deprivation and calamity to this meeting. Now with respect to legislation, on looking back to the history of the Pharmaceutical Society, I am very much of the opinion of the gentleman who said that legislation is a very doubtful benefit to us. I look upon the whole course of legislation which has taken place during the existence of the Pharmaceutical Society, and I find that it consists mainly of a continual increase of restriction and bondage upon those who have taken some means to educate and qualify themselves for the duties of their profession, and taking off every restriction from those who are their enemies, and who are living by poaching on the legitimate province of the chemist and druggist. We have occupied altogether a wrong position in legislation. We have been placed under the tutelage of so many dry nurses that we have been well nigh suffocated with the swaddling clothes of restriction they have placed upon us, and it is well for us that we have been able to maintain even an existence at all. I will just mention a few of the bodies into whose hands our interests have been placed. First of all there is the Medical Council; then there is the House of Commons; then there is the Privy Council; the Board of Inland Revenue; and there are surveyors and inspectors, and I know not what officers besides. I daresay the recollection of other gentlemen will furnish other instances. We cannot take a turn without finding some official bumble at our elbow to tell us what we may do, and what we may not do. Instead of our being placed in the management of our own affairs and of that legislation which ought to regulate our duties to the public the consideration of such matters is placed in the hands of other people. I ask you whether the members of Parliament, the Medical Council, the Privy Council, or any of the other imperial officials, know more about pharmacy than we do, or are they better qualified to understand the relations of pharmacy to the interests and safety of the public than we are? Yet we have every one of those bodies dictating to us what course we should pursue, and what we should do, and what we should not do. I say this is a great grievance, and one of the first things we ought to do is to make such representations with regard to the salient grievances under which we labour to the House of Commons as shall get an alteration of the law. I might refer to the report of Dr. Stevenson, which is mentioned in the report on the table. What does his complaint amount to? That certain incompetent students presented themselves for examination and that they were very properly rejected by the examiners. Is that a ground of complaint? It simply shows that the examiners have done their duty. You cannot prevent any incompetent individual from presenting himself for examination, and if the examiners understand their duty and do it properly, why then the result is that such a candidate is rejected. Let him go and resume his studies or take some other occupation. It is his look out, and I do not think that in any way the Society should be held responsible for it. Then there is another thing with regard to the curriculum, or that which stands as a substitute for it in the present Pharmacy Bill. I think it is much more practicable and reasonable than that which was proposed some years ago, but I would beg to point out one omission which I am surprised the promoters of the Pharmacy Bill have not included in the curriculum —I mean the art of blowing the trumpet, which has so large an influence on the present state of our trade and business. You know there are several senses in which you can blow the trumpet, and I believe there is one of our esteemed members who can produce very pleasing sounds from a crooked brass tube, but that is not the sort of blowing the trumpet I mean. I mean the sort of blowing the trumpet in which our American brethren are so great that I am quite certain they are entitled to bear away the palm. Such is their native modesty and the absolute veracity of all their public announcements and newspapers that we may still take them in a certain sense as examples, although I must acknowledge that some of our English brethren do not come very far behind them. There were several highly honoured names which Mr. Giles mentioned to us just now, and there are others which he did not mention of men equally competent and eminent in their day, but I do not think any of them would have passed their examination in blowing the trumpet. They were men of a very different character, and owed their success and the admiration with which they were rewarded to very different qualities. I cannot help expressing my great regret at the legal interpretation put on the phrase sale of poisons, that the seller of a poison is the person who absolutely delivers over something which is not his property to the customer, perhaps taking the money for it and perhaps not—at all events he derives no pecuniary profit from the transaction. Well, sir, when I see that the word "seller" has been very distinctly defined in another section of the Act, I think it is quite unreasonable and contrary to common sense to say that the word "seller" can bear such an interpretation as that which has been put upon it by a very high legal authority. I can only say that so far as I can see it may be good law, but it is really contrary to common sense, and more than that, it opens the door to our adversaries. If that really be the legal and proper meaning of the word "seller," I question if there is a gentleman in this room who is not liable for selling poisons under this Act. Supposing in your absence from business here to-day some person were to go into the establishment in which you are interested and get an ounce of oxalic acid. Well you would say, I have a qualified assistant to serve him. But has your qualified assistant got a label printed to put on the parcel with his name and address on it? because if he has not, and he sells the poison, he certainly sells it contrary to the working of the Act and is therefore liable to prosecution. I am very sorry to occupy the time of the meeting so long, but this point has pressed on my mind so much that I felt bound to mention it.

Mr. **Pickard**: I should be very glad if the fees could be so arranged that at the time of the passing of the examinations the sums paid by the candidates might be brought into the Society's coffers in sufficient amounts to recompense the Society for the outlay which it has to make from year in maintaining the egister, and in performing various other duties which it at present performs quite gratuitously for members, a large majority of whom, I am sorry to say, remain completely outside the Society. With regard to the Journal I think the suggestion of Mr. Symes is worthy of every consideration. Let the Journal stand on its own merits. I think we should get better Journals, which the members will read more carefully and take more interest in. I believe Mr. Bland is raising a mare's nest with regard to the labelling of poisons, as that is a matter perfectly well taken care of in the labelling section, which provides that the name and address of the person on whose behalf the sale is made is the seller, and not the person who actually hands it over.

The PRESIDENT: There are one or two points upon which I should have commented in my introductory observations. It will be remembered that under the new arrangement for voting for Local Secretaries, it was suggested a year ago that the election of Local Secretaries should be separated from the election of the Council. I do not think it necessary to create what some may deem antagonism in regard to particular persons in any particular town or centre, but anything which tends to furnish an excuse for bringing about meetings in any town is desirable. On this particular occasion, at a very large number of the centres for which Local Secretaries were appointed, meetings were held beforehand, and the question as to who were the best men to elect as representatives was discussed. That I consider is a beneficial thing, and anything that tends to bring the members of the Society together is sure to prove of service. Another question to be considered was with regard to the appointment of Divisional Secretaries. I am sorry I did not refer to it, because I do not wish to do anything to damp the ardour of officers who are practically my right hand men, and who have been at my elbow two or three times a year since their appointment. The Divisional Secretaries of London, as you know, are appointed on a tentative plan by the Council, and the Council will probably have to consider whether it would not be desirable to allow the local body to make their own election, in order that greater interest may be created in their meetings. That is a question rather for the Divisional Secretaries themselves, and probably they will meet the new President and Council later on, and confer with them on the subject. I know that the feeling of my colleagues distinctly is that they will be guided by the wishes of the Divisional Secretaries themselves in the matter. The result of the discussions which we have had shows, on the whole, that we are proceeding on right lines. It is particularly gratifying to me, as President, to hear Mr. Atkinson's polite observations, and a straightforward remark to the effect that if one does not agree with the President, at least one may talk to him, is a remark, which can be dealt with. Mr. Atkinson says a great many people do not agree with the President and Council. That is true, but it is because they did not know as much as the President and Council do about the details of the work. It takes a lifetime almost to learn. It is a matter of executive, and the ideal Society which Mr. Atkinson sees in the future must be a Society which, having relegated certain powers to the executive, leaves that body to deal with it. That is what Mr. Atkinson refers to. It is no use saying that statutory powers are wanted for this, that and the other, unless we exercise with regard to ourselves and our brethren true professional feeling. No statutory power will increase our prices, and no statutory power will increase the business unless we have with it the true professional feeling, which gains the respect of the public and the powers that be, because true professional feeling is a distinct something which everyone can understand. But, as has been very properly put by Mr. Shenstone, if we have statutory powers to create a semi-professional body, and that body chooses to ally itself with hucksters, what hope is there of raising the position of that body, and how can we hope the public will appreciate our endeavours? The fact is we absolutely throw ourselves away. We say we cannot do this, that and the other. I say you can. I say you ought to stand behind your counters and blow your own trumpets to the public. As Mr. Bland says: "Do it, you are justified in doing it." The public will not understand what you are and of what you are composed until it has been educated. There was a time when the apothecaries of old, and many other professional men too, were regarded in the same light as our own profession is. It is only by the general process of education that you can expect the public to appreciate our services, and if instead of standing on your first line of defence you were to set to work when anyone quarrels with you, and fight the battle out, the result would be satisfactory. If you throw up the cudgels at once and compete with any neighbouring grocer in all the preparations you sell the public is ready to kick you, and very rightly. It serves you right too. The Pharmaceutical Society may grow to be a power, but it cannot put backbone into men who will not have a backbone. I am sure I have done all I can to put some into every member of the Society. I am not ashamed of being a chemist and druggist, and I am not ashamed of telling the public I am a chemist and druggist. I am not ashamed of telling them I mean to be paid for my services, and I never fail to try and persuade the most troublesome customer that he is wrong and get him to apologize for any complaint as to price or anything else. There are others who could tell you things of the same kind. We must individually stand by our individual rights, and endeavour in that way to support our corporate rights, because in that respect the corporation cannot do much good. In regard to certain points that have been mentioned by Mr. Symes, as I said before, I confess I am a little disappointed with him. We want to get as nearly to an ideal arrangement as we can. He knows, for instance, that we cannot make a man a member of this Society at the present moment unless he is a pharmaceutical chemist, and therefore we want powers. He knows that we cannot divide the examinations; we cannot do this, that and the other without bye-laws based on the Act of Parliament, and if he does not know, let me tell him that powers are contained in the Bill by which we hope to accomplish very nearly all he suggests.

Mr. SYMES: No, no.

The PRESIDENT: Very well; I do not understand him. I give it up. In the first place we have been told over and over again that you cannot consolidate this Society unless every chemist and druggist can come into it as a registered member. Do you accept that, Mr. Symes? Can we do that without fresh powers?

Mr. SYMES: It is useless my arguing the case. I say you do not ask for the powers. If you get your Bill through and accomplish what you ask, I say you do not get power to do what I advocate. That is obvious.

The PRESIDENT: Obvious that in the Bill itself you do not get all you ask for, but it is obvious that you cannot get what you want without that Bill being passed. That is my answer to Mr. Symes.

Mr. SYMES: I say if it is passed it does not give you power to do what I ask for. You know that, sir.

The PRESIDENT: I do not understand you. I am utterly incapable of understanding you.

Mr. SYMES: I say we shall never consolidate the trade until an Act of Parliament is passed, whereby when a man passes his qualifying examination, you have power at once to make that man a member of the Society, and by that process you will get the whole of the trade or craft into the Society. Your Bill now does not ask for any such power, and therefore you will never accomplish by that Bill what I say is a desirable thing.

The PRESIDENT: I quite understand now, but I did not before. Mr. Symes would ask the Legislature to insist that when a man passes his examination he should become *de facto* a member of the Society as well as registered; whereas we propose to attain that end by asking for certain powers and putting them in by bye-laws; you would go by statute. That is the difference between us. We quite agree with Mr. Symes in respect to that. But I should like him to try his influence on a few of the Liverpool members as regards such a sweeping clause as he suggests being put into a statute. I should be very glad if we could venture to attack the difficulty in that way, but I am bound to say that I am capable of looking at the matter from what may be called a probationary point of view, and doing what we can by bye-law. I must remind Mr. Symes that it is contrary to the general spirit of legislation, and that there is a disinclination to put into any statute a power to compel a man to pay a sum of money to keep up a corporation. The solicitor will tell you that the Incorporated Law Society is very much in the same position as we are, and that there is a feeling on the part of Parliament that there should be provisions for examining men, putting them on registers; and then as regards joining a voluntary society like this it should be an entirely optional matter. The feeling is so strongly engrained in the breast of the Legislature that it will take, I am sure, another twenty-five years before we can get as far as that. But my point is this: we cannot attempt to reach this point unless we get more men into the Society to ask for it. Mr. Symes is in fact, by his argument, increasing the tendency outside to say, "We will not join you until you have done something to consolidate us;" whereas my position is, Come in and we can do something for you. That is the position to take. It is absolutely childish to raise any objections to consolidation as long as a man is outside. Let him come in and help shape the legislation, and help us to go to the House to get powers. That is the principle of the thing. If Mr. Symes thinks it is possible to attain what he requires, I put it to him to get every chemist and druggist in Liverpool to join the Society. Then we shall be very glad to listen to him. But would his colleagues in Liverpool agree with him? In the first place, I have grave doubt as to the members of the trade, and in the next place I have still graver doubts as to the members of Parliament themselves. What I do say is this, that it is desirable that the actual annual payment should be moderate, and above all that there should be a composition fee of moderate amount. When we come to the bye-laws I think I shall be able to show that is very nearly the point. Mr. Symes will remember that when he was a member of the Council he thought that twenty guineas would be a very good sum for the final fee, that is to say, for a Major certificate and a life membership of the Society. Practically that is what we are proposing by the bye-laws. When he gets to Liverpool and leaves the Council he forgets we are to some extent under the control and Government of the Privy Council. We have not the power to go beyond a certain extent in what is called fining members of the trade for carrying on a lawful business, the right to do which they have acquired by going through a certain course of training and examination. You have only a right to fine them up to a certain point. On the general principle that Mr. Symes inculcates I am quite sure that everyone in this room is agreed. What I object to as an executive officer is that one of my late colleagues should make it more difficult to get along by saying, when we are going in for half the loaf he likes he does not care a rap for the Bill. That is unfortunate. I object to any assistant who has been an assistant for a number of years being registered for certain purposes, having, in fact, powers given to him which are tantamount to making him a registered chemist and druggist, and I object also on your behalf to creating a new class of assistants. As this is a point which is constantly coming forward one must be clear about it. If you create a new class of assistants you will be doing what was done by the Legislature in 1868. You will have the class of assistants in another twenty-five years made by statute as persons capable of keeping open shop, and the assistants you create to-day will become your masters to-morrow, and then you will be worse off than you were before. I say put up with your difficulty about assistants; do your work yourselves, and charge for your own services in doing it, and do not look out for cheap unqualified, or partially qualified labour. These are the principles upon which pharmacy can be made to pay its way, and I am quite certain it cannot be made to pay on any other plan. With regard to Mr. Russell's observations, I think his interpretation of our intentions in the Bill are not strictly accurate, but I may say that in regard to the sale of proprietary medicines (and this was referred to by Mr. Atkinson also) containing poison, that subject is not lost sight of, and if I may say it without breaking a secret, the general feeling of my colleagues on the Council is that that question will have to be definitely settled by an action at law at the first convenient opportunity. I can assure Mr. Windsor that if we do not touch the question in the new Bill, it is because we think we are better off under the old one. We want to get a decision on the right lines, and we ask you to leave us to determine how and when that shall be done. Of course, gentlemen, if an attack of that sort is made by a public body, and we are called upon to take proceedings with regard to the sale of patent or proprietary medicines containing poison, we must bear our share of the responsibility when the decision is arrived at, because it will hit us all more or less. You cannot knock down your enemy, and then trample upon him and get rid of him; when you have knocked him down you find there is another phase of things coming into force which applies to ourselves—and some of us are not perhaps as careful with regard to labelling as we ought to be, having regard to the recent decision. The Council feel, and I heartily agree with it—that it is desirable in the interests of the public that one or two things should happen, either that there should be practically no necessity to label what are called proprietary medicines containing poison with the word "poison," or if it be necessary to do that that the sale should be by registered and qualified persons only. If we go before a law court and are unsuccessful in the latter part, Mr. Atkinson will see we are making the thing worse for ourselves. I for one do not want to see in grocers or hucksters shop windows every patent medicine exposed for sale at close prices, as it leads the public to believe that those persons are qualified sellers of poisons, and does us a deal of harm. The subject is not free from difficulty. Your Council is in possession of a number of data in connection with the subject, and is practically not losing sight of the matter. It is possible from communications we have had from one body and another that before the next annual meeting we may be called upon to take proceedings. But remember it will not do for us as a Society to go into a court of law, and say we want for our people a right to sell all the poison. If we do that we prejudice the judge against us at once, for he would say

You want a monopoly in this thing as well as other monopolies you have got." But if we are called pon by a responsible public body, or a Government epartment, to prosecute in the public interest, we pproach the law courts under conditions more avourable for the determination of a knotty question ike this. Therefore, what I submit to you is that n this particular part of the law question we must, or successful results to be accomplished, be more r less assisted by, or moved by, and helped by, some utside body, and be called upon to exercise these owers. I think Mr. Atkinson will see the force of hose observations. The same remark applies to Mr. Russell of Windsor. With regard to Mr. Pickard's bservations that he agrees with Mr. Symes, Mr. Pickard is one of those active divisional secretaries o whom I have referred, and I think he is quite ight. When you have certain powers it is awful o think what Mr. Symes would go for in Parliament. There is a talk of free education, but I ancy if anyone were to say that every person hould be a registered chemist and druggist people would be shocked. Let me once more remind you that veryone in this room, and out of it, is responsible for his own individual action, and the strength of the corporate body depends largely on the strength, firmness, udgment and good sense of every individual member. Before putting the resolution allow me with apologies to supplement my friend Mr. Giles's observations with what I should have said last night if we had not had so much to do. He very properly referred o some of the active founders of the Society—those who have held office and borne the heat and burden of the day. There is one curious matter of interest in connection with our friend, Mr. Thomas Hyde Hills, whose name is associated with us with regard to prizes, and who has made himself in fact the successor of Jacob Bell, so far as the Society went. There is this curious thing, which is a source of congratulation in one sense, although that congratulation is modified by the circumstances under which Mr. Hills at the present moment lies, that this very day is the anniversary of his birth. I can only say, I am afraid he will never be able to appreciate it, but we wish him in that future state which is supposed to be the greatest possible happiness. In the company which Mr. Giles referred to there is one man who, after Jacob Bell, deserves our admiration, namely, Mr. Sandford. If Jacob Bell was, as he undoubtedly was, the founder of this Society n the widest term, Sandford was the consolidator in the sense in which Mr. Giles referred to it. It s to Mr. Sandford's great credit that in 1866 and 1867 he actually proposed in the direction Mr. Symes s now moving, that every chemist and druggist should be a member, and we were obliged to oppose him, because our members, then pharmaceutical chemists, would not stand it. I mean to say that his far-sighted views with regard to the consolidation of the Society were right. I do not hesitate to say that those who nsisted upon that were wrong, and that Mr. Sandford at that time was absolutely right, and the best proof of that is that we are going to Parliament to get the very powers which Mr. Sandford proposed to get then. Many of you know that I do know something of my old chief Sandford, and it was very largely to his influence that I was induced to take an active interest in the work of the Society. I know of no man who in the most active and busiest times of the year—and Mr. Sandford had to work like many us—who would as he did give up his nights as well as his days for the interests of the Phamaceutical Society and the craft, and I know of no man with feelings more thoroughly imbued with the notion that patriotism was necessary in our body; notwithstanding all that, he would not tread on the toe or hurt the hair of an outside chemist and druggist n any proposed legislation. I go further and say what I think was an unwise thing from a general political point of view, to show his humanity in that direction, and goodness of heart, he positively refused to consent to a registration fee being fixed when the Pharmacy Act of 1868 was passed, because he would not have it. I said that the Pharmaceutical Society had gone to Parliament to obtain power to tax any man who was then in business. As a matter of fact, every chemist and druggist in Great Britain was registered at our expense for nothing, and in many cases has not contributed a sixpence to our revenue ever since. That was a great thing in principle, but the chemists and druggists no doubt would have appreciated it more if he had not been so magnanimous. But it was a proof of his goodness of heart and kindly feelings to his brethren in the trade. I should be sorry that the little sketch which Mr. Giles has brought forward should go forth to the members at large without expressing on our part our deep regret that Mr. George Webb Sandford is not amongst us, for although he is not seriously in bad health he is not well enough to come here, and our hope that for a long time he may have a happy life, free from suffering and pain.

Mr. GILES: I heartily agree with that.

The resolution for the adoption of the report and financial statement was then put and carried unanimously.

The PRESIDENT: Gentlemen, I am sorry to tell you that yesterday one of the founders and a past officer of the Society, Mr. Wm. Lionel Bird, a colleague of mine, died rather suddenly. With your permission I should like to ask you, as the members are assembled here, to allow me as the President to send a letter of condolence to his widow. Mr. Bird was a Vice-President of this Society for three or four years. He was on the Council with Mr. Bell, and he belonged to that band of hard-working men who did not talk much, but who did a great deal of work. I have the greatest possible respect for all the work he did for the Society.

The PRESIDENT then read a list of names of gentlemen who had been nominated to act as scrutineers, and their appointment was unanimously agreed to.

The PRESIDENT then called attention to the fact that the following registers had been laid upon the table in compliance with the provisions of the Act:—

- Register of Members, Associates, and Apprentices or Students of the Society.
- Register of all persons entitled to be registered under the Statute 1852.
- Register in accordance with the provisions of the Act of 1868 of all persons entitled to be registered under that Act.

APPOINTMENT OF AUDITORS.

The following gentlemen were appointed to act as auditors:—

LESCHER, FRANK HARWOOD, 60, Bartholomew Close London, E.C.
STACEY, SAMUEL LLOYD, 300, High Holborn, London.
UMNEY, CHARLES, 50, Southwark Street, London, S.E.
WATTS, WILLIAM MANNING, 32, Lower Whitecross Street, London, E.C.
YATES, FRANCIS, 64, Park Street, Southwark, London.

The meeting was then adjourned until 11 o'clock on Thursday.

SPECIAL GENERAL MEETING.

The SECRETARY read the notice conveying the meeting.

The PRESIDENT: Before proposing that the Bye-laws be approved, I wish to make a few preliminary observations. It will be necessary for me to put these

Bye-laws to you separately for your general approval, and then afterwards I must ask you to finally vote upon the whole draft. I think that we have practically incorporated in the report the main alterations in the draft. They are that the fine for restoration to membership, the minimum of which has been half a year's subscription hitherto, shall be reduced to a nominal sum; that the entrance fee of the chemist and druggist class appointed under the Act of 1868 shall be abolished altogether; that a class of corresponding members shall be created to meet the growing wants of the Society on its educational side (there being a certain number of foreigners and colonial brethren, who are desirous of becoming associated with us), and that the life composition member's fee shall be reduced to 10 guineas. I should like to call Mr. Symes's attention to that, but I do not see him in the room. Therefore, when a man passes his examination he can at once join the Society, pay ten guineas, and any subscription subsequently ends. The present fee is twenty guineas.

Mr. **Giles**: Does he get the Journal for that?

The **President**: Yes.

Mr. **Giles**: Does that pay?

The **President**: We think so.

Mr. **Giles**: I do not.

The **President**: Perhaps you do not, but we have considered that point in many ways. Then there are certain powers in regard to the examinations and examiners which are proposed to be created for the convenience of the Council in future years, and lastly we come to the fees for examinations. It is proposed that the fee for the local examination shall be increased to five guineas, and the Major fee reduced to three guineas. In the early days it was contemplated that a man in business should pay ten guineas, while an assistant should pay only five guineas, and it was always supposed the assistant would become the master. In 1868, thanks to our friends the members of the United Society of Chemists and Druggists, we had to take the qualification of the chemist and druggist as a standpoint, and begin at the bottom again, and I am not sure that we have even now got much further than we were in 1868. Then it is proposed, at the suggestion of the visitor of the Privy Council, to add as a subject for examination of the Minor, a knowledge of the law relating to the sale of poisons. That applies not only to the ordinary Minor examination, but to the modified. The notion is that the young apprentice of the future will understand Section 17 better if he has been examined in it, and will understand a good deal more of what it deals with. It is strongly felt by the Privy Council that we should follow the precedent of foreign countries, where, as you know, a knowledge of the legal part of the rules which guide his calling is insisted upon as part of the qualification of every student.

Mr. **Normal**: If it were possible I think it would be very desirable that the Preliminary examination should be passed before apprenticeship, but I believe you say, sir, it cannot be done.

The **President**: We cannot do that at present.

The several Bye-laws were then proceeded with and discussed.

On Section 5.

Mr. **Normal**: Would not it be better if this section read "one-third of the Council" to go out and not two-thirds?

The **President**: Under the present state of the law we cannot do that. We are proposing to alter it, but now the Bye-laws must be in accordance with the old Act.

On No. 6, Section 5—

Mr. **Andrews**: I think it would be an advantage if members were allowed to put voting papers into the box for other members who might not be able to be present at the actual time of voting, and who thus lose their votes.

Mr. **Allen**: I should not like to see anything of that kind, because it might lead to great difficulty. I can fancy that if such a thing were to be sanctioned, that at an election a man might collect proxies and put them into the box, when after all the members whose proxy had been collected would on further consideration, perhaps, vote differently.

Mr. **Normal**: I do not think such a thing as is suggested by Mr. Andrews has ever been done in any society.

The **President**: There is something in Mr. Andrews' suggestion, but the fact is that the 1852 Act is so worded that we have no power to deal with the matter in the Bye-laws.

A **Member**: A proxy wants a stamp, too, I believe.

Mr. **Robinson**; There can be no effective amendment in the Bye-laws proposed to-day. There is no power in this meeting, without notice, to amend or alter any of these Bye-laws.

On Section 12—

Mr. **Stark**: The question which I have to bring before you on this section is one which has been the subject of a prolonged controversy in the *Pharmaceutical Journal*, viz., the question of the Preliminary examination. My reason for raising it is this, that notwithstanding that the hand of reform has been tolerably busy in many other respects the Preliminary examination is unaltered and remains the same as it was on the day the Society was started. That has always seemed to me and many others a curious anomaly. I suppose it is not contested that a Preliminary examination represents, as it ought to do, the amount of knowledge one ought to have before going into the Minor and Major examinations, but whereas the latter examinations have been altered and made much stiffer than they were there is no alteration in the Preliminary examination. I contend that the amount of knowledge one is obliged to have for passing the present Preliminary examination is not sufficient to properly enable him to grasp the subjects which are comprised in the new Minor and Major examinations. There is another fact which strikes me as being very significant. When the prizes are given away it is customary for the Examiner in congratulating the successful candidate to lay stress on the fact that he possesses a liberal examination. I do not suppose the majority of chemists are not, but at the same time if a point is to be made of that there must be something more. I am not bringing forward any motion or resolution upon this matter. My object is simply to bring it forward so that it may be discussed by wiser heads than mine, and to ask the Council to give the subject their most careful consideration.

Mr. **Andrews**: I wish to express my entire concurrence with the views of Mr. Stark.

The **President**: So do I, but there are some statutory difficulties about the matter which at present cannot be dealt with. I am sure that Mr. Stark will understand that he has the sympathy of everyone who takes an interest in our work. The matter shall receive due consideration, and I am quite sure we shall be happy to be able to make a move in that direction.

Mr. **Ekin**: I think, sir, you certainly might go further in enforcing the Preliminary on the lines we already proceed on. As an old examiner I have been frequently pained to find men coming up to be examined who could not do the commonest sum in arithmetic. I remember going to see someone at the College of Preceptors, and it was pressed upon us to be more careful and not to go in for an exaggerated standard, but from what I can learn I am afraid there is no improvement at the present time.

Mr. **Shepheard**: Might I suggest that the Preliminary examination should be passed before apprenticehip. I think that would prove of immense advantage o the members of the Society and to the poor fellows who work on year after year and who then find it impossible to pass and that they are perfectly incompetent or the work they have undertaken.

Mr. Atkins: I should like to say one word on this ubject. I am extremely glad that this important matter has received some further consideration, and I ave been very much pleased, and wish to take this pportunity of expressing my pleasure with the most areful analysis in Mr. Saul's paper on that matter. If we can judge by the amount of criticism it has called orth no such paper has created so much interest efore, and I venture, as one who long years ago took p a somewhat strong position on this question to say hat we must level up from the very foundation. An dditional reason for that which forces itself on my mind in these later days is the marvellous growth of lementary education. The fact is that our errand boys at the present time are very close on the heels of our apprentices, and if we are to maintain that position which our young men ought to occupy we must commence at the lowest point. I thank Mr. Stark, as representing the Assistants of London, for bringing this matter forward. I will not say more, except that I believe in the changes which are impending in regard to the Major and Minor examinations, and I think we shall be false to our profession if we do not all in our power to reform the Preliminary examination. I should like to see that examination made compulsory before apprenticeship.

Mr. Giles: You must not overlook what is the character of Preliminary examinations in other professions. Something has been said about making the examination such as it is real. It is absurd as at present that 40 per cent. should qualify to pass, as I am told.

The President: It is 40 per cent. in the subject, but 50 per cent. in the aggregate.

Mr. Giles: It makes a difference I agree, but I do submit that you ought to require in a very elementary kind of examination something like sound proficiency on the proposed schedule required by the statute.

The President: This remains practically as it was before, with the addition of the subject referred to in my introductory remarks, that is a knowledge of the law relating to the sale of poisons.

Mr. Andrews: You cannot have many more candidates for the Modified.

The President: We have many more eligible, but whether they are dead or living we do not know. They have sent in their names and there they remain.

Mr. Campkin: There is one question in which I am rather interested, and that is with reference to the alteration of examination fees of the Minors from three to five guineas. I take it that the Council is unanimously of opinion that that should be done, and it may be that this meeting is, but I think, however good it may be, it is rather a serious thing for a great number of young men whose friends are not in the best of positions to raise the fee from three to five guineas? Then in the case of failure do I understand that a Minor would have to pay the sum of £5 for re-entry?

The President: Yes.

Mr. Campkin: Are you not prepared to recommend a smaller sum than that?

The President: I am obliged to Mr. Campkin for having raised the question. The fact is that we have for a great many years, I am afraid, been a little too sensitive, like he is at this moment with regard to the poor man coming up for examination. Our experience is that it is better for the candidate that certain difficulties should be put in his way before he comes up for examination. We find men coming up for examination who are wholly unprepared for it, and who throw their money away to try it on. But really, apart from any question of how much a Minor should pay for examination and registry, I believe the effect will be salutary, and the broad result I hope will be that we shall have fewer examinations. Our examinations are numerous because we have to re-examine the men over and over again, and if this alteration of the fees tends to show men that they must not come before us until they are prepared it will be of great use, and I am sure it will pay them better. Then after all one must remember that money in all professions is a qualification. We are always ready to help the deserving man, but still with regard to these fees I think the effect will be salutary on the men themselves. With your permission I now beg to move—

"That the new Bye-laws submitted to the special general meeting be confirmed and approved."

The Vice-President: I beg to second the motion.

The motion was put and carried unanimously.

Mr. Giles: I should like before the meeting disperses to propose a complimentary vote to our President. He manages the meeting with wonderful courtesy and dispatch, and whenever any question is raised he shows an extraordinary command of all subjects that he deals with.

The motion, having been seconded, was put and carried unanimously.

The President: Gentlemen, I thank you on the part of my colleagues and myself for your kindness. I assure you we feel that the warmth with which you have paid us this compliment is a double acknowledgment of your approval of the way in which the Executive has carried out its duties. We have just received a telegram, announcing that one of our best officers and an active man in all fights for the good of this Society and the trade, has died suddenly. I refer to the late Mr. Brown, of Manchester. Every one remembers how combative for interests of a particular kind and how combative for the defence of this Society he was; and I am sure we should like it to be reported before we separate that we express our regret at his sudden decease, and express to his nephew who represents him our appreciation of his worth to the Society.

Mr. Giles: He was a singularly able man.

ADJOURNED GENERAL MEETING.

Thursday, May 28.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The adjourned meeting for receiving the report of the Scrutineers was held on Thursday, May 28.

The Chairman of the Scrutineers, Mr. E. N. Butt, read the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the Fiftieth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following:—

Voting papers reported by the Secretary to have been issued		3444
Voting papers received		1226
Voting papers issued but not returned		2218
Voting papers received		1226
Voting papers disallowed:—		
Informal	6	
Received by post too late	52	
		58
Voting papers registered		1168

Result of the Poll.

Martindale	1072	Schacht	1013
Atkins	1060	Allen	1008
Bottle	1051	Leigh	999
Greenish	1048	Watt	942
Abraham	1037	Harrison	869
Gostling	1035		
Southall	1034		
Newsholme	1030	Botwood	498
Cross	1018	Spink	343

E. N. BUTT, *Chairman.*

JOHN C. UMNEY.
T. A. ELLWOOD.
SIDNEY E. TENCH.
ALBERT COOPER.
HENRY C. BIRCH.
RICHD. W. GILES.
F. C. NEVE.
JAMES H. GRADIDGE.
W. MURTON HOLMES.
F. BASCOMBE.
W. PICKARD.
THOS. HENRY POWELL.
T. H. BATEMAN.
R. FISHER YOUNG.
LEO. ATKINSON.
D. R. JACKS.
H. BATE.
FREDERICK ANDREWS.

THE NEW COUNCIL.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing year:—

ABRAHAM, ALFRED CLAY, 87, Bold Street, Liverpool.
ALLEN, CHARLES BOWEN, 20, High Road, Kilburn, London, N.W.
ATKINS, SAMUEL RALPH, Market Place, Salisbury.
BOTTLE, ALEXANDER, 37, Townwall Street, Dover.
CARTEIGHE, MICHAEL, 180, New Bond St., London, W.
CROSS, WILLIAM GOWEN, Mardol, Shrewsbury.
EVANS, GWILYM, 7, Stepney Street, Llanelly.
GOSTLING, THOMAS PRESTON, Market Hill, Diss.
GREENISH, THOMAS, 20, New St., Dorset Sq., N.W.
HAMPSON, ROBERT, 31, Baalbec Rd., Highbury Pl., N
HARRISON, JOHN, 33, Bridge Street, Sunderland.
HILLS, WALTER, 225, Oxford Street, London, W.
LEIGH, MARSHALL, 46, Dyke Road, Brighton.
MARTINDALE, WILLIAM, 10, New Cavendish St., W.
NEWSHOLME, GEORGE THOMAS WILKINSON, 74, Market Place, Sheffield.
RICHARDSON, JOHN GEORGE FREDERICK, Elmfield, Knighton, Leicester.
SCHACHT, GEORGE FREDERICK, 52, Royal York Crescent, Clifton, Bristol.
SOUTHALL, ALFRED, 17, Bull Street, Birmingham.
STORRAR, DAVID, 228, High Street, Kirkcaldy, N.B.
WARREN, WILLIAM, 24, Russell Street, Covent Garden, W.C.
WATT, JAMES, High Street, Haddington, N.B.

On the motion of the President, a vote of thanks was awarded to the Scrutineers for their services, and the proceedings then terminated.

THE JUBILEE DINNER.

The Jubilee Dinner of the Pharmaceutical Society was held on Wednesday evening last, at the Criterion Restaurant, when upwards of three hundred members and friends, including many distinguished men, both English and Foreign, assembled. During the dinner the band of the Grenadier Guards performed a choice selection of music.

After dinner, "The Health of the Queen" having been proposed and drunk in the usual loyal manner,

The PRESIDENT proposed "The Founders of the Pharmaceutical Society." Having already said a good deal about them on the previous evening, he need only add that whereas in some societies it was necessary for many reasons that this toast should be drunk in silence, he was glad to say that there were still living about twenty founders of the Pharmaceutical Society, one of whom was in such excellent health that he was present at those festivities, and he begged to couple with the toast the name of Mr. Edward Horner.

Mr. EDWARD HORNER, in responding, referred to the fact that the firm with which he was connected had been established in Bucklersbury since before the fire of London, and for the last 140 years the name had been continued without a single break. Since the foundation of this Society there had been a great improvement in the position of chemists, who were now not merely men of business, but men of science-professional men.

The PRESIDENT next proposed "The Houses of Parliament," coupled with the name of Mr. Gainsford Bruce, Q.C., M.P.

Mr. GAINSFORD BRUCE, M.P., in responding, said he found himself called upon rather unexpectedly, as a much more distinguished member was present who he thought would have responded to the toast, but he found that he was reserved for higher things. The Upper House needed nothing to be said in its favour, for it always had a place in the hearts of Englishmen. With reference to the House of Commons it was what the people made it, and therefore they could never find fault with it. They sat there very late, and very early, and did very little. There was a Bill there which the President, and many members of the Society were much interested in, and which he should like to see passed, affecting as it did the education of the younger members of the profession. That Bill appeared year after year, and did not get much further, and no doubt some might think the House of Commons might go a little faster. Perhaps it might, but it must not always be judged by results, because, although there were some good Bills which did not pass, there were a great many very bad Bills which it did not pass. There was a strong Conservative element in the House of Commons which was not mainly represented on the side on which he sat, nor on the front Opposition bench on which his friend, Sir Lyon Playfair, sat; the great conservative element which prevented legislation sat on the opposition side below the gangway, and those gentlemen made legislation very difficult and very slow. They might remember the story of the children of a board school being asked to describe a pin, when a little girl said, "It is a piece of wire, sharp at one end and round at the other, and saves many lives." When she was asked how it saved lives, the reply was, "By not swallowing of them," and in the same way if they could see the number of bad Bills which year by year the House of Commons refused to pass they would be thankful to it, not for what it did, but for what it refused to do.

The PRESIDENT then proposed "The Medical Profession." Those who took an active interest in Pharmaceutical work were conscious of the enormous labour and self-sacrifice necessary for the proper practice of that profession, and it was well to remember in proposing this toast, that pharmacists had placed upon them by recent events the duty of training men in botany and chemistry, for practically the medical practitioner of the future had almost given up these two subjects as part of their curriculum. The amount of work in the various branches of science they had do was so great that the rulers of the medical culty had decided that certain subjects should be cised, and amongst them within certain limits those had mentioned. He begged to couple with the ast the names of the Treasurer of the Royal College Physicians, Sir Dyce Duckworth, and the President the Royal College of Surgeons, Mr. Thomas Bryant.

Sir **Dyce Duckworth** said he must, as representing e President of his college, return his very best anks for the way in which the toast had been pro-osed and received. It was impossible for anyone who ad watched the progress of pharmacy for twenty-five thirty years, as he had done, not to be struck with e stupendous advance which it had made during at time, and it was not too much to say that e great progress which had been achieved in that bject in this country was distinctly due to the labours the Pharmaceutical Society. It would be impossible r the physicians of England not to appreciate the work hich had been done and the achievements which had een accomplished. It had occurred to him that his iend the President of the College of Surgeons would ave much less to say, because the relations between he operating surgeon and the pharmacist must be in-gnificant compared with those which existed between he latter and the physician, but he remembered that ven in the surgeon's art the greatest advances made ere really founded very much on a chemical basis, nd when he thought of the glorious triumphs of odern clean antiseptic surgery, he remembered t once that the surgeon must go to the pharmacist to btain those wonderful agents with which he com ated the dire evils which were so often wont to fol-ow on his carefully planned and skillfully carried out perations. These were certainly days of specializa-ion, but he was old fashioned enough himself to say hat he viewed this tendency to differentiation and pecialization with some regret, not being quite fully onvinced that it was the best thing which could appen to our common humanity or our social sys-em. The great subject of botany, one of the pillars pon which biology rested, had been, as he thought, ery improperly dropped from modern medical edu-ation. He counted himself happy to have been rained in a school where botany was one of the great ubjects dealt with, and had never had cause to regret he training he had had in that subject. He had pro-ably forgotten 90 per cent. of the details he had learnt, ut the training he had received had been of great use o him as a practical physician, because it taught him ethod and assisted him in going into details in con-idering all the different problems that arose in dis-ussing cases of disease. He should, therefore, do his est to see that the subject of botany was brought back gain into the scheme of medical education, for he onceived that no physician could be properly educated or his work until he had had a preliminary training n that branch of biology known as botany. Physicians ad not failed to note the great advances made in harmacy, and the years during which Mr. Carteighe ad been in office as President of that Society would e counted as amongst the most successful and preg-ant in results for the future of any the Society had nown. He offered his most hearty good wishes for he next fifty years, and did not doubt that the Society ould progress in the future as it had in the past, nd when the hundredth anniversary came to be cele-rated, those then present would have even greater riumphs to tell of, and the Society would be still ore firmly established than it was now in the hearts f all right-minded Englishmen.

Mr. **Thos. Bryant** said the operation he had to erform should be a speedy and he hoped a successful ne. He congratulated the Society on having attained ts Jubilee, and felt sure that if it continued on the same road which it had been travelling during the last fifty years, it would be quite certain to do an equivalent amount of good. Surgeons, as his friend Sir Dyce Duckworth had stated, were very grateful to pharmacists for what they had already done in the way of antiseptics. They looked to pharmacists to work out all the different problems connected with them, and to give them the simplest which could be prepared. He would only suggest at the present time, when there was so many in the field, that they should quietly work out the problem of which was the best before seeking for new ones. They wanted more experience and more facts connected with those they already knew, each of which had its advantage and each had its disadvantage. For his own part he would ask members of the Society to work out thoroughly the one for which he had the greatest partiality at present, iodol, which was a splendid antiseptic, but was somewhat difficult to work with. They all knew the virtues of carbolic acid and the mercuric antiseptics, and he need not enlarge upon them, for they were in constant use day by day, and he would only ask them to still more perfect those already discovered before giving the surgeon new ones to deal with. He begged to heartily congratulate the Society on having attained its Jubilee.

The **President** next proposed "The Learned Societies," which he said was a wide term, covering all branches of knowledge. Practically the Pharmaceutical Society had to do with the elementary branches of two or three sciences, but incidentally others were brought in, and it might be said very truly that the successful pharmacist, in order to be abreast of the present day, almost required to be a man of elementary scientific knowledge before he could be said to be able to carry on his work; in other words, a man who had a knowledge of science greater than that required by the examinations imposed by the State, but still elementary. He begged to couple with the toast the name of the representative of the Royal Society, the father of all scientific societies, Professor Michael Foster, an honorary member, and Mr. Timothy Holmes, President of the Royal Medical and Chirurgical Society.

Professor **Foster**, in replying, said he wondered if people ever asked themselves what "learned" meant; some people who were not learned thought that "learned" meant wise, but he knew to the contrary. It had been his lot to build a house on the top of a hill in a village near Cambridge, and he realized what "learned" meant when he found that the common talk of the village was that they always knew a learned man was a fool, but they did not think he would be such a fool as to build a house on the top of that hill. It was rather bordering on egotism to ask him to respond for the learned Societies, because being an honorary member of the Pharmaceutical Society, he was to some extent responding for it, which was included in that toast. The Royal Society had been referred to as the father of all the other Societies, and without discussing biological matters he should say it was the mother, and when he thought of her he always remembered the old nursery rhyme of the old woman who lived in a shoe, and had so many children she did not know what to do. There was a time when the Royal Society sat in Crane Court, and gathered into itself all the knowledge of the time. If the Horner of the day had anything to say he came to the Royal Society, but now he came to the Pharmaceutical Society, who published the communication in its Journal. It seemed to him, therefore, that the time would come when the Royal Society would be a kind of Upper House, when it would adjourn early for dinner, and make a show of pretending to do things, but leave all the actual work to be done by the Pharmaceutical and the other Societies. But still if the Society did actually go into the clouds he trusted that it would have left an example, and the example and precept which he wished to impress on all its children was this, that throughout its life it had endeavoured never to degenerate into an academy. It had alway endeavoured to avoid becoming a collection of irresponsible professors, but to keep in touch with the actual living work of the nation. Speaking of the spirit of the Royal Society he might say that that was now its definite feeling, that learning was a thing of great value, and that there was some kind of learning which could not be carried out save by the help of the repose that was gained from freedom from the duties of the world at large, but if that learning was to have its proper effect on the world it must be in touch with the world. The professions of medicine, surgery and pharmacy should lay hold of as much science as possible, but they must never think that the science was in any way lessened by the fact that they were practical professions having to do with men and things, and that pounds, shillings and pence were at the bottom of a great deal of it.

Mr. **Timothy Holmes** said he felt much honoured in being allowed to respond to this toast, and begged to join the hearty congratulations of the Society he represented with those of all the other learned societies on this interesting event in the career of the Pharmaceutical Society. The President of the College of Surgeons had complained, he thought justly, that pharmacy had been left out of the medical curriculum. He did not complain of that, for so many things had been put into it that the difficulty of the runners had been to get through them at all, and to get to the end of the career without being tripped up by the very numerous pit-falls that the examinations laid in their path. He only hoped that whether pharmacy were made one of those subjects or not they would be such that the candidates should really possess some useful knowledge of them. He believed at the present time the members of the medical profession had a very inadequate education in the great science which the Pharmaceutical Society was meant to teach. He hoped that would be reformed in the future, not by putting fresh educational stumbling blocks in their way, but by seeing that they had really a knowledge of the art which lay at the basis of medical practice, that of pharmacy. He congratulated the Society on the progress it had made during the last fifty years, and though they would not be alive to see the result of another fifty years, he had no doubt it would be such as to throw into the shade all which had been done in the past.

The **Rt. Hon. Sir Lyon Playfair**, K.C.B., etc., then rose to propose the toast of the evening, "the Pharmaceutical Society of Great Britain, and the health of the President." He said: Mr. President, I think I have the honour of being an honorary member of the Society. I was much perplexed when I was asked to propose the toast of the evening, and asked myself whether I had any knowledge whatever of the subject, and I found that what I possessed was of an extremely antique character, in fact about as old as your Society. About fifty years ago I attended for six months the materia medica lectures of Pereira. For another six months I attended the course of Sir Robert Christison, and I had the inestimable advantage, which I have always thought a most important part of my education, of having served for six months in the shop of a druggist in Glasgow, where I had to make and compound prescriptions. But this is all matter of personal history and very antique, and I thought I would try to make my observations on this toast in some manner that would conceal my perfect ignorance of the subject. The subject which first addressed itself to my attention, which I thought might be even forgotten by many of you, although to many gentlemen interested in the history of pharmacy it must be still fresh in your recollection, was the enormous change which has taken place in the pharmacy of the present day as compared with that of the past. We all recollect that at one time surgeons and barbers were associated together, and that grocers and apothecaries formed one common association. The barbers and surgeons have become separated—empiricism has given way to science—and you have severed yourselves from your old associates, the grocers, and have established for yourselves a scientific foundation. But in doing so you have lost very much of the picturesqueness of the ancient pharmacy. Think of the old times, when in all pharmacies there were always at hand such remedies as living worms, living frogs and toads, and puppy dogs, and as a condition of a shop of good repute there was one remedy always to be kept, "a fat fox of middle age," if you can get such an animal. All this has now disappeared. But after that part of pharmacy had disappeared, and gradually some idea of science was beginning to penetrate into this empirical art. The pharmacy of the old time was extremely complex, and as we have a pestilence now raging in this country I thought I would look up a famous prescription—a universal remedy for pestilence—and the antidote given by Mattiolus. I find it contains 124 ingredients. But even after Mattiolus' time it was quite common for a prescription to have sixty or seventy different ingredients. Gradually the complexity of medicine produced a reaction. We had then Bishop Berkeley coming forward to show that tar contained an enormous proportion of the vital principle of the universe, and that tar water cured all diseases, and that druggists required to keep nothing in their shops except tar water. The curious thing was that the bishop's views were accepted all over Europe until they produced a lively discussion, and tar water was not found so efficient as it was supposed. But if the old bishop could come to life again, how delighted he would be to find such beautiful preparations made out of his old friend tar—some of these preparations have been very useful, not only as antiseptics, but as direct internal medicines. Another great step which has been made in modern pharmacy is removing the unnecessary materials from the medicine, and getting the active principle in its most condensed and pleasant form. This concentration of active principles is really one of the triumphs of the modern pharmacist. I mean such things as where we have extracted morphia from opium, quinine from the cinchona barks, aloin from aloes, and other active principles which have made pharmacy and medicine such an entirely new art and science. The old medicines used to be distinguished by their repulsiveness, for when Charles the second died, on the day of his death he was given a prescription which was signed by fourteen physicians, and therefore must have been a good one. That prescription, which was poured down the throat of the dying monarch, was a most nauseous liquid, distilled from fresh human skulls. Of course this was intended to be a stimulant, and contained, as all distillates from animal bodies do, a large quantity of ammonia. Instead of this repulsive liquid we would now give a spoonful of sal volatile, which would act as a stimulant far more efficiently than that nauseous substance did. You cannot be surprised that the Elizabethan poets railed against medicine at that time, and that we have in Shakespeare such words as "Out loathed medicine, hateful potion avaunt," but now your preparations are so beautiful, and they are prepared with such skill, that the patient could say, in the words of Falstaff, "If the rascal has not give me medicines to make me love him I will be hanged." It is now the triumph of odern pharmacy that you try to obtain the active rinciples of the various ingredients, and give them in e most pleasant and most concentrated and effective rm. It would be absurd to say anything of the proound changes which have gone over pharmacy during e last 30 years, or even the last 15 years—your own ournal shows the wonderful changes which have taken lace. One of the most interesting to us as an mpire is that latterly our colonies have been growing e most important drugs, so that we have ot now to obtain them from foreign countries. The inchonas are now, in a great many of our olonies, grown with great success, and there is nother drug in which I have perhaps a hereditary terest, ipecacuanha, which perhaps stands second in ank to cinchona. That drug was known in the middle f the seventeenth century, but its virtues were holly forgotten until a medical officer of the Indian rmy, called Surgeon Playfair, discovered its virtues as n emetic and expectorant, and particularly as a remedy gainst dysentery. If I take credit from my father for aving rediscovered the usefulness of this important rug, I hope you will take it in extenuation of the gnorance which I show in other respects in proposing his toast for your acceptance. If you want to know he changes which have taken place in the materia edica and the art of pharmacy you have only to ompare two great books. When I was young I studied, ore than fifty years ago the great thick book of Pereira. hat was the materia medica we had all to learn. At hat time I almost knew it by heart, but a great book y a pupil of mine who has distinguished himself, so hat I am very proud of him, and I am very proud of ther pupils whom I see round this table—for intance, I am very proud of my friend Sir Dyce Duckworth, and Professor Frankland, and various pupils I ee here—but if you will only compare Lauder Brunton's book with Pereira's you will see the normous progress which has been made during he lifetime of your Society in the materia medica of his country. Your Society represents this progress. You very wisely at the beginning determined to found our Society, to raise it to dignity and to honour by iving a thorough education to the practitioners of our art, and you did so first by cultivating their eneral intelligence by a Preliminary examination, nd second by giving them a thorough technical ducation. I looked at your calendar this morning, nd at some of the examination papers, and I came on ne question which opened my eyes as to your large ommercial transactions, and the wonderful profits ou must make. This was the question put. Muliply £37,654,219 by 5, by 11, and by 45. Now if these re the sort of entries you make in your ledgers you ust have advanced enormously from the time when Romeo said to the lean and starved apothecary, 'I pay thy poverty, and not thy will." But it is our technical education which interests me more rofoundly. You have recognized that the practice f pharmacy involves great public responsibilities, nd you have given to your practitioners that horough knowledge in the *technique* of their rt which enables them to perform their work with dignity. Amongst your professors are the two meritus professors, Redwood, whom I am sorry ot to see here to-night, and Bentley, both of whom ave done good work, not only in pharmacy, ut in science generally, and amongst the active rofessors are Attfield, Dunstan and Green, men whose ames are known to science, who have the most horough knowledge, which enables your students to btain the technical education which is so necessary. Then I ask you to drink the health of the Pharmaceuical Society, and I join with it the name of your Preident. I know you elect your President annually, but the Pharmaceutical Society year must be a very long one, because I know as a political man I have been sitting on the Opposition benches for a good many years, and before I sat there I used to have your President coming to me, as Vice-President of the Privy Council, advocating pharmaceutical reforms, and I was very much struck by the fact that we were but plastic clay in his hands, because he had such a persuasive manner and such zeal for the advancement of your science.

The **President**, in responding, said the work of the Society during the past fifty years had been a long struggle. The conditions referred to by Sir Lyon Playfair and Professor Foster were always present. They had had to do what they did for any branch of science in the face of the necessity which always presented itself of earning their daily bread, and if it had been possible, in the true spirit of the ancient city guilds, to earn their bread and butter and at the same time do something for the advancement of knowledge, they were amply rewarded. Before sitting down he begged to propose the honorary members of the Pharmaceutical Society, so many of whom were present that it was rather a difficult task to select any one to respond, but he would ask leave to couple with the toast the names of Professor Edward Frankland, one of the oldest honorary members, and Brigade Surgeon Aitcheson, who was only recently elected.

Professor **Edward Frankland** in responding said: I am glad to take this opportunity of thanking you for the manner in which this toast has been received, and I am perhaps not alone, but probably nearly so, amongst the honorary members present, who remember the foundation of the Pharmaceutical Society of Great Britain. I remember well the condition of the assistant or apprentice of the pharmaceutist in those days. I knew a youth at that time who in the year 1840 was apprenticed for five years to a chemist and paid a premium, and passed the entrance examination. I do not know that he was exactly set to polish up the handle of the big front door, but if he had been set to perform the operation of removing the oxides from that piece of furniture, he certainly would have been more usefully employed, and would have been learning more chemistry than when his head was put into a bag, and he was set to pound cantharides in a big mortar. All this is now changed, and the education which this Society, of which I have the honour to be honorary member, and the training which this Society now gives to young pharmacists, are such as may well mark a great era in the progress of pharmacy in this country. Not only are these pharmacists enabled to hear lectures by men of the highest eminence, whilst the youth of whom I have spoken once had an opportunity of hearing a short course of chemical lectures, but it was thought no doubt that a practical training was better suited to him than a theoretical one, but the training which is now given is such as merits the highest commendation. But it is necessary to go further than this. It is necessary not only to teach, but to extend the boundaries of knowledge, and every society like this great Pharmaceutical Society is in duty bound to endeavour to extend the field of that science upon which its profession depends. This is, I am happy to say, what is now distinguishing the Pharmaceutical Society in the year of its jubilee. It has founded a laboratory for pharmaceutical research; it has established there a professor who has the confidence of every chemist in this country. Your Professor of Research and of your laboratory, Professor Dunstan, has already awakened the interest of chemists in his research on the nitro compounds of the organic radicles, and we are all looking forward with great interest to his researches on the aconite alkaloids. I would remind the Pharmaceutical Society that its members are the only legal chemists in this country, and we the outsiders wish most cordially that at the next Jubilee celebrated by the Pharmaceutical Society it may be found that they have lived up to this distinction.

The PRESIDENT next proposed the "Guests of Honour from Abroad," to whom they were so much indebted, not only for the kind addresses of congratulation they had brought to the Society but for their personal presence and sympathy. It was especially gratifying to know that there were present from Belgium, France and Germany, many distinguished pharmacists, men who had done good scientific work in their own countries, where the standard of qualification and education was much higher than in England. He would couple with the toast the names of M. Gys, M. Petit and Herr Fröelich.

M. GYS, who apologized for not speaking in English, said he brought with him the heartiest congratulations from Belgian pharmacists to their English brethren.

M. PETIT, President of the Association Générale des Pharmaciens de France, said he was happy to have been able to assist at this family festival, which had allowed him again to see old friends. If the Pharmaceutical Society had merited well of science it had also merited well of pharmacy. It had given the most evident proof of what could be done, outside of all governmental action, by association wisely conducted and self-help practiced with energy. The Association Générale des Pharmaciens de France, founded only fourteen years, had followed the example of the English Society, and had been already able to render signal services. It was in the name of that association that he wished the Pharmaceutical Society a brilliant centenary. For their part they would be happy to celebrate their jubilee as worthily as that which was being celebrated that day. He raised his glass to the prosperity of the Pharmaceutical Society of Great Britain.

Herr M. FRÖELICH, in reply to the toast, expressed his cognizance of the great honour paid him as a guest of a Society esteemed throughout the whole civilized world. A striking proof of the regard in which the Pharmaceutical Society of Great Britain was held had been furnished on the previous day by the overwhelming number of delegations and addresses sent from all parts to convey the congratulations of other bodies upon the Jubilee of the Society. He himself had the honour especially to represent the Apotheker-Verein, but he was sure that all German pharmacists joined him in the hope and wish that the English and German confederates would continue to work like brothers hand in hand for the advancement of pharmaceutical interests.

Herr REHE (Cologne section of Deutscher Apotheker Verein) said on the occasion of the International Pharmaceutical Congress in London, he and his colleagues from Germany were extremely gratified at the kind and hospitable manner in which they were received. On behalf of the Apotheker-Verein he desired to express his entire satisfaction at the visits paid by members of the Pharmaceutical Society, which he regretted were not more numerous, and he hoped that on the next occasion, when the meeting would take place in Rhineland, many Englishmen would be present and give their German friends the opportunity of returning the hospitality they had received in London.

M. VERNE also added a few words, saying this was his first visit to London, but he had learned a great many things, among others that the Pharmaceutical Society had its friends in all parts of the world, and that its President knew how to gather around him the most distinguished men connected with the profession. He hoped before long to visit London again, and to be able to report that he had profited by what he had learned.

Dr. H. THOMS, as representative and President of the Pharmaceutical Society in Berlin, expressed his thanks for the fraternal treatment his society had received at the hands of the Pharmaceutical Society of Great Britain. He said that he and his fellow members were filled with pride at the invitation to participate in the Jubilee festivities of their English brethren. As a freshly formed society they had a splendid example in the Pharmaceutical Society of Great Britain, an example they would strive to follow, and the representatives of pharmacy in Germany could only wish for a similar future for their society in Berlin.

M. PATEIN also added a few words of congratulation and sympathy on behalf of Paris pharmacists.

Herr JACOBI said that his feelings had been already expressed by his countrymen, and that the present scene recalled to his mind the old adage,

> "Wer liebt nicht Weib, Wein und Gesang
> Er bleibt ein Narr sein Leben lang."

He might be allowed to add one item to the requirements of sensible men, that of friendship, and he sincerely wished that the friendship existing between English and German pharmacists might increase, flourish, and prosper. He thought the English pharmacist could afford no better proof of increasing friendship than to accept his friend Rehe's invitation and visit the Apotheker Verein in large numbers next summer. In conclusion he expressed his pride at the fact that this was the third occasion on which the Hanbury medal had been awarded to a German scientist.

Herr KAUERT, the Vice-President of the Apotheker Verein, said that he very highly appreciated the honour of being present on this occasion. They had all witnessed on the previous evening the tokens of the high esteem in which the Pharmaceutical Society of Great Britain is held by sister associations, and he was glad that his society had seen fit to confer diplomas of membership upon Messrs. Carteighe, Greenish and Paul.

The PRESIDENT next proposed the Visitors, coupling with the toast the names of Sir Joseph Lister, Bart., and Professor Tilden.

Sir JOSEPH LISTER in responding said such work as he had been able to do in surgery would have been utterly impossible without the generous, self-denying, and kindly co-operation of the pharmacist. He congratulated the Society on the position it had attained, and the high regard in which it was evidently held by the pharmacists of foreign countries.

Dr. TILDEN, F.R.S., said he hardly knew whether he ought to respond in his official capacity as President of the Institute of Chemistry, or as an individual, but in the latter character he could scarcely call himself a visitor. He could never forget that he was a student of the Society, and for a number of years an officer teaching in the Laboratory. He congratulated the Society on its progress, and particularly on having returned in a certain sense to the old traditions of the past, of Fownes and Pereira, in days long before any one present had anything to do with the Society. He looked back to the time when he received from Jacob Bell a certificate of having passed the Preliminary examination, and the President was one of his examiners when he became a pharmaceutical chemist, and therefore he rejoiced exceedingly at the position the Society now occupied.

M. HOUDÉ apologized for not appearing earlier, but explained that he had been to the Derby, which as a national festival stood far above the Grand Prix, and he had only just returned.

The PRESIDENT announced that a number of letters and telegrams had been received.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hill, Gillow, Sawer, Driscoll, Benger, D. E. C.

A STUDY OF COCA LEAVES AND THEIR ALKALOIDS.[*]

BY O. HESSE.

The increased interest aroused in hydrochloride of cocaine some years since caused the manufacture of this compound to be undertaken in many different quarters, but the resulting preparations not infrequently differed considerably in composition and formula from the body described and investigated by Lossen.[†] This unsatisfactory state of things induced me at the time, as I was occupied with the preparation of this and other compounds of cocaine, to undertake a more detailed investigation of the whole subject.

Although the circumstances referred to have assumed a more favourable aspect in recent years, only a very pure hydrochloride of cocaine finding acceptance in commerce at the present time, yet I think that some of the recorded observations should not be withheld from publication, since in many respects they rectify and supplement existing information upon the subject, and also afford an opportunity for an exact comparison of cocaine with other basic constituents of coca.

Before, however, entering into details, I may be allowed to communicate a few facts concerning coca leaves that will impart a better general acquaintance with the subject.

It is worthy of note that Niemann[‡] selected the broad-leaved coca for investigation. This material was derived from the *Erythroxylon Coca*, Lamarck, a shrubby plant indigenous to the country east of the Andes, from southern Columbia to the Argentine Republic, and much cultivated on the yungas of Peru and Bolivia. Indeed it is from the latter countries that the supplies of coca for the market have been principally drawn.

In Peru and Bolivia the coca leaves are picked thrice yearly, viz., in spring, summer, and autumn, and on the last gathering the coca plant is completely stripped of its leaves. The coca leaves are dried as quickly as possible in the sun, and then either packed in banana leaves as "tambor" or "drum" (bundles weighing about 18 kilos), which are further fastened together to form bales about 70 kilos in weight, or at once packed into bales from 45 to 70 kilos in weight. These large bales are transported by mules and other beasts of burden hundreds of English miles through the Andes to the different ports of Bolivia and Peru, from whence they are exported to Europe and North America. The coca harvested in Bolivia is exported principally from Arica and Mollendo, the supply from Southern Peru is exported *viâ* Lima, and that from Northern Peru *viâ* Salvaverry, the port of Trujillo or Truxillo. The marks of the coca, however, correspond less to the places of export than to the districts in which the coca has been cultivated, or to the places in which the respective commercial houses have their headquarters, so that in the market not only "Lima coca," but also "Huanuko coca," "Cusco coca," "Trujillo coca," etc., are distinctive terms. With the exception of "Trujillo coca" all these varieties are identical in appearance with the coca investigated by Niemann. The Trujillo coca, which is obtained from the province Trujillo, and also apparently from more northerly districts in Ecuador and Columbia, differs from the above in that the leaves are brightly coloured, narrower, less leathery, extremely thin, and therefore very fragile. On this account the Trujillo or Truxillo[*] coca of commerce consists almost entirely of fragments of leaves. The origin of this coca is attributed to a variety of the above named plant, viz., *Erythroxylon Coca*, var. *Novagranatense*, Dyer.

Beside these two varieties of coca a third sort came temporarily into the market, which occupied an intermediate position between both the previous kinds in size of leaf, but the leaves were very leathery and well preserved. This sort, which was principally sent to Paris, I have erroneously attributed to Trujillo in a previous communication,[†] but this assumption does not accord with subsequent information.

In view of the therapeutical interest attached to the drug, it has been deemed advisable to cultivate the coca plant in other places as well as South America. Such attempts have been made in the East Indies, in Ceylon, Java, etc. According to Warden[‡] the coca plants flourish in the cinchona plantations of Madras, and in the tea plantations of Bengal, and yield a leaf containing from 0·358 to 1·671 per cent. alkaloid. In Ceylon, where the plants have been distributed from the Peradeniya Gardens, a leaf obtains that is certainly rich in alkaloid, but the base frequently consists principally of cinnamylecgonine methyl ester. The culture in Java is still less satisfactory, although here also the leaf often contains considerable quantities of alkaloid. In all these latter kinds of coca leaves the alkaloids accompanying cocaine preponderate, and it is moreover said that they are partly derived from a new variety of coca. Burck[§] designates the coca plant cultivated in British India as *Erythroxylon Bolivianum*, and the Java plant as *Erythroxylon Coca*, var. *Spruceanum*. The latter is stated to occupy a position between *E. Coca* and *E. Coca*, var. *Novagranatense*, and is most probably the plant that yielded the coca imported into Paris several years ago.

In the cocas from South America the alkaloidal percentage is also by no means constant, but varies both in quantity and quality. These variations appear to be attributable not only to the variety of plant, but also to the influence of local circumstances, as culture experiments in the East Indies have shown. It is also to be taken into account that according to Rusby[||] the alkaloidal percentage varies with the age of the leaves, and that less careful drying or a lengthy transport of the coca, especially if it has been packed still in a moist condition, considerably decreases the yield. From both the first named South American cocas, when they have received good treatment, I have obtained 0·7 to 0·9 per cent. alkaloid, of which the greater part consists of cocaine in the broad-leaved variety, and to the extent of about one-half in the narrow-leaved or Trujillo coca. The third kind, or the coca obtained from Paris, however, yielded 1·2 per cent. alkaloid, of which about one-quarter consisted of cocaine, whilst one specimen, an apparently excellent coca from Venezuela, contained only 0·02 per cent. alkaloid. Whether a trace of cocaine occurred in the latter, or whether it was entirely absent therefrom, could not be decided from the small quantity of material.

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[*] Memoir presented to the Pharmaceutical Society on the occasion of the presentation to the author of the Hanbury Medal, May 26, 1891.

[†] *Annalen*, 133, 351. [‡] *Ibid.*, 121, 372.

[*] Since the name Trujillo is more frequently met with than Truxillo, I prefer to employ the former spelling.

[†] *Berichte der deutsch. chem. Ges.*, xxii., 666.

[‡] *Pharm. Journ.*, [3], xviii., 1010, 1027.

[§] *Pharm. Journ.*, [3], xxi., 760.

[||] *Pharm. Journ.*, [3], xvi., 706.

Under the name "crude cocaine" is understood the total quantity of bases as they are obtained by one or other method from the various kinds of coca. Owing to the differences which the "crude cocaine" must necessarily show, it is clear that it is not possible to obtain a pure preparation from this material, if it is simply saturated with hydrochloric acid and then evaporated to crystallization, as Squibb[*] earlier recommended. Meanwhile, however, the method for the preparation of cocaine hydrochloride has been so perfected—I need only refer to Williams's[†] method—that the differences in the crude material are no longer a matter of serious consideration.

I. *Cocaine.*

I have effected the separation of the cocaine from the crude substance direct with hydrochloric acid in such a way that the accompanying alkaloids have been retained unaltered. The alkaloid was obtained from the hydrochloride, which had been once recrystallized from chloroform with the addition of ether, by means of ammonia or sodic carbonate and ether, the ethereal solution depositing the base in the well known form upon evaporation. The body melts, like the synthetical product, at 97° C. in Roth's apparatus. Niemann, as well as Liebermann and Giesel[‡] record the melting point as 98° C., Skraup[§] as 96° to 97° C., Merck[||] as 97° to 98° C. Cocaine dissolves readily in hot petroleum ether and crystallizes out of the cooled solution in needles. It also dissolves easily in hot alcohol, wood spirit, acetone and chloroform, and crystallizes from these solvents upon cooling, if the solution be sufficiently concentrated. In hot water it dissolves more readily than in cold, but at the same time a fairly rapid decomposition occurs. Even if the alkaloid be heated for some time with water to 80° C., it gradually disappears and is not again precipitated upon cooling. The solution, which is of distinctly acid reaction, now contains benzoylecgonine and ecgonine, as well as cocaine benzoate, so that a decomposition of the base is effected in the following sense:—

$$C_{17}H_{21}NO_4 + H_2O = C_{16}H_{19}NO_4 + CH_4O$$
$$C_{17}H_{21}NO_4 + 2H_2O = C_9H_{15}NO_3 + C_6H_5{\cdot}COOH + CH_4O.$$

The benzoic acid liberated in this reaction, not an inconsiderable quantity, combines with the cocaine still undecomposed, and effects not only its solution, but also hinders its further decomposition. That benzoylecgonine is produced by the action of water upon cocaine, Paul[¶] and Einhorn[**] have already demonstrated, without, however, particularizing the course of the reaction.

Even when cocaine is recrystallized out of hot dilute alcohol, partial decomposition into methyl alcohol and benzoylecgonine is scarcely to be avoided. If the cocaine obtained in this manner be dissolved in ether more or less benzoylecgonine may be removed from the ethereal solution by treatment with water.

The hydrochloride of cocaine itself, which is the salt of this base most required, contains one molecule of alkaloid to one molecule of hydrochloric acid. It crystallizes from ice-cold water in colourless prisms containing 9·5 per cent. of water of crystallization, and therefore corresponding to the formula $C_{17}H_{21}NO_4$, $HCl + 2H_2O$; but an anhydrous form occurs as a crystalline powder when, for example, absolute ether, in which it is insoluble, is added to its solution in chloroform. According to Antrick[*] it melts at 181° to 185° C.; according to Einhorn and Marquardt[†] at 181·5° C.; whilst my own observations in Roth's apparatus correspond to 186° C. Minute impurities, almost defying detection, lower the melting-point of the hydrochloride to about 180° C.

A very dilute solution of the hydrochloride gives almost immediately upon addition of ammonia a crystalline precipitate of cocaine. When the solution is more concentrated, however, a milky opaqueness first occurs upon the addition of ammonia, but the opacity soon disappears and crystals of cocaine are deposited. The resulting precipitate, as also that obtained with carbonate of soda, is anhydrous cocaine, an observation also recorded by Liebermann and Giesel, and not a hydrate of the alkaloid, as suggested by Squibb. Indeed, cocaine forms no compound with water, a fact inconsistent with the hypothesis of Liebermann and Giesel, who attempted to explain the peculiar behaviour of cocaine to ammonia or soda by assuming that cocaine is at first precipitated by these reagents from its salts in an amorphous condition, and that the amorphous cocaine becomes more or less quickly crystalline according to the concentration of the solution, passing through an intermediate soluble form. This property of cocaine is met with in many other alkaloids.

The aqueous solution of cocaine hydrochloride, which reacts neutrally, gradually acquires a slightly acid character when boiled for a considerable time under an upright condenser, or heated in a sealed tube to 120° C., though the amount of decomposition is very slight, even if the heating be long continued. But if hydrochloric acid be added to the solution, formation of benzoic acid occurs rapidly, and the decomposition continues until within a short time the whole of the cocaine has been decomposed. The same reaction is observed if a solution of cocaine in concentrated hydrochloric acid be allowed to stand at ordinary temperatures; but on the contrary no decomposition of cocaine occurs if it be boiled at the ordinary atmospheric pressure with excess of benzoic acid and water, or with dilute or glacial acetic acid. It may be therefore concluded that the action of acids upon cocaine depends upon especial conditions.

The slightly warmed aqueous solution of the hydrochloride gives with platinum chloride a yellowish-white flocculent precipitate of the double platinum salt, that soon becomes crystalline. If platinum chloride be added to a hot alcoholic solution of the hydrochloride, the double platinum salt eparates in fine orange-coloured leaflets that are ompletely anhydrous, and melt at 215° C.

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[*] *Pharm. Journ.*, [3], xv., 776.

[†] *Pharm. Journ.*, [3], xviii., 262.

[‡] *Berichte der deutsch. chem. Ges.*, xxi., 3196.

[§] *Monatshefte fur Chemie*, vi., 556.

[||] *Berichte der deutsch. chem. Ges.*, xviii., 2264, 2954.

[¶] *Pharm. Journ.*, [3], xvi., 325.

[**] *Berichte der deutsch. chem. Ges*, xxi., 48.

[*] *Berichte der deutsch. chem. Ges.*, xx., 331.

[†] *Ibid.*, xxiii., 473.

0·284 gr. of the substance dried at 100° C. gave upon ncineration 0·0552 Pt.

	Calculated for $(C_{17}H_{21}NO_4)_2PtCl_6H_2$	Found
Pt.	19·20	19·43 per cent.

The platinum salt obtained from aqueous soluions is also anhydrous, which is the more remarkble since all the alkaloids accompanying cocaine ppear to form platinum salts containing water of rystallization.

The gold salt is precipitated by gold chloride rom hot alcoholic solutions of the hydrochloride n beautiful gold-shimmering leaflets, that are anydrous, melt at 196°, and, contrary to the asserion of Lossen, are of very stable nature.

0·520 gr. of substance dried at 100° C. gave upon ncineration 0·160 Au.

	Calculated for $C_{17}H_{21}NO_4, AuCl_4H$.	Found.
Au . . .	30·63.	30·76 per cent.

Upon mixing the aqueous solution of cocaine ydrochloride with a dilute solution of permananate of potash, a purple-violet precipitate of permanganate of cocaine obtains, whilst the supernaant liquid also acquires a purple-violet tint. In a hort time, however, both liquid and precipitate ose their colour and dioxide of manganese is deosited. On the other hand a solution of cocaine ydrochloride acidified with hydrochloric acid gives with bichromate of potassium a pretty precipitate onsisting of leaflets. Both reactions, the first iscovered by Giesel, the second by Mezger, are of mportance, since the first serves to detect an admixture of cinnamylecgonine methylester and simiar compounds, the second indicates the presence f cocamine and such bodies.

Benzoylecgonine.

The conversion of cocaine into benzoylecgonine as been already referred to. This body crystalizes out of hot concentrated aqueous solutions pon cooling in glassy prisms, which Paul correctly emarks bear a strong resemblance to ammonium xalate. These crystals contain four molecules of water of crystallization, which is partially removed t 100° C. and completely at 120° C.

I. 0·2184 gr. air-dried substance lost at 120° C. 0·0432 gr. H_2O.

II. 0·2663 gr. air-dried substance lost at 120° C. 0·0520 gr. H_2O.

	Calculated for $C_{16}H_{19}NO_4+4H_2O$.	Found. I.	II.
$4H_2O$	19·94.	19·78	19·48 per cent.

0·1703 gr. substance dried at 120° gave 0·4135 gr. CO_2 and 0·1035 gr. H_2O.

	Calculated for $C_{16}H_{19}NO_4$.	Found.
C. . .	66·44.	66·22 per cent.
H . .	6·57.	6·75 ,,

These results confirm the respective statements f Skraup. The melting point of the benzoylcgonine crystallized with four molecules of water, I lso found to agree with that given by Skraup 92° C.), whilst Liebermann and Giesel record it as 6–87° C. The melting-point of anhydrous benzoylcgonine I found to be 194° C., whilst Skraup records 92–193° C and Liebermann and Giesel 195° C. Benzoylecgonine dissolves very easily in alcohol and wood spirit, is fairly soluble in hot acetone and chloroform, and crystallizes out of the latter solutions when cold in long needles. Dissolved in absolute alcohol the hydrous substance showed in a solution $p=3$ and $t=15°$ C.

$$[\alpha]_D = -44{\cdot}6^\circ.$$

Its aqueous solution has a neutral reaction. It forms with hydrochloric acid a salt that crystallizes in colourless needles and is very soluble in water. If gold chloride be added to a solution of the latter a yellow flocculent precipitate is formed that rapidly becomes crystalline, and is represented by the formula $C_{16}H_{19}NO_4,AuCl_4H+H_2O$.

0·3195 gr. air-dried substance lost at 100° C. 0·009 gr. H_2O and yielded upon incineration 0·0985 gr. Au.

	Calculated.	Found.
Au	30·45	30·82 per cent.
H_2O	2·78	2·81 ,, ,,

The gold salt crystallizes from hot alcohol in beautiful rhombic plates.

As W. Merck has already shown, benzoylecgonine is reconverted into cocaine by treatment with methyl iodide. For this purpose Merck enclosed the mixture in a tube and heated to 100° C., but this is unnecessary, as methyl iodide combines with benzoylecgonine readily if a solution of the two bodies in methyl alcohol be warmed to about 60° C. in an open flask. Skraup, indeed, also adds sodium methoxide to the mixture, yet not only is this addition in the present synthesis superfluous, but, as Merck has correctly remarked, distinctly injurious.

Ecgonine.

If cocaine or benzoylecgonine be heated with excess of hydrochloric acid upon a sand-bath to about 80° C., benzoic acid separates from the solution upon cooling, and after its removal ecgonine hydrochloride crystallizes from the evaporated filtrate. This salt can easily be obtained pure by recrystallization from hot 93 per cent. alcohol, and then forms cubical crystals that contain no water of crystallization. These crystals present the peculiar behaviour of commencing to decrepitate at 200° C., but melt with copious frothing at from 234° to 238°. Liebermann does not mention this peculiarity, and also records the melting point as 246° C., at which temperature, however, the ecgonine hydrochloride has suffered considerable decomposition.

From water ecgonine hydrochloride crystallizes in long, colourless, slightly hygroscopic prisms, which contain one molecule of water of crystallization. This water disappears almost completely in the exsiccator.

0·3315 gr. substance lost at 120° C. 0·0285 gr. H_2O.

	Calculated for $C_9H_{15}NO_3HCl+H_2O$.	Found.
H_2O	7·75	8·59 per cent.

The hydrochloride of ecgonine in aqueous solution rotates the plane of polarized light in like manner to the left, and with $p=10$ (anhydrous substance) and $t=15°$ C.

$$[\alpha]_D = -59{\cdot}4^\circ$$

was observed. Einhorn* records $[\alpha]_D = -57°$ without giving further information as to the experimental conditions.

The platinum salt of ecgonine is precipitated in different physical forms and sometimes also varies in respect to its composition according to the conditions of its formation. If platinum chloride be added to an aqueous solution of ecgonine hydrochloride no precipitate is formed, but upon evaporation of the solution in an exsiccator the platinochloride separates in orange-red, warty aggregates of crystals. On the other hand, if an alcoholic platinum chloride solution be added to a solution of ecgonine hydrochloride in hot absolute alcohol, long orange-red prisms first separate, which gradually undergo a spontaneous conversion into short prisms and small tabular crystals that are completely free from water and alcohol. The melting point of these is near 206° C.

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* *Berichte der deutsch. chem. Ges.*, xxii., 1495.

0·2074 gr. substance dried at 100° gave upon incineration 0·0524 gr. Pt.

	Calculated for $(C_9H_{15}NO_3)_2PtCl_6H_2$.	Found.
Pt. . . .	25·01.	25·26 per cent.

In one instance, after addition of platinum chloride to the hydrochloric acid solution of ecgonine and spontaneous evaporation, the platinum salt was obtained in leafy scales that soon lost their sheen when exposed to the air.

0·2664 gr. air-dried and apparently undeliquesced substance gave at 120° C. 0·0105 gr. H_2O, and upon incineration 0·0633 Pt.

	Calculated for $(C_9H_{15}NO_3)_2.PtCl_6H_2+2H_2O$.	Found.
Pt. . .	23·91.	23·35 per cent.
H_2O . .	4·41.	3·94 „

The ecgonine itself can be obtained from its hydrochloride either by treating an aqueous solution with oxide of silver, removing the excess of silver after the completion of the reaction by means of sulphuretted hydrogen, and evaporating the clear filtered solution, or by adding barium carbonate to the solution of the hydrochloride, evaporating and extracting the residue with boiling alcohol.

Repeatedly recrystallized from absolute alcohol ecgonine assumes four-sided, hemiedral forms, but from water it crystallizes in colourless prisms, in both instances, however, with one molecule of water of crystallization.

I. 0·4695 gr. air-dried substance crystallized from alcohol lost at 130° C. 0·0425 gr. H_2O.

II. 0·6540 gr. air-dried substance crystallized from water lost at 130° C. 0·0589 gr. H_2O.

	Calculated for $C_9H_{15}NO_3+H_2O$.	Found. I.	Found. II.
H_2O. , . . .	8·86	9·05	9·00

At 130° C. ecgonine is completely anhydrous and shows no further loss by heating to 140° or 150° C. The perfectly dry ecgonine melts in Roth's apparatus at 197° to 198° C., the melting-point previously observed by Lossen and later by Einhorn. The statement of Liebermann,* that anhydrous ecgonine melts at 205° C. is therefore undoubtedly incorrect.

Ecgonine is difficultly soluble in hot chloroform, benzoic methyl ester or acetoacetic ester, but crystallizes unaltered from these solvents upon cooling. In water it dissolves readily, and if the aqueous solution be evaporated on a glass plate, a crystalline deposit resembling ice flowers is formed. In an aqueous solution where $p=5$ ($C_9H_{15}NO_3+H_2O$) and $t=15°$, the rotatory power $[\alpha]_D = -$[illegible]. The aqueous solution has a neutral reaction, but acquires an acid reaction immediately upon addition of a small quantity of an acid, or an alkaline reaction by addition of alkali. Ecgonine therefore occupies a position upon the borderland of acid and base, and like the amido acids forms compounds both with bases and acids.

II.—*Cocamine.*

Cocamine was discovered by me in 1886 in the Paris coca already referred to. A preliminary description of the base appeared in the *Pharmaceutische Zeitung*, 1887, p. 407, and at the same time I distinctly expressed my intention of further investigating the subject.*

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* *Berichte der deutsch. chem. Ges.*, xxi., 2342. Liebermann says: "The crystals are hydrous and melt gradually with evolution of water-vapour at 198° C., the temperature observed by Lossen for ecgonine. After drying at 140° C. the melting-point is constant at 205° C." Lossen, however, made no such statement as Liebermann suggests, but employed the completely anhydrous ecgonine for his experiments. Apparently Liebermann made his determinations with a thermometer that registered about 8° too high, a conclusion arrived at by the comparison of other statements.

* Without awaiting the promised communication, Liebermann has considered it advisable to undertake the investigation of this base, mixed with at least one other [illegible] substance, and to describe this mixture as isatropylcocaine. Liebermann attempts to mask his procedure by [illegible] several statements from my brief publication, respecting the products of decomposition of this body, and [illegible] them in his peculiar style. But this can afford no excuse, for a communication concerning the detailed investigation of these products of decomposition had not yet appeared, and the contradictions that unfortunately appeared in my preliminary notes did not admit of definite conclusions. Although my investigations were practically concluded in May, 1888, for the undermentioned reasons I did not think it expedient to make them public directly after Liebermann's communication on the subject, but I took the opportunity of publishing them in the commencement of [illegible] since a further silence under the circumstances might have been regarded as a renunciation of the work. In the [illegible] that Liebermann issued in the *Pharmaceutische Zeitung*, 1889, p. 281, this chemist amongst other remarks expresses himself thus:

"Die Behauptung Hesse's, dass seine gegenwärtige (zweite) Untersuchung ueber Cocamin beim Erscheinen meiner ersten Publikation bis auf unwesentliches [illegible] schlossen sei, ist mir insofern unverständlich, als ich [illegible] recht einsehe, warum er dann mit seiner Erwiderung [illegible] Monate gewartet hat. Dagegen kann ich zeigen, dass [illegible] Hesse jetzt meine Resultate durchgehends bestätigt, [illegible] dazu gar nicht direkt aus seinen Arbeiten an sich, [illegible] lediglich unter gleichzeitiger Benützung der von mir [illegible] gestellten Formeln und Schlussfolgerungen gelangt. ... Auch aus seinen jetzigen Analysen der Base kann [illegible] nämlich, ohne Benutzung meiner Arbeiten, nicht [illegible] sondern seine frühere Formel ableiten, weil er um [illegible] 2 p. Ct. im Kohlenstoff zu niedrige Zahlen findet. [illegible] nimmt er jetzt statt seiner früheren Formel, [illegible] meine Formel, $C_{19}H_{23}NO_4$, und zum Ausgleich der [illegible] enen Differenzen einen Gehalt der Base von [illegible] Wasser an."

That the true value of the above may be [illegible] I will remark that all the analyses of cocamine [illegible] derivatives recorded in my second communication ([illegible] February 19, 1889), had been effected before the [illegible] ance of Liebermann's first publication, that is [illegible] during the period between March, 1886, and May, [illegible] inclusive; every subsequent analytical estimation [illegible] carried out after the appearance of that publication I [illegible] unmentioned. The analysis last executed (May, [illegible] was that of the cocaic acid, the lead salt of which [illegible] long been analysed. But since at that time I had [illegible] observed, as can be easily corroborated by reference [illegible] tolatory communications to fellow-workers, that [illegible] and methyl chloride resulted from the action of [illegible] chloric acid on cocamine, I was furnished with all the [illegible] that called for the alteration of the old formula into [illegible] new. The reason that I did not immediately [illegible] new formula, which agreed with the formula [illegible]

The coca in question contained about 0·6 per cent. cocamine, a quantity determined indirectly by the amount of cocaic acid formed upon decomposition. Only a comparatively small quantity about 200 grams) of cocamine could be obtained as such, and this was effected by precipitation of the total alkaloids in petroleum ether. For this purpose the slightly warmed acetic acid solution of this alkaloid was made into an emulsion with warm petroleum ether, and simultaneously an excess of dilute ammonia added. After cooling, the petroleum ether and the alkaline aqueous solutions, which had meanwhile separated, were removed, and the precipitated crude alkaloid was again treated in the same way. The alkaloid thus obtained presented the appearance of a yellowish coherent mass. It was dissolved in acetic acid, the solution treated with animal charcoal and then precipitated with a slight excess of ammonia. The flocculent precipitate was again dissolved in acetic acid, and again precipitated with ammonia, and this procedure was repeated until the alkaloid assumed the form of a homogeneous crystalline precipitate. The air-dried substance was then dried in an exsiccator and analysed. For analysis I. a preparation that had been dried in the exsiccator for two months, and for analysis II. a specimen dried in the exsiccator for three days at 53° C., was employed. No loss of weight was observed by this treatment.

I. 0·2478 gr. substance gave 0·613 gr. CO_2 and 0·156 gr. H_2O.
0·4155 gr. substance gave 0·01799 gr. N.
II. 0·2462 gr. substance gave 0·609 gr. CO_2 and 0·158 gr. H_2O.

From these results I deduced, about five years ago, the formula $C_{17}H_{21}NO_4$, according to which cocamine would be an isomeride of cocaine, and later 1887) made this known as already indicated. But a subsequent chlorine estimation of the corresponding hydrochloride, which I made shortly after publication, gave the simplest expression for the hydrochloride as $C_{19}H_{25}NO_5,HCl$ (and not $C_{17}H_{21}NO_4,HCl$, as would have been expected from the carbon and hydrogen estimation), and for the alkaloid itself $C_{19}H_{24}NO_{4\frac{1}{2}} = C_{19}H_{23}NO_4 + \frac{1}{2}H_2O$. In consequence of Liebermann's communication upon the so-called γ-isatropic acid, I subsequently attempted to remove the half molecule of water, which did not assume the character of water of crystallization in the preparation, by employing reduced atmospheric pressure; but in vain, probably because the available reduction of pressure was insufficient. I obtained, for example, the following data:—

III. 0·2357 gr. substance, dried for two days in an exsiccator by 53° C., and under 500 mm. barometric pressure without any loss, gave 0·5805 gr. CO_2 and 0·152 gr. H_2O.

On account of the following considerations I therefore felt compelled to double the above formula to $C_{38}H_{46}N_2O_8 + H_2O$.

	Calculated for $C_{38}H_{46}N_2O_8 + H_2O$.	Found.		
		I.	II.	III.
C . . .	67·45	67·46	67·33	67·17
H . . .	7·04	6·99	7·09	7·16
N . . .	4·14	4·33	—	—

Cocamine forms a molten mass at 90°–95° C., but does not lose water by the change; if the temperature be raised to 120° C., water is driven off, but only allows of an approximate estimation of the same. Thus 0·2678 gr. substance lost 0·0068 gr. = 2·54 per cent., whereas one molecule of water requires 2·66 per cent. loss. A more careful examination of the residue showed, however, that a small quantity of methyl alcohol must also have been removed at this temperature. In a further experiment, in which every possible precaution was taken to prevent the slightest rise of temperature above 120° C., a loss of 1·93 per cent. was recorded, and the examination of the residue showed that it consisted entirely of cocamine. Thus proof is afforded that the exsiccator-dried cocamine practically contains one molecule of water.*

If the substance be heated to 124° C., rapid decomposition occurs and white vapours of agreeable odour are evolved, whilst the residue becomes more and more insoluble in acetic acid. When the loss has reached about 11 per cent., the alkaloid is completely decomposed; the residue dissolves almost completely in ammonia, and acetic acid produces a white flocculent precipitate in the clear solution. This precipitate is easily soluble in ether and the ethereal solution leaves upon evaporation a semi-crystalline residue consisting of cocaic and ecgonylcocaic acid. Whether ecgonine, or more probably anhydroecgonine, is formed during decomposition could not be determined.

When cocamine is precipitated from dilute acid solutions with ammonia, it forms a white flocculent precipitate, that soon becomes thick and crystalline, and then appears under the microscope to consist of hexagonal forms, which are apparently short, flat prisms, with terminal domes.

Cocamine dissolves readily in alcohol, ether, acetone, chloroform and benzene, less readily in petroleum ether, petroleum spirit and hot water, and

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by Liebermann, upon the great bell, is founded entirely upon the fact that a revision of the work upon the platinum salt demanded by the circumstances had still to be carried out.

I admit that I committed an error by not publishing a reply immediately after the appearance of Liebermann's article. But in this reply I should have been compelled either to have declared Liebermann's statements respecting the melting points of ecgonine, ecgonine hydrochloride, and of the so-called γ-isatropic acid to be false, or to have considered the substances in question as different from those I had obtained from the decomposition of cocamine. As I had no right to make the first assumption, and yet on the other hand the suggested difference appeared doubtful, nothing else remained for me than to postpone the reply until the matter had been re-examined. Unfortunately this examination, which terminated with the failure to corroborate Liebermann's statements in regard to the melting points, involved a great expenditure of time and labour. As I am not in the same pleasant position as Liebermann and able to dispose of the time and energy of others, but was compelled to rely upon myself, it happened that month after month went by in this investigation. I should not have published anything further respecting this matter before the communication of the present paper, had I not feared that after Frankfeld had recorded the occurrence of cinnamic acid among the decomposition products of the accompanying coca alkaloids, silence in this case would have been misconstrued.

* I have not mentioned a combustion of this dried residue, because Liebermann and Drory (*Berichte der deutsch. chem. Ges.*, xxii., 682) have meanwhile confirmed this result from the synthetically prepared cocamine. In the paper quoted these chemists say that the synthetical cocamine, which they call γ-isatropylcocaine, is identical in all physical characteristics, solubilities and reactions with its namesake, the natural base. But as they had not yet seen the natural base, only the cocamine can have been referred to which they speak of as its synonym.

only in traces in cold water, ammonia, or caustic soda solution. It melts at 80° C., decomposes as above-mentioned at 124°, and in alcoholic solution reacts alkaline and rotates the plane of polarized light to the left. When $p=4$ (hydrate) and $t=15°$ C. the solution in absolute alcohol indicated

$$[\alpha]_D = -27 \cdot 5°.$$

Heated with water at 100° C. it suffers no decomposition, but by heating with hydrochloric acid in open or closed vessels at 80° or 100° C. it quickly splits up into methyl chloride, cocaic acid and ecgonine. A similar decomposition occurs when cocamine is boiled with alcoholic baryta solution, but the reaction is not so rapid as when excess of acid is employed.

Cocamine forms only amorphous salts. The hydrochloride was prepared by addition of hydrochloric acid to an alcoholic solution of the alkaloid, until the whole had been neutralized. Upon evaporation of the solution at 60° C. and finally in an exsiccator the salt remained as an almost colourless varnish, which when completely dried could be rubbed to a fine white powder, which is slightly hygroscopic. After drying in an exsiccator until the weight remained constant, the powdered salt gave the following results :—

0·240 gr. substance gave 0·5255 gr. CO_2 and 0·148 gr. H_2O.

0·239 gr. substance gave 0·0880 gr. AgCl.

This corresponds to the formula

$$C_{38}H_{50}N_2O_{10},2HCl = C_{38}H_{46}N_2O_8,2HCl + 2H_2O.$$

	Calculated.	Found.
C	59·45	59·71 per cent.
H	6·78	6·81 „
Cl	9·25	9·11 „

The percentage of water in this compound does not, however, allow of direct estimation. If it is heated, for instance, to 100° C., it gradually loses in weight to a far greater extent than the theoretical requirements for two molecules of water of crystallization. Thus 0·534 gr. suffered 9·86 per cent. loss in a short time and then still contained 6·06 per cent. chlorine. In a second experiment, for which a temperature of 120° was employed, the weight remained constant after a loss of 14·91 per cent., whilst the substance still retained a minute trace of chlorine. If a loss of two molecules HCl and two molecules H_2O had been sustained the equivalent decrease in weight would be 14·2 per cent., or 17·8 per cent. assuming two molecules CH_4O and two molecules HCl or two molecules CH_3Cl and two molecules H_2O had been eliminated, or finally 15·4 per cent. for two molecules CH_3Cl and one molecule H_2O. If the loss of chlorine in the first experiment be attributed to the elimination of methyl chloride, this would account for 4·55 per cent. and leave a remaining 9·86 − 4·55 = 5·31 per cent. as due to water, whilst the theoretical quantity of water is 4·7 per cent. Under these circumstances it was attempted to determine the composition of the hydrochloride by a synthetical method. For this purpose the exsiccator-dried cocamine, $C_{38}H_{46}N_2O_8 + H_2O$, was employed, and 0·549 gr. mixed at ordinary temperature with the calculated quantity of decinormal hydrochloric acid. Gradually the alkaloid was completely dissolved, and the solution, which possessed neither acid nor alkaline reaction, was next evaporated at 60° and the residue dried in an exsiccator until of constant weight. 0·622 gr. hydrochloride was thus obtained, a quantity that corresponds to the formula $C_{38}H_{46}N_2O_8,2HCl+2H_2O$, since 100 parts of $C_{38}H_{46}N_2O_8 + H_2O$ would yield 113·46 parts of a salt of the above formula (113·9 parts found).

Cocamine hydrochloride tastes intensely bitter, is readily soluble in water, alcohol and chloroform, less readily in acetone and is insoluble in ether. Its solutions give no coloration with ferric chloride, but yield precipitates with gold, platinum and mercuric chlorides.

The platinum salt was obtained as a pale yellow flocculent amorphous precipitate by precipitation of a dilute aqueous solution of the hydrochloride with sodium-platinum chloride. It is very slightly soluble in boiling water and scarcely at all in cold water.

I. 0·262 gr. air-dried substance lost at 110° C. 0·0[illegible] gr. H_2O and gave upon incineration 0·0465 gr. Pt.
II. 0·291 gr. air-dried substance lost at 110° C. 0·0[illegible] gr. H_2O and gave upon incineration 0·0515 gr. Pt.

	Calculated for $C_{38}H_{46}N_2O_8,PtCl_6H_2+3H_2O$	Found. I.	Found. II.
Pt . . .	17·32	17·74	17·69
$3H_2O$ . .	4·81	5·34	5·32

If the solution of cocamine in dilute hydrochloric acid be treated with platinum chloride, the resulting precipitate contains more platinum and less acid than is required by the above formula. Apparently under these conditions some acid platinochloride, $C_{38}H_{46}N_2O_8,2PtCl_6H_2+xH_2O$, also obtains and is mixed with the first salt.

The gold salt is a fine yellow amorphous flocculent precipitate, and *the acid chromate* also has the same appearance. The formation of the latter distinguishes hydrochloride of cocamine from hydrochloride of cocaine, whilst potassium permanganate behaves similarly towards both salts.

Cocamine acts, according to the investigation of Stockman, as a muscle poison ; its hydrochloride has an anæsthetic action, although it is considerably less active than cocaine hydrochloride.

Decomposition of Cocamine.

Cocamine decomposes in a similar manner to cocaine by boiling with alcoholic baryta solution or by heating with hydrochloric acid, but under these conditions cocamic acid obtains in the place of benzoic acid. As cocamine is accompanied in the leaves by more or less isococamine, which differs but slightly from cocamine in solubility and other characteristics, it is very difficult to obtain sufficiently pure cocamine, in consequence of which a small amount of isococaic acid corresponding to the percentage of isococamine occurs among the decomposition products. In different experiments with cocamine derived from the above-mentioned coca leaves, I obtained on some occasions [illegible] isococaic acid, and at other times such a small yield that the total quantity only sufficed for an approximate determination of the melting point and for the observation of its crystalline form.

Ecgonine.

The basic decomposition product of cocamine resulting from treatment with alcoholic baryta solution did not at first appear to exactly correspond to the ecgonine obtained from cocaine by Lossen's method, *i.e.*, by heating with hydrochloric acid. This difference was probably due to the fact that ecgonine is partially altered by baryta, since by treatment of the baryta product with hydrochloric acid, or by the direct decomposition of cocamine with this acid, hydrochloride of ecgonine was alone obtained. Apparently ecgonine undergoes an internal molecular change by treatment with baryta into the dextro-ecgonine discovered by Einhorn, whilst the subsequent treatment with hydrochloric acid produces the reverse change into the original product.

The hydrochloride after repeated recrystallization from alcohol is anhydrous and free from alcohol. It gave the following results upon analysis—

0·2640 gr. substance dried at 100° gave 0·4665 gr. CO_2 and 0·1725 gr. H_2O.

0·3485 gr. substance dried at 100° gave 0·225 gr. AgCl.

	Calculated for $C_9H_{15}NO_3$, HCl.	Found.	
C.	48·66	48·19	per cent.
H	7·22	7·26	„
Cl	16·02	15·97	„

The ecgonine and double platinum salt prepared from this hydrochloride corresponded completely with the derivatives from cocaine.

Cocaic Acid.

As I have already mentioned, I have named the characteristic acid resulting from the decomposition of cocamine, cocaic acid, and its radicle, cocamyl, a nomenclature analogous to that adopted in cinnamyl, the radicle of cinnamic acid, with which it stands in close relationship.

If cocamine is decomposed by alcoholic baryta solution, barium cocaiate separates, which, dissolved in water, yields a flocculent precipitate of cocaic acid upon addition of hydrochloric acid. On the other hand by decomposition of the base with hydrochloric acid, a mixture of cocaic acid with ecgonylcocaic acid results. For the purification of the crude cocaic acid obtained by either process it is advisable to boil with a slight excess of milk of lime, precipitate the clear filtrate with hydrochloric acid and well wash the precipitate with water. The dried acid should be then dissolved in hot glacial acetic acid, from which the cocaic acid crystallizes upon cooling, and by a second recrystallization from glacial acetic acid it is obtained absolutely pure.

0·2492 gr. substance dried at 120° gave 0·6635 gr. CO_2 and 0·124 gr. H_2O.

From these data, together with those derived from the analysis of the lead salt, I at first deduced the formula $C_9H_8O_2$, which Liebermann by means of the Raoult's method also proposed for the supposed identical so-called γ-isatropic acid. From later observation I was, however, induced to double this formula, and Liebermann did the same almost simultaneously. The respective results, together with the theoretical values, are given in the following table :—

	Calculated for	Found.		
	$C_{18}H_{16}O_4$.	Hesse.*	Liebermann.	
C.	72·97	72·61	72·62	72·61 p. c.
H.	5·41	5·52	5·67	5·74 „

Cocaic acid contains no water of crystallization in the molecule; it is scarcely soluble in cold water, slightly in hot water, and crystallizes in small colourless leaflets from the aqueous solution. From hot glacial acetic acid, in which it is very soluble, it separates almost completely in beautiful satiny leaflets when the hot solution is mixed with an equal volume of boiling water and allowed to cool. Cocaic acid dissolves readily in moderately dilute alcohol upon warming, and crystallizes therefrom in flat needles; similar crystals separate from ethereal solutions, but ether dissolves it with difficulty. When the ethereal solution of the absolutely pure acid is allowed to evaporate very slowly, a crystalline form sometimes obtains which resembles that assumed by benzoic acid under the same conditions; but cocaic acid may be readily distinguished from benzoic acid by its comparative insolubility in water and ether, by its non-volatility and by its higher melting-point, 266-267° C.* Liebermann generally gives the melting point of this acid, which he inconsistently first termed γ-isatropic acid and then α-truxillic acid, as 274° C., once as 276°, statements that must be incorrect.

In accord with the under-mentioned observations cocaic acid must be regarded as a dibasic acid, although the preparation of an acid salt has not yet been effected, whilst the manufacture of the neutral salts, which frequently crystallize very beautifully, presents no difficulty.

The *ammonium salt* is easily obtained by solution of the acid in hot alcohol and addition of ammonia in slight excess. Upon cooling the ammonium salt separates in colourless needles that dissolve with difficulty in hot alcohol, are readily soluble in hot water, and less soluble in cold water. The aqueous solution is of neutral reaction, but soon acquires an acid character when warmed.

0·3955 gr. air-dried substance gave an admixture with platinum chloride, etc., 0·228 gr. Pt.

0·2106 gr. air-dried substance gave 0·503 gr. CO_2 and 0·1265 gr. H_2O.

	Calculated for $C_{18}H_{14}O_4(NH_4)_2$	Found.	
C	65·42	65·14	per cent.
H	6·66	6·67	„ „
N	8·48	8·29	„ „

The *copper salt* occurs as a beautiful blue-green precipitate, that soon becomes crystalline, when a solution of copper sulphate is added to the slightly warmed aqueous solution of the ammonium salt. It is insoluble in water and possesses the composition $C_{18}H_{14}O_4Cu+2H_2O$.

	Calculated.	Found.		
CuO.	20·18	19·40	19·69	per cent.
$2H_2O$	9·14	—	9·74	„ „

The *lead salt* was obtained in an analogous manner, and consists of small mostly microscopical needles, that are almost insoluble in water and are anhydrous at 120° C.

0·1583 gr. air-dried substance lost at 120° C. 0·005 gr. H_2O, and upon incineration, etc., gave 0·091 gr. Pb. SO_4.

	Calculated for $C_{18}H_{14}O_4Pb+H_2O$	Found.	
Pb	39·88	39·27	per cent.
H_2O	3·46	3·14	„ „

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* In reply to Liebermann's criticism, that I contented myself with one analysis of the acid, I may remark that I had no motive to repeat the analysis after Liebermann had obtained the same results.

* Different preparations melted generally at 266°, but in a few cases a temperature of 267° was recorded. The estimations were made in a Roth's apparatus with a previously checked thermometer, as I have already mentioned in other places.

The *silver salt*, obtained by precipitation of the ammonium salt with nitrate of silver solution, occurs as a white flocculent precipitate, that soon becomes crystalline and is rapidly deposited. As Liebermann has already found, it possesses the composition $C_{18}H_{14}O_4Ag_2$.

0·2395 gr. substance dried at 100° gave upon incineration 0·101 gr. Ag.

	Calculated.	Found.
Ag	42·35	42·17 per cent.

Cocaiate of quinine, resulting from the addition of a hot aqueous solution of hydrochloride of quinine to an aqueous solution of ammonium cocaiate, separates in small white needles, that dissolve with difficulty in boiling water and scarcely at all in cold water or chloroform. From hot alcohol, in which it readily dissolves, the salt crystallizes in beautiful prisms.

0·7235 gr. substance lost 0·024 gr. H_2O at 120°, and yielded 0·4825 gr. quinine.

	Calculated for $(C_{20}H_{24}N_2O_2)_2 \cdot C_{18}H_{16}O_4+2H_2O$.	Found.
Quinine	66·12	66·68 per cent.
$2H_2O$	3·67	3·30 „ „

No acid salt could be obtained by addition of 1 mol. cocaic acid to this salt.

Cocaiate of hydroquinine is obtained by the double decomposition of sulphate of hydroquinine and ammonium cocaiate in hot aqueous solution. It separates in small white needles that dissolve with difficulty in hot water, but easily in chloroform and hot alcohol.

0 5815 gr. air-dried substance lost 0·0288 gr. H_2O. at 120° C.

0·8840 gr. air-dried substance yielded 0·586 gr. hydroquinine.

	Calculated for $(C_{20}H_{26}N_2O_2)_2.C_{18}H_{16}O_4+2H_2O$.	Found.
Hydroquinine .	66·26	66·29 per cent.
$2H_2O$	3 65	3·92 „

Cocaiate of cinchonidine, obtained in an analogous manner to the previous salts, crystallizes in small white needles that are easily soluble in alcohol and hot water, but dissolve in cold water and chloroform with difficulty. Apparently it also contains two molecules of water of crystallization, and effloresces at ordinary temperatures.

0·242 gr. substance dried at 100° yielded 0·160 gr. cinchonidine.

	Calculated for $(C_{19}H_{22}N_2O)_2C_{18}H_{16}O_4$.	Found.
Cinchonidine .	66·51	66·11 per cent.

Cocaiate of hydrocinchonidine is prepared in a similar manner to the cinchonidine salt; it is similar to the latter in appearance as well as in its behaviour towards solvents, with the exception that it dissolves easily in chloroform.

Cocaiate of conchinine,* prepared by the precipitation of sulphate of conchinine with ammonium cocaiate in hot aqueous solution, crystallizes from alcohol in delicate white needles, which are moderately soluble in water and very soluble in chloroform. Its composition is $(C_{20}H_{24}N_2O_2)_2,C_{18}H_{16}O_4+4H_2O$.

	Calculated.	Found.
Conchinine . .	63·78	63·75 per cent.
$4H_2O$ . . .	7·08	7·06 „

Cocaic acid dimethyl ester, $C_{18}H_{14}O_4(CH_3)_2$. Cocaic acid readily dissolves in hot methyl alcoh and crystallizes out unaltered upon cooling. B if some hydrochloric acid be added to the solutio the methyl ester is rapidly formed, and, a it is only slightly soluble in methyl alcohol immediately separates. It crystallizes in beautif satiny leaflets melting at 173° C In hot dil alcohol the ester only dissolves to a small exte and crystallizes therefrom in colourless needles. I is very soluble in hot glacial acetic acid and can b readily recrystallized from this solvent without undergoing any decomposition. Liebermann, wh also prepared this ester, observed a slightly high melting point, namely 174° C.

0·1527 gr. substance gave 0·4075 gr. CO_2 and 0·084 g H_2O.

	Calculated.	Found
C	74·07	73·81 per cent.
H	6·17	6·19 „

An attempt to convert the ester into an amid by boiling with alcoholic ammonia, or into a ethoreal acid, was unsuccessful. Nor was it pos sible to obtain a trace of an ethereal acid from the methyl-alcoholic mother-liquor that occurs in the preparation of the ester.

Ecgonylcocaic Acid.

Cocamine and cocamine hydrochloride are con verted to a greater or less extent into ecgonylco caic acid by heating them alone to 124° or 120° C. respectively, but no cocamylecgonine is formed, a I have previously erroneously stated in anoth place. If the residue be dissolved in ammon and this solution be mixed with barium chlori the barium salt of ecgonylcocaic acid is precip tated.

The same acid is generated during the com mencement of the decomposition of cocamine wi concentrated hydrochloric acid and then separat as an oil. If the solution be shaken with ether the ecgonylcocaic acid is removed by the latter and remains after evaporation of the solvent as a yellowish varnish-like residue, from which the barium salt can be prepared in the above manner. In both cases the acid is obtained in such a cond tion that it is only possible to effect its purifica when working with large quantities. The neces sary amount was derived from a part of the s called amorphous alkaloids that had been extract from the Paris coca and had been subjected f some months to a temperature of about 60° C. This dissolved readily in ammonia, and the solu tion was fractionally precipitated with chloride o barium; the second, third and fourth fractio were dissolved in cold water, and the clear filtr supersaturated with acetic acid, by which m the ecgonylcocaic acid was separated. Ecgony cocaic acid can also be obtained by fractiona precipitation of the ammoniacal solution with ace acid, but the acid thus prepared is not quite pu as more acids than ecgonylcocaic acid result fr the decomposition of the base with hydrochlo acid.

The pure air-dried substance consists of irreg lar yellowish white or white fragments which furn upon trituration a white powder melting at 120° C. Upon analysis—

I. 0·2612 gr. substance dried at 120° gave 0·65 g CO_2 and 0·1465 gr. H_2O.

II. 0·2475 substance dried at 120° gave 0·630 g CO_2 and 0·1365 gr. H_2O.

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* As conchinine the author refers to the base termed quinidine by Pasteur [Ed.].

In my second publication concerning cocamine* I put forward the formula $C_{18}H_{19}NO_4$ for this substance and called it provisionally cocrylecgonine. More detailed investigation, however, suggested the formula $C_{27}H_{29}NO_6$; the theoretical values for both formulæ and the analytical results are recorded in the following table:—

	Calculated for		Found.		
	$C_{18}H_{19}NO_4$	$C_{27}H_{29}NO_6$	I.	II.	
C. .	69·00	69·97	69·43	69·42	per cent.
H .	6·07	6·26	6·23	6·12	,, ,,

Freshly precipitated ecgonylcocaic acid dissolves fairly readily in cold water and imparts to it an acid reaction. It is also easily soluble in alcohol and ether, and separates in an amorphous condition from the ethereal solution when rapidly evaporated, whilst by slow evaporation more or less cocaic acid separates. If the ethereal solution be repeatedly shaken with water or dilute hydrochloric acid, ecgonine is removed in the lower layer and nearly pure cocaic acid results from the evaporation of the ethereal solution. This decomposition of ecgonylcocaic acid also occurs when its solution is warmed with milk of lime, or indeed even when the ammoniacal solution is allowed to stand for any length of time. Concentrated hydrochloric acid decomposes it upon warming in like manner, although less quickly, which probably bears a connection with the slight solubility of ecgonylcocaic acid in concentrated hydrochloric acid.

An ammoniacal solution of the acid, as nearly as possible neutralized with acetic acid, yields amorphous flocculent precipitates with both barium and cupric chlorides. The precipitate resulting from the latter reagent is bluish-green in colour and is insoluble in water.

0·106 gr. of the air-dried substance lost 0·010 gr. H_2O at 160°, and yielded 0·0158 gr. CuO upon incineration.

	Calculated for $C_{27}H_{27}NO_6Cu+3H_2O$.	Found.	
CuO	13·80	14·90	per cent.
$3H_2O$	9·35	9·43	,, ,,

In accordance with my earlier views regarding the composition of ecgonylcocaic acid, it had previously appeared to me that the acid resulting from its decomposition with hydrochloric acid probably contained two atoms of hydrogen less than cocaic acid, or that even a chlorcocaic acid $C_{18}H_{14}Cl_2O_4$ might result from the addition of HCl. Although the acid exhibited the melting point of 266° C., *i.e.*, exactly that of cocaic acid, and also completely agreed in its other properties with the acid in question, yet in consideration of my earlier ideas concerning this decomposition product, I considered it desirable to execute an analysis of the substance.

0·1742 gr. substance dried at 120° C. gave 0·4625 gr. CO_2 and 0·087 gr. H_2O.

	Calculated for $C_{18}H_{16}O_4$.	Found.	
C . .	72·97	72·41	per cent.
H . .	5·41	5·54	,, ,,

The acid formed by the decomposition of ecgonylcocaic acid with hydrochloric acid is therefore undoubtedly cocaic acid, and the decomposition of cocamine by hydrochloric acid can be expressed by the following equations:—

$$\text{I. } C_{38}H_{46}N_2O_8 + 3H_2O = \underset{\text{Ecgonylcocaic acid.}}{C_{27}H_{29}NO_6} + \underset{\text{Ecgonine.}}{C_9H_{15}NO_3} + \underset{\text{Methyl alcohol.}}{2CH_4O}.$$

$$\text{II. } C_{27}H_{29}NO_6 + H_2O = \underset{\text{Cocaic acid.}}{C_{18}H_{16}O_4} + \underset{\text{Ecgonine.}}{C_9H_{15}NO_3}.$$

The decomposition process involved by heating cocamine hydrochloride to 120° C. must also take place in the same sense.

$$C_{38}H_{46}N_2O_8,2HCl + 2H_2O =$$
$$C_{27}H_{29}NO_6 + C_9H_{15}NO_3 + 2CH_3Cl + H_2O.$$

According to this equation the theoretical loss in weight would be 15·4 per cent., whilst 14·9 per cent. was observed.

Ecgonylcocaic acid appears to combine with ecgonine in moderately concentrated solutions, since a completely clear solution is formed. On addition of cold water, however, a resinous flocculent precipitate of ecgonylcocaic acid separates.

I have in vain endeavoured to isolate cocamylecgonine from the decomposition products of cocamine, though in the meantime Liebermann and Drory* have effected its synthesis and called it γ-isatropylecgonine. Doubtless this want of success is due to the fact that the decomposition of the cocamine is effected solely in the sense of the above equations.

(*To be continued.*)

THE EXHIBITS AT THE CELEBRATION OF THE SOCIETY'S JUBILEE.

On the occasion of the official celebration of the Jubilee of the foundation of the Society, a number of articles of interest, chiefly of a historic nature, were displayed in various parts of the Society's premises.

The collection exhibited in the Council Room included the photographs of all the founders of the Society who are still living; in addition numerous engravings and oil paintings of past officers and founders were hung upon the walls.

Amongst other pictures of interest may be mentioned the valuable paintings of John Bell's Laboratory, by Hunt, and of Morson's Laboratory at Hornsey, by W. Müller.

Daniel Hanbury's ability as an artist was seen in a number of paintings and sketches, including pictures of the laboratory of the firm with which he was connected, and others illustrating scenes visited on his tours to the Holy Land and elsewhere.

Engraved portraits of Ambrose Godfrey Hanckwitz, who first prepared phosphorus in its solid form about the year 1680, together with three engravings of the laboratory of Robert Boyle, in which Hanckwitz worked, and which for many years after was occupied by Messrs. Godfrey and Cooke, were also exhibited.

Visitors of antiquarian proclivities were amply provided with material in the form of old books and manuscripts relating to pharmacy. Of especial interest was the collection of works, upwards of thirty in number, illustrating the progress of pharmacy and allied subjects from 1560 to 1830, contributed by Mr. George Weddell, of Newcastle-on-Tyne. This selection from Mr. Weddell's collection included the original manuscript entitled "Arcana Fairfaxiana Manuscripta," a volume of apothecaries lore nearly three centuries old, the *fac simile* reproduction of which was reviewed in this Journal (before, p. 614).

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* *Berichte der deutsch. chem. Ges.*, xxii., 665.

* *Berichte der deutsch. chem. Ges.*, xxii., 680.

A number of druggists' recipe books of the last century were also shown; the remedies therein prescribed being illustrative of the times when blood-letting and materia medica derived from the animal kingdom were relied on to a considerable extent as curative agents.

Two laboratory process books, employed about 1730 to 1740 at Apothecaries' Hall, in which the old alchemical symbols were largely employed, were of considerable interest in themselves, and as showing the advances made in scientific nomenclature since that time.

The changes which have taken place in the prices of many drugs and chemicals since the early part of the century were illustrated by a number of old invoices and price lists of wholesale druggists. As examples may be mentioned the price of quinine sulphate quoted in Messrs. Morson and Sons' list, dated 1822, at 40*s.* per ounce; and phosphorus invoiced about the same time at 44*s.* per lb.

In connection with the School of Pharmacy were shown a syllabus of the lectures delivered soon after the foundation of the Society by the various professors, Pereira's correspondence with Professor Guibourt, an air-pump which formerly belonged to Pereira, "Lectures on Botany" (1822), the work of A. Todd Thomson, first professor of botany to the Society, and Daniel Hanbury's manuscript notes of the lectures delivered by Fownes and Pereira.

The following exhibits, amongst others, attracted considerable attention. A series of humorous sketches and etchings by Jacob Bell; a number of autograph letters by founders and past officers of the Society; an album containing the photographs of all apprentices and associates of the Society who have obtained Jacob Bell Scholarships, commencing with W. A. Tilden, in 1861, and continuing up to the present time; an album containing photographs of those who took part in the International Pharmaceutical Congress held in London in 1881; the Royal Charter of Incorporation of the Society; and the Grant of Arms to the Society.

The Museums on the ground floor in No. 17 being requisitioned for cloak rooms, and the Library for refreshments, but little space was available for exhibits. In the old examination room, however, Dr. Pereira's work was represented by a case containing some typical specimens illustrative of the thoroughness with which his researches in materia medica were carried out, and his own catalogue of his collection was placed with them. These specimens are of great interest, as representing some varieties of cinchona barks, catechu, etc., that have ceased to come into the London market, or which come only at long intervals. It may, moreover, be regarded as the nucleus around which have been formed the very extensive collections now in the Museum of the Society.

In the next room the materia medica collection and medicinal herbarium of the late Daniel Hanbury have lately been placed, and the room is now known as the Daniel Hanbury room. Here were exhibited numerous specimens illustrating Hanbury's life and work, and others lent for the occasion, chiefly illustrative of the materia medica of the last century.

Amongst the articles of personal interest was a manuscript of the late Daniel Hanbury in its earliest stage, written on various scraps of paper, in the clear, neat handwriting, characteristic of Hanbury's manuscript, which must have rendered his "copy" quite a treat for the printer, especially since the final copy was written on a page of uniform size, with every letter well formed, and every sentence carefully punctuated. Specimens of *Amomum angustifolium*, from the Hanbury Herbarium, exhibited in the central case in this room, might have been taken as models of what herbarium specimens should be, each sheet having representative parts of the plant with flowers dissected, and beautifully executed colour drawings of the natural colour of the flowers. A packet of papers on Trehala and a series of letters on Chinese drugs served to show the immense amount of time and trouble often taken by Hanbury to elucidate points of apparently minor importance, but which has made all that he has written thoroughly trustworthy. The other exhibits in this room include a set of materia medica specimens of the last century which were at one time in the possession of Dr. W. G. Maton, F.R.S., who was a Vice-President of the Linnean Society from A.D. 1775–1837, but some of the specimens apparently date from a much earlier period. These specimens are contained in quaint old glass bottles of a greenish tint and irregular form, which serve at a glance to show what improvement a century has made in glass manufacture. On a table near it were placed some old London Pharmacopœias, dating from about 1721 to 1821, and bearing evidence in the list of simples of the changes that have taken place in materia medica in the last one hundred and fifty years. A few of the old fashioned articles, out of Dr. Maton's collection, were placed in view, and include such articles as Egyptian mummy, intestines of wolf and liver of eels, whilst close by was shown viper's fat and lozenges of viper's flesh. This selection perhaps was necessary, for, judging from the old Pharmacopœia lists of officinal materia medica, some of the specimens were not fit to mention to ears polite, much less to expose to view. Some old drugs from the same collection were of more general interest, such as the spikenard, mandrake and aloes (wood) and onycha of Scripture; nephritic wood, the botanical source of which, though a Mexican product, even Hanbury failed to ascertain; and the *Lignum rhodium* or *aspalathus*, in which he was more successful. There were also flea-seed (*Plantago Psyllium*), a seed which has somewhat undeservedly fallen into desuetude, deriving its name from its similarity and colour to *Pulex irritans*, but possessing demulcent rather than irritating properties; woad; heliotropium or turnsole, a deep blue colouring matter like litmus, obtained from *Crozophora tinctoria*; opopanax; sagapenum; resin from the common ivy; fragrant labdanum, supposed to be the myrrh mentioned in Genesis, ch. xliii., v. 2, and other articles that a modern pharmacist would find it rather difficult to procure.

A nest of druggist's shop drawers, carefully made of oak, with carved brass labels, illustrative also of pharmacy of a byegone period, exhibited some names that would have puzzled an apprentice of the present day, or even one who had passed the Minor examination, such as:—Fl. Balaust; lap. bezoard; fl. stoechad.; rosmari; cancr. ch.; cancr-ocul; F. dict. cret; F. pol. mont. Yet, with the exception of the last, specimens of the drugs had been procured and were placed in the drawers, and any one opening the drawers would find the specimens as fresh as when kept in stock one hundred years ago.

A cabinet of old materia medica, lent by Messrs. Corbyn and Stacey, and dating also from the last century, illustrated the care taken to preserve the specimens in olden times, and the excellent quality of the drugs then in use.

The Pharmaceutical Journal.

SATURDAY, JUNE 6, 1891.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Richard Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL MEETING.

The Council meeting on Wednesday was attended by fifteen members, and after the minutes of the previous meeting had been confirmed, a motion was brought forward by Mr. Bottle expressing the indebtedness of the Council to Mr. Carteighe for his labours in connection with the celebration of the Jubilee of the Society. This was seconded by Mr. Hampson and supported by Mr. Atkins, who referred to the important influence that would be exercised in the future by the general recognition of the services rendered by the Pharmaceutical Society. The motion was carried unanimously and acknowledged by Mr. Carteighe as expressing not only the appreciation of his colleagues, but also representing the goodwill of many outside the Council.

On balloting for President Mr. Carteighe was again elected to that office, and in thanking his colleagues for the honour, which he regarded as an evidence of their belief in his loyalty to the Society, he referred to the unanimity prevailing amongst them as being the essential condition for enabling the Council or any public body to do useful work for those represented. A recognition of what lies within the range of possibility, and a corresponding limitation of their endeavours, would be more conducive to harmonious and satisfactory working than the encouragement of disputatious debates upon less attainable matters.

Mr. Bottle was again re-elected Vice-President, and acknowledged this renewed mark of confidence with an assurance that he would continue to do all in his power to promote the best interests of the Society. Mr. Hampson was also re-elected Treasurer, and expressed his hope that there would be a material increase in the funds of the Society and of the Benevolent Fund.

After the election of officers was completed one person was elected a pharmaceutical chemist member of the Society, and one a chemist and druggist member; eight persons were elected associates, and thirty-nine were elected apprentices and students of the Society. The several standing committees of the Council were then appointed and the Council proceeded to consider the reports.

The report of the Finance Committee presented no unusual feature, beyond the mention of a donation of twenty guineas to the Benevolent Fund in connection with the celebration of the Society's Jubilee. On the motion of the President, seconded by the Vice-President, a vote of thanks was passed to the members of the Staff who had assisting in procuring and arranging articles for exhibition at the Jubilee celebration, and a sum of fifty pounds was voted for division among the clerks in the Secretary's office, as a recognition of their zealous performance of the arduous extra work connected with occasion.

The report of the acting Benevolent Fund Committee was adopted. Upon its recommendation, three grants of five pounds each and one of ten pounds were made, and the Secretary reported the death at the age of 83 of Mr. Hollinworth, who has been an annuitant since the year 1879. The Vice-President mentioned the success which had attended the endeavours to secure the election of Mr. How of Bournemouth as an annuitant of the Royal Masonic Benevolent Institution, pointing out that this result was due to the kind support of pharmaceutical masons and especially to that rendered by Mr. Dugdale, of Poole. Mr. Richardson also referred to the great interest that has been taken in this election as having been largely consequent upon the establishment of a masonic lodge by members of the pharmaceutical body. He anticipated that in the future it might be possible to secure a large number of votes in favour of candidates connected with the trade seeking election to one or other of the masonic charities.

The General Purposes Committee reported the progress made in the prosecution of cases of infringement of the Pharmacy Acts which have been placed in the hands of the Solicitor. Five defendants have paid penalties and costs. In another case in which a penalty was recovered but not paid, the defendant had recommenced business and an execution was levied. Several cases now stand for hearing and proceedings have been recommended in other cases.

On the motion of the President, seconded by the Vice-President, it was unanimously decided to send letters of condolence to the relatives of Mr. W. S. Brown and Mr. W. L. Bird, both of whom were formerly members of the Council and occupied the position of Vice-President.

We regret to notice that in the report of the official celebration of the Society's Jubilee the address from the Midland Counties Chemists' Association does not appear among those presented by personal representatives. That was a mistake arising from the number of addresses of which no previous notification had been given. Actually, the address from Birmingham was read and presented by Mr. C. Thompson, the Vice-President, and we much regret that this fact was not correctly reported. We trust, however, that a consideration of the difficulty of dealing with such a large number of addresses on the spur of the moment will furnish an excuse for the oversight, which was simply due to an inadvertence of the reporter.

* * *

In reply to a question put in the House of Commons on Monday evening by Sir Lyon Playfair, the Chancellor of the Exchequer said he had been informed that the effect produced by scheduling ether under the Irish Poisons' Act had been most beneficial. Its use as a beverage was reported to have diminished considerably, and by many was alleged to have ceased altogether. It was further stated that the sale of ether by wholesale druggists in Belfast had fallen off 90 per cent. As to methylated spirit, the Chancellor of the Exchequer said he hoped the drinking of it might be prevented by the means taken to make it more nauseous and by stricter regulations that have been approved by the Board of Inland Revenue.

* * *

On Thursday evening a paper on "The Water Supplies of London" was read by Mr. R. A. Robinson, at a meeting held in the Kensington Town Hall, under the auspices of the Kensington Ratepayers' Association. The chair was taken on this occasion by General Lord Chelmsford, G.C.B.

* * *

In reply to an inquiry we may say that there ought not be any doubt as to the meaning of the term "sodæ carb." in a prescription. Although carbonate of soda is an article of the British Pharmacopœia, and its dose is there stated, the bicarbonate has long been preferred for medicinal purposes, as it is less nauseous, and we take it that is what the term above quoted is intended to denote. In the older Pharmacopœias of London and Edinburgh this salt was termed "carbonate of soda," and the salt which, according to modern nomenclature, is known as carbonate of soda, was termed "subcarbonate."

* * *

We are informed that at a public meeting held in Madras on April 8 to consider a memorial to perpetuate the name and services of the late Dr. Mohideen Sheriff, the editor of the 'Supplement to the Pharmacopœia of India,' the sum of Rs. 587 was collected and other donations are coming in. It has also been arranged that the 'Materia Medica of Southern India,' which Dr. M. Sheriff was engaged in editing at the time of his death, shall be completed by Mr. David Hooper, the Government Quinologist at Ootacamund.

* * *

We have received a letter from Mr. Gillow, M.R.C.S., in which he suggests that public attention should be directed to the value of a drug which he names "kreat," as a remedy for influenza, and which he has found to be a specific in pulling up the system after an attack, as well as a powerful means of prevention for those who are exposed to the malady. No information is given as to the nature of this drug, or the mode in which it is to be used. In regard to the former point it may be mentioned that an Indian drug was recently described as a new remedy in the *British Medical Journal* under the name of "kreat," though as shown in this Journal, p. 837, that name is only the vernacular equivalent of *Agathotes*, the old generic name of *Ophelia Chirata*.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 3, 1891.

Present—Messrs. Abraham, Allen, Atkins, Bottle, Carteighe, Cross, Greenish, Hampson, Harrison, Hills, Leigh, Martindale, Newsholme, Richardson, and Warren.

Mr. **Michael Carteighe** took the chair.

The minutes of the last monthly meeting, and of the special meeting on May 27, were read and confirmed.

The Jubilee Meeting.

Mr. **Bottle** said he desired, before the business on the agenda was proceeded with, to obtain the Chairman's permission to make a few observations which would probably be out of order later on. He wished to move—

> "That the best thanks of the Council are eminently due and are hereby tendered to the President for his zeal, devotion, tact and ability, which conduced so much to the international reciprocity and great success of the recent Jubilee proceedings."

This resolution would commend itself to all, and he himself could bear testimony to the time, zeal, and attention which the President had devoted not only to the larger, but to the minor details, of everything connected with the Jubilee proceedings. It was a source of great pleasure to him as an old member of the Council to have been permitted to live on in connection with the Society to see its Jubilee. The celebration was most successful. There was not a hitch anywhere, and he had been extremely gratified at the success of the whole proceedings. They would all agree that the success was in great measure due to the indefatigable exertions of the President.

Mr. **Hampson** seconded the motion, saying he was sure the members of Council would be unanimous in recording an expression of thanks to the President for his wonderful administrative ability, his zeal, and all the high qualities necessary to make an undertaking of such a kind successful.

Mr. **Atkins** desired to support the motion, and esteemed it a privilege to do so. He felt, of course, that every man who undertook office did it from a sense of public duty, and did not look for any expression of thanks; but there was a very large amount of unpaid work done in the world, which ought to have a very warm recognition on the part of those to whom the service was rendered. The claims of the President in this case were supreme, and he wished to bear his personal testimony, not for the first time, to the services Mr. Carteighe had rendered to the Society and to pharmacy in general. He need not enlarge on the points mentioned by Mr. Bottle and Mr. Hampson, with which he heartily concurred; he held that as time passed on, the importance of that function would increase in the estimation of pharmacists, not only in this country but throughout the civilized world. If he might be permitted, he should like to say a word with reference to the services the President had rendered in his recent visits to the country. He felt that a great deal had been done to make the Society more perfectly understood, and to bring about a more perfect accord. Only a few days ago he had a visit from a gentleman, who told him he went to one of those meetings with a determination to oppose the policy of the Society, but having heard the President's explanation, he was convinced, and should be for the future a loyal supporter of the Society. He most emphatically supported the motion.

The motion was put by Mr. **Bottle** and carried unanimously.

Mr. **Carteighe** said he was not going to make a speech on this occasion, but would simply express in the warmest terms his appreciation of the kindness of his colleagues; he thanked them from his heart for the kind expressions of goodwill which had been uttered, which he knew represented the goodwill of a great many outside. The great thing was for the officers and Council of the Society to work together for the progress of the body politic, the whole Society; and if during his term of office he had been able in any way to further that end he was heartily thankful.

Election of President.

On the ballot being taken in the usual way,

MR. MICHAEL CARTEIGHE

was re-elected President.

The **President** said it was rather difficult to know how to express his thanks for the tenth time for this honour. He could only say that the confidence thus again placed in him was an evidence that his colleagues believed he was loyal to the Society, and that oyalty and any usefulness he had been able to show had been brought about by the loyalty and fidelity of his colleagues. It was sometimes said that it was a great mistake to be so unanimous. No doubt it was rom the point of view of certain people outside, but no public body could do useful work if it was perpetually wrangling, and if he had received such testimonies of good will from time to time, he believed it was because it was recognized that the work should proceed in the most satisfactory manner, understanding what was within the range of possibility and striving to attain that rather than encouraging debates over matters which were impossible of attainment. He could only obey the orders of the Council and accept office for another year. The office entailed considerable responsibility and effort, but he should be the last man to move in any direction against the obvious wishes of his colleagues.

Election of Vice-President.

On a ballot being taken,

MR. ALEXANDER BOTTLE

was re-elected Vice-President.

The **Vice-President** said he had only to thank his friends for this renewed mark of their confidence and to say that he would endeavour to the best of his ability to deserve it by promoting the best interests of the Society and good fellowship amongst the Council.

Election of Treasurer.

On the ballot being taken,

MR. ROBERT HAMPSON

was re-elected Treasurer for the ensuing year.

The **Treasurer** returned his cordial thanks for the honour again conferred upon him, and hoped that the funds of the Society, and especially the Benevolent Fund, would grow larger and larger.

Standing Orders.

The standing orders of the Council were re-enacted for the ensuing year.

Secretary and Registrar.

Mr. **Richard Bremridge** was re-appointed Secretary and Registrar for the ensuing year.

Editor and Sub-Editor of the Journal.

Dr. B. H. **Paul** was reappointed Editor and Mr. F. **Passmore** Sub-editor of the Journal for the ensuing year.

Curator.

Mr. **Holmes** was reappointed Curator of the Society's Museum for the ensuing year.

Assistant Secretary.

Mr. J. R. **Hill** was reappointed an Assistant Secretary of the Society for the ensuing year.

Examiners for the Jacob Bell and Redwood Scholarships.

Messrs. W. M. **Holmes** and A. E. **Tanner** were appointed to conduct the examinations for these Scholarships in July next.

Elections.

MEMBERS.

Pharmaceutical Chemist.

George Goss, of Islington, N., having passed the Major examination, and having tendered his subscription for the current year, was elected a "Member" of the Society.

Chemist and Druggist.

George Gibbons, of Adwy, near Wrexham, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Bishop, Ernest	Lewisham.
Gooch, Stephen Leeds	Holt.
Gough, Ernest William	Burnham, Somerset.
Loveluck, Griffith David	Aberavon.
Polley, Thomas Edgar	Peckham.
Swindells, Richard	Hyde.

ASSOCIATES.

The following, having passed the Minor examination, and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Clarke, William Edward	Foxholes.
Lyon, William	Keith.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Barlow, Thomas Oldham	Bowdon.
Bartley, Frank Giles	London.
Bateson, Alfred Campbell	Kendal.
Beale, Frederic Owen	Leicester.
Blackbourn, William	Newark.
Bourdas, Isaiah, jun.	London.
Chippendale, John Richard	Preston.
Currie, Archibald	Leith.
Douglas, Andrew	Edinburgh.
Egerton, William Leggett	Southsea.
Elphinstone, Joseph Lawson	Aberdeen.
Fordham, Sidney Herbert	London.
Franks, Frank Richard	London.
Gibson, James Arthur	Glasgow.
Goodwin, Francis Arthur	Hampton Bishop.
Gratte, Alfred	Newport (Mon.).
Green, George	Bristol.
Hallaway, Robert Railton	Carlisle.
Hawthorne, Archibald	Stafford.
McMahon, Ernest Hammond	London.
Moffitt, Thomas Henry	Acklington.
Morton, Henry Rosser	Margate.
Parsons, Ernest Alsager	Wolston.
Parry, Dan Josiah	Blaina.
Pigott, William Edmund	Wadsley.
Pitt, Charles Frederick	Bristol.
Randall, Bruford Henry	Wareham.

Rees, Thomas	Pentrechwyth.
Roberts, Caswallon Pugh	Criocieth.
Robinson, Joseph	Stanley.
Rowland, Herbert Luker	Weybridge.
Scholefield, William Henry	Leeds.
Shaw, Thomas Alexander	Hull.
Stones, Arthur John	Rotherham.
Sudlow, Thomas Wilson	Stockton-on-Tees.
Swainson, John Williams	Devonport.
Tunbridge, Francis F. Arnull	Reading.
Walkerdine, William Alfred	Derby.
Wood, Joseph William Wells	London.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

APPOINTMENT OF COMMITTEES.

The Council went into Committee to consider the arrangement of the different Committees, as the result of which the following arrangements were made:—

General Purposes.—The whole Council. To meet on the evening before the meeting of the Council, and at such other times as may be necessary.

Finance.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Abraham, Allen, Cross, Gostling, Harrison, Hills, Leigh, Martindale, Newsholme and Schacht. To meet the day preceding the Council meeting, and at such other times as may be required.

Benevolent Fund.—The President (Mr. Carteighe), Vice-President (Mr. Bottle) and Messrs. Atkins, Evans, Greenish, Hampson, Richardson, Southall, Storrar, Warren and Watt. To meet the day before the Council meeting, and at such other times as may be necessary.

Library, Museum, Laboratory and House.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Allen, Atkins, Cross, Greenish, Hampson, Hills, Martindale, Newsholme, Richardson, Schacht and Warren. To meet on the second Wednesday in the month, except August and September, and at such other times as may be required.

Law and Parliamentary.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Abraham, Allen, Atkins, Cross, Hampson, Harrison, Hills, Martindale, Newsholme, Richardson, Storrar, Warren and Watt. To meet as occasion may require.

Research.—The President (Mr. Carteighe), Vice-President (Mr. Bottle), and Messrs. Greenish and Schacht.

Evening Meetings.—The staff of the Society's School, the Editor and Curator, were requested to assist the President and Vice-President in making arrangements for the Society's evening meetings in London.

REPORT OF THE FINANCE COMMITTEE.

The report of this Committee was of the usual character, and recommended sundry accounts for payment.

The PRESIDENT (as Chairman of the Committee), moved the adoption of the report. He said there was nothing special in the receipts except the half yearly payment from the publishers. The receipts on account of the Benevolent Fund had not been very large, most of them having come in in April. On the donation account a sum of twenty guineas had been received from Mr. Seabury, an American pharmacist, he believed originally a pharmaceutical chemist, who was unable to attend the Jubilee, but sent this cheque as a mark of his respect for the Society and its work.

The report and recommendations were unanimously adopted.

THE JUBILEE.

The PRESIDENT moved a vote of thanks to those members of the Society's staff who assisted in procuring and arranging the articles exhibited at the official celebration of the Society's Jubilee on May 26.

This was seconded by the VICE-PRESIDENT and carried unanimously.

The PRESIDENT said there had been a great deal of very arduous work in the office during the past few months, and he would move that £50 be placed in the Secretary's hands for distribution amongst the staff of clerks in his office, in recognition of the very loyal manner in which the staff had worked, not as a payment for zealous services, which were not to be measured in money, but as a token of appreciation of those ungrudging services in this Jubilee year.

The VICE-PRESIDENT said he had much pleasure in seconding the motion, which was at once put and carried unanimously.

REPORT OF THE LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April	Day	563	32	12	22
	Evening	251	18	6	11

Circulation of books.	Total.	Town.	Country.	Carriage paid.
April	214	115	99	£1 9s. 2d.

The undermentioned donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Squire, Supplement to Companion to the British Pharmacopœia, 1891. From the AUTHOR.
West (W.), Sulla conjugazione delle Zigeuner, 1891. From the AUTHOR.
U. S. Department of Agriculture, Division of Chemistry, Bulletin, No. 28. From the DEPARTMENT.
Kaiserliche Akademie der Wissenschaften in Wien, Sitzungsberichte, Chemie, 1889–90. From the AKADEMIE.
Pharmaceutical Society of Ireland, Calendar, 1891. From the SOCIETY.
Royal Institution, Proceedings, No. 84.
— List of Members, etc., 1890.
— Additions to the Library, 1882–90. From the INSTITUTION.
Chemical Society, Journal, 1890.
Deutsche Chemische Gesellschaft, Berichte, 1890. From Mr. WALTER H
Flückiger (F. A.), Pharmacognosie des Pflanzenreiches, 3. Aufl., 1891. From the AUTHOR.
Institute of Chemistry, Register, 1891. From the INSTITUTE.
Dieterich (E.), Neues pharmaceutisches Manual, 4. Aufl., 1891. From the AUTHOR.
University of London, Calendar, 1891. From the UNIVERSITY.

The Committee recommended that the undermentioned works be purchased:—

For the Library in London—

Botanisches Adressbuch, 1891.
Meyer (E. v.), History of Chemistry, 1891.
Muir (M. M. P.), Principles of Chemistry, 2nd ed. 1891.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April	Morning	737	51	9	29
	Evening	160	14	2	6

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Seven specimens of British Plants.
From Mr. W. West, Bradford.
Specimens of fruit of *Myrtus communis* and Eucalyptus Oil.
From Messrs. Potter and Clarke.
Specimens of fruits of a species of Myristica from New Granada. From Mr. P. Griffin.
Specimens of Medicinal Products from the Niger.
From Messrs. Figgis and Co.

The Staff of the Society's School had attended and reported on their respective classes.

The President moved the adoption of the report, which was at once agreed to.

Report of the Benevolent Fund Committee.

A meeting of several members acting as a Committee of the Benevolent Fund recommended the following grants:—

£5 to an associate and member from 1841 to 1850 (age 64), who has had three previous grants of like amount. Applicant suffers from bronchitis and is unfit for work. (London).

£5 to the widow (age 47) of a chemist and druggist. She has four children, the two eldest earning a little, but the two youngest entirely dependent upon her. She had a grant of £5 in May, 1890. (Bromley).

£5 to the widow (age 48) of an associate in business. She endeavours to support herself by letting apartments. Had a similar grant in April, 1890. (Liverpool).

£10 to the widow (age 59) of a registered chemist and druggist, who had a grant of £15 last year to assist her in establishing a lodging house. She has been very unfortunate during the past winter. (Yarmouth).

One application had not been entertained.

The Secretary had reported the death on May 12 of Charles F. Hollinworth, aged 83, who had been an annuitant since 1879.

The Vice-President, in moving the adoption of the report and recommendations, said the applications were of the usual kind, and beyond illustrating the fact that the keeping of houses for the purpose of letting lodgings was not very successful in the hands of applicants, did not call for any particular comment. He should like, however, to thank all members who had assisted in securing the election of Mr. How as an annuitant of the Royal Masonic Benevolent Institution, and to mention that they were especially indebted to Mr. Dugdale, of Poole, who had pledged his credit to a considerable extent by borrowing votes for the election. He hoped their friends would bear this in mind, and transfer to him sufficient votes to enable him to repay the debt which he had incurred.

Mr. Richardson wished to emphasize this point. A great deal of interest had been taken by Masonic brethren in this election, very largely he believed in consequence of the establishment of a lodge in connection with pharmacy. He looked forward to great results from this in the future, and hoped that their indebtedness to masonic brethren all over the kingdom would be repaid by the transfer of votes, either for boys, girls, or aged masons.

The motion was carried unanimously.

The Sessional Address.

It was resolved that the Library, Museum, and Laboratory Committee be authorized to make arrangements for the delivery of the Sessional Address in October.

Report of the General Purposes Committee

The report of this Committee included the usual letter from the Solicitor stating the progress made with cases which had been placed in his hands. Five defendants had paid penalties and costs. Several cases were standing for hearing. One defendant, against whom a penalty had been recovered, had not paid it, but had recommenced business; in this case an execution had been levied and the amount recovered with costs.

Several other cases of infringement had been reported and proceedings were recommended.

The Council went into committee to consider the above report.

On resuming, the report and recommendations were unanimously adopted.

Correspondence.

A letter was read from Brigade-Surgeon J. E. T. Aitchison, thanking the Council for the honour done him in electing him an honorary member of the Society.

The Late Mr. W. S. Brown and Mr. W. L. Bird.

The President said it would be remembered that at the Annual Meeting, information was received of the death of two former members of the Council, and votes of sympathy were passed, but it would be only right that the Council also should place on record a resolution of condolence. Mr. William Scott Brown, of Manchester, was not only a member of the Council, but a Vice-President, and most present would remember the active and zealous work which he did. They might not, however, all know as well as he did the shrewdness and promptitude with which Mr. Brown took up the details of an intricate subject, and was able to present them to a meeting. When he first joined the Council he had a notion, like many others, that the work done was not very great, and was accomplished in a somewhat antiquated manner, but he was no sooner in harness than he changed his views completely. He (the President) left the Council just as Mr. Brown came on, but he met him on the Board of Examiners, and heard him confess that outsiders had no conception of the amount of work which was done, and of the careful way in which both the Council and Board of Examiners performed their duties. While he remained on the Council he did very valuable work, and two years ago he made a very handsome donation to the Benevolent Fund. He was President of the Manchester Pharmaceutical Association for many years, and was very highly respected in Manchester, where he was a member of the Town Council. Mr. Brown was a bachelor, and was now represented by his nephew, Mr. Stones, to whom he should be glad to be permitted to convey the condolence of the Council. Mr. W. Lionel Bird was not only a member of the Council, but one of the founders of the Society, and for three years Vice-President, and he had hoped to see him at the Jubilee meeting. Mr. Bird sat on the Council with him for several years, where he did very useful work, especially on the Finance Committee. He was one of those useful men who rallied round Jacob Bell and assisted him in doing work in certain parts of London which he could not undertake personally. He begged, therefore, to move the following resolutions:—

> "That this Council has heard with much regret of the death of Mr. Wm. Scott Brown, of Manchester, who for several years was a member of Council and formerly Vice-President, and desires to express its sympathy with his nephew and relatives in their bereavement."
>
> "That the Council has also heard with much regret of the death of Mr. W. L. Bird, one of the founders of the Society, and also a former member of Council and Vice-President of the Society, and desires to express its sympathy with the family of the deceased."

The Vice-President seconded the motion, saying it had been his privilege to know both these gentlemen, especially Mr. Brown, whose friendship he had enjoyed, and who was one of the most able business men he ever met.

Mr. **Hampson** said when he was in Manchester he was much associated with Mr. Brown, not only as a friend, but as a worker in various associations, and he was much shocked to hear of his decease. Mr. Brown was possessed of very remarkable qualities, not only in business, but in administration, which he used in connection with a number of benevolent and other useful associations. The place of such a man was not readily filled, and he felt that in passing this resolution the Council would be only doing what was just and kind.

The motion was carried unanimously.

THE JUBILEE CELEBRATION.

In addition to the congratulations announced in last week's Journal, letters, from which the following extracts are taken, have been received:—

Mr. W. Searby, Dean of the California College of Pharmacy, writes:—"About twenty-four years ago, good old Walter Martin, of Guildford, now gone to his rest, told me of the Pharmaceutical Society and of the voluntary examinations they provided for young men who might have enough ambition to aspire to membership. I at once set my face in that direction, and between six and seven years later passed the 'Major,' receiving some kindly words from Peter Squire and John T. Davenport. From that day to the present I have always cherished a warm feeling for the Society and watched its career with great interest, though I have been so far removed from its base of operations that it has not been in my power to contribute to its success. I congratulate, you, however, my dear sir, and your colleagues, that you have been privileged to labour together for its advancement, and that your efforts have been so successful, notwithstanding the many obstacles with which you have had to contend."

M. Jonas, Vice-President of the Société Royale de Pharmacie de Bruxelles, writes:—"I should have been most happy to have seen once more our numerous friends in Great Britain, and to have congratulated them upon the occasion of the festival which brings them together. Please to accept my sincere regrets and most cordial salutations."

Professor Reichardt, of Jena, who was prevented from being present by illness, writes:—"I take the present opportunity to expressing recognition of the efforts of your Pharmaceutical Society to raise and give dignity to our position. I regard the Society as an example. I wish with my whole heart that your endeavours may never become futile, but that they may lead to the elevation of professional standing and recognition of scientific effort."

Telegrams.—Besides the telegrams announced last week others have been received from Mr. Lotze, President of the Danmarks Apothekerforening, Copenhagen; from Mr. Scbardt, President of the Apotekare-Societetens Direktion, Stockholm; from Mr. A. von Waldheim, Vienna, Honorary Member; from Mr. W. A. Allan, Local Secretary, Dumfries; and from Mr. H. S. Wellcome.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual meeting of this Association was held at the Masonic Hall, on Wednesday, May 27. Councillor Fitz-Hugh, J.P., the President, occupied the chair, and among those present were Messrs. W. H. Parker (Vice-President), J. Wilford (Treasurer), A. E. Beilby, C. A. Bolton, R. H. Beverley. A. Middleton, T. R. Fletcher, R. Jackson, F. R. Sergeant, and W. Gill (Hon. Sec.).

The Council's report, which was as follows, was taken as read:—

"Your Council is pleased to report that during the past year the work of the Association has not only been steadily maintained, but with regard to educational matters an important step has been taken by establishing a dispensing class at University College. The need of such a class has long been felt, but the expense attending its formation has prevented your Council taking action until this year, when a grant of £20 was received from the Pharmaceutical Society, and with this assistance (for which the best thanks of the Association have been tendered to the Pharmaceutical Society), apparatus and materials for accommodating ten students have been purchased.

"Mr. Sergeant kindly consented to teach the class which was commenced in January, and has been a decided success; eleven lectures, followed on each occasion by an hour's practical work, have been given, the average attendance being 8·5. At an examination at the end of the term Mr. A. Whittaker took the first prize, Mr. H. J. Wright the second, and Mr. A. Adams was specially commended.

"A pharmaceutical botany class, conducted by Mr. J. W. Carr, M.A., has also been held at the College, at which twenty-two lectures, illustrated with magic lantern slides, and followed by practical microscopical work, have been given. Twenty-five students entered and there has been an average attendance of 19·5.

"Examinations were held at the end of each term, and gave results which are far from satisfactory; out of a possible 100 marks only three obtained more than 50, these being Mr. Burdett 69, Mr. Whittaker 59, and Mr. Gee 54. Considering the elaborate educational apparatus provided for this class your Council is very disappointed with these results.

"A pharmacy class conducted by Mr. Eberlin has been held at the Association's Room on alternate Friday evenings, at which there has been an average attendance of 6; the class has been of great benefit to the students.

"During the year two trade meetings have been held; one on June 11, 1890, to consider the Thursday half holiday question, at which the majority of chemists of the town decided to close for the whole or a portion of Thursday afternoon and evening, and this arrangement has been well adhered to. On April 8, 1891, a meeting called to consider the Pharmacy Acts Amendment Bill passed resolutions asking local M.P.'s to support the second reading of the Bill, and desiring the Pharmaceutical Society to endeavour to obtain more protection for the trade. These meetings, though not numerously attended, were marked by a fraternal spirit, and a strong desire that members should combine to further our interests to a greater extent than in the past.

"The annual pic-nic was held at Hasleford on July 30, and thoroughly enjoyed by those present. The annual dinner, held at the Masonic Hall on December 10, was also a success and well attended.

"The Association now numbers 57 members and 37 associates."

On the motion of Mr. Bolton, seconded by Mr. Parker, this report was adopted, as was also the Treasurer's report, which showed that the balance in hand had been slightly increased.

A vote of thanks was passed to the Pharmaceutical Society for the Journal, which had been regularly received.

The election of officers for the ensuing year then took place, with the following result:—President, Mr. Councillor Fitz-Hugh, J.P.; Vice-President, Mr. W. H.

Parker; Treasurer, Mr. J. Wilford; Hon. Sec. Mr. W. Gill; Council, Messrs. Beilby, Beverley, Bolton, Fletcher, Middleton, Dennis, Savage and Sergeant.

It was decided to make arrangements for classes on pharmaceutical chemistry and materia medica to be held next session.

A vote of thanks to the President for his valuable services in the past and for presiding that evening received the very hearty support of the meeting.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

Taking advantage of the annual holiday in celebration of the Queen's birthday, the second botanical excursion of the season took place on Thursday, May 21. At the kind invitation of Mr. Charles Jenner, the members enjoyed the great privilege of visiting his celebrated garden at Easter Duddingston Lodge. Leaving the Waverley station by train at 12·30 p.m., the company reached their destination a little after 1 o'clock and were received by Mr. Jenner. Under the direction of the chief gardener and his assistants and accompanied by Mr. Jenner, the company then had a walk round one portion of the garden, returning to the terrace in front of the house, where the company, numbering about fifty, were sumptuously entertained to luncheon. Luncheon being ended Mr. Jenner expressed his great pleasure at meeting the members of the Association, and hoped they would thoroughly enjoy themselves. Being upwards of eighty years of age he found it necessary to be careful, and they would excuse his absence for the remainder of the day as it was his habit to retire early for rest. At the request of the Committee Mr. Rutherford Hill expressed, in the name of the Association, their high appreciation of the privilege conferred upon them, and their hearty thanks for the unexampled kindness and hospitality with which Mr. Jenner had received them. The weather was most favourable, and under the guidance of the chief gardener, accompanied by Messrs. Nesbit and Wood, a very enjoyable and profitable afternoon was spent in the extensive and beautifully arranged garden and grounds. Shortly after 4 p.m. the company again gathered in front of the house, where tea and coffee were served; and after Mr. Lothian, President, had again given expression to the great pleasure their visit had given them and their indebtedness to Mr. Jenner, the company left and returned to town. The Easter Duddingstone Lodge gardens are well known to many botanists as containing probably the finest collection of out-door plants in Great Britain. It is to these especially that Mr. Jenner devotes attention, and the grounds have been laid out regardless of expense to secure their successful culture. It has been found that if a pit four feet deep be dug in any part of the grounds water speedily collects in it. This is due to the fact that numerous perennial streams of water pass along the surface of the red sandstone rock at this level, and these streams passing up through the porous soil keep it always in a moist condition, so that when plants in other gardens are being destroyed by drought it is found that here they are fresh and in good condition. Among plants which specially attracted attention may be mentioned the curious prophet's plant, *Arnebia echioides*, with its spotted petals; *Orchis mascula*, in full flower; *Skimmia Japonica*, with red berries of last year, and this year's flowers at one time; a large plant of *Rheum palmatum*, various Japanese maples, which have successfully weathered several winters; *Daphne Mezereon* and two other species in full flower; numerous varieties of *Fritillaria*, *Narcissus*, *Muscari*, *Scilla* and *Saxifraga*; fine flowering specimens of Spanish broom, *Spartium junceum*, and *Polygala Chamæbuxus*. It was the unanimous opinion of all who were present that this excursion beats the record, and the day will long be remembered.

The next excursion is to Colinton on June 10, leaving Caledonian Station at 8·35 p.m.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual meeting of the Midland Counties Chemists' Association was held on Thursday, May 21, at the Mason College, Birmingham, Mr. A. Southall, President, in the chair.

Several letters of apology for absence were announced.

The Annual Report of the Council stated that the Association numbered 170 members and associates, an increase of 7 over the previous year. Mr. Lucas, a past president, had been elected the first honorary member. The session was opened by a conversazione at the Midland Hotel, when the President delivered an address. On November 18, Mr. Carteighe, President of the Pharmaceutical Society of Great Britain, was entertained at dinner by the Council, and afterwards addressed a well attended meeting of members and pharmacists of the district on the Pharmacy Acts Amendment Bill. At this meeting a resolution was passed, expressing the opinion that the Bill was deserving of support, and pledging those present to do their utmost to secure its passage through Parliament. On December 23 the annual dinner was held at the Midland Hotel, and on January 22 the twentieth annual ball was held at the Edgbaston Assembly Rooms. Five other meetings had been held, and the attendance had been good. There had been five council meetings during the year, at which discussion had taken place upon the Pharmacy Acts Amendment Bill, the Birmingham Municipal Technical School, railway rates, the Pharmaceutical Society's Council election and other important subjects. Thirty new volumes had been added to the library, which is located in Mason's College, and now contains about 200 volumes. Several books had been presented, and two materia medica cabinets had been given jointly by Messrs. Evans, Sons and Co., of Liverpool, and Messrs. Evans, Lescher and Webb, of London. It had been found impracticable to induce a sufficient number of students to join the projected classes, and the Council expressed its regret at the apathy existing among the junior members of the trade. The applications for assistance from the Benevolent Fund had been more numerous, and help had been given to deserving cases. The financial statement showed that starting with a balance in hand of £15 12*s.* 4*d.* the receipts during the year had been £35 5*s.* 2*d.* and the expenditure £40 18*s.* 10*d.*, leaving a balance of £9 18*s.* 8*d.*

The adoption of the report as above was proposed from the chair and seconded by F. H. Prosser and carried unanimously.

It was also decided to prepare an illuminated address to be presented to the Pharmaceutical Society at the official celebration of its jubilee, Tuesday, May the 26th.

The following were elected for the Council for session 1891–2:—Birmingham and district: Barclay, T., Perry, G. E., Alcock, F. H., Arblaster, C. J., Chapman, T. W., Dewson, S., Thompson, C., Jones, W., Thonger, G., Southall, A., Howes, H., Prosser, F. H., Barlow F., Crooke, C. G., Magor, M., Ferriday. E. J. P., Gibbs, R. D., Poole, Jeffery; Wyles, W. F., Coventry; Hinds, J., Coventry; Owen, G. F., Dudley; Barrett, J. T., Leamington; Hutton, H., Leamington; Selleck, W. R., Stourbridge; Morris, J. O., Walsall; Morris, G., Wednesbury; Gibson, F. G., Wolverhampton.

A vote of thanks to the scrutineers and the officers of the Association was proposed by Mr. Onion and seconded by Mr. John Drew and carried unanimously.

On the proposition of Mr. Southall a vote of thanks was accorded to Mr W. H. Pullin for his useful services to the Association while as member of Council and as Vice-President. He was a great loss to the Association. Having now retired from business he could not hold the post longer.

BRIGHTON ASSOCIATION OF PHARMACY.

Jubilee Dinner.

The members of the above Association celebrated the Jubilee of the Pharmaceutical Society on Thursday evening, May 28, by a dinner. Mr. W. D. Savage, J.P., occupied the chair, and about twenty-five chemists were present. After the dinner the usual loyal toasts were honoured, then the Chairman proposed "The Pharmaceutical Society." In the course of his remarks he said that he had been connected with the Pharmaceutical Society for a period extending over fifty years, having been one of the founders. At a time when some were disposed to question the practical utility of the Society, he was bound to state that it had done a great deal more good than some recognized. He remembered, in the early days of the Pharmaceutical Society, the Apothecaries Company endeavoured to bring the chemists under its control, and had it not been for the Society, chemists would now be under the restraining influence of the Apothecaries Company. In regard to the work of the Society, there was a great deal done in committees which never came before the members, prosecutions and other matters which it was not desirable to publish. The toast was heartily accepted by those present.

Mr. Marshall Leigh replied and commenced with an amusing description of the Jubilee Meetings in London which he had just been attending, and then referred to the present position of the Pharmacy Acts Amendment Bill in the House of Commons. He explained that blocks had been placed upon certain of the clauses. It had been represented to various M.P.'s that the clauses in question would be a serious hardship to a class of men, who in Scotland, and to some extent in England, had become managers of "surgeon's retails" and branch shops, who had contracted matrimonial and other engagements, and who would be legally disqualified to act as managers if the Bill became law; considerable sympathy had been thus aroused and the Bill had been blocked. Other people opposed the curriculum clauses because they thought they were intended to confine students to the School of the Society, but this was evidently a mistaken notion, as every student there cost the Society a good deal of money, in fact the Society expended over £1000 a year on the School.

Alderman Cox next proposed "The Brighton Association of Pharmacy." He thought he was competent to propose the toast, as he had been a member of the pharmaceutical profession since 1826, and esteemed the Pharmaceutical Society for the good work it had done in the past fifty years. The alderman took the opportunity of inviting the whole of those present to accompany him on another trip in the "Sissie," on June 11.

The toast was responded to by the President (Mr. W. D. Savage), Hon. Sec. (Mr. Marshall Leigh), and Treasurer (Mr. J. R. Gwatkin).

Mr. Histed proposed "The Brighton Junior Association of Pharmacy."

Mr. Coleman replied.

During the evening the proceedings were enlivened by songs and recitations by Dr. Goode, Messrs. Shepherd, Coleman, Wallis and Wyborn.

BRIGHTON JUNIOR ASSOCIATION OF PHARMACY.

A general meeting was held on May 27, the Vice-President, Mr. A. C. Coleman, in the chair, when the following was added to the rules:—

That the retiring President remain an honorary member of Committee.

A vote of thanks to Mr. J. Williamson was also passed for a photograph of the address sent to the Pharmaceutical Society.

The meeting was followed by a very enjoyable sociable evening, when about forty members and friends were present.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Molecular Theory of Induced Magnetism.

The Molecular Theory of Induced Magnetism furnished the subject for the discourse delivered at the Royal Institution on Friday, the 22nd ult., by Professor Ewing. The theory, which is based upon Weber's fundamental conception that all the molecules of iron, nickel, and cobalt, are molecular magnets, the total effect or magnetization of which first becomes apparent when they have been arranged in some degree of order, was very clearly and concisely propounded and illustrated by the lecturer, as well as suggested explanations of many of the phenomena relating to magnetism. One of the strongest proofs urged in favour of the correctness of Weber's hypothesis is the occurrence of magnetic saturation, a condition in which the metal acquires no further increase in magnetic qualities with increase of magnetic force. On the other hand it appears difficult to explain why magnetization does not obtain with a minimal magnetic force, that is to say, why a small magnetic force does not exert a perceptible influence in a systematic rearrangement of the molecules. Maxwell thought the indifference of the metal to small magnetic forces afforded evidence of the existence of a special force which kept the molecules in their original positions to one another, but other phenomena contra-indicated the acceptance of such a strongly conservative principle. Another difficulty presented itself in the tendency of the molecules to persist in the position in which they were arranged by magnetization, so that a very considerable fraction of magnetism was retained after removal of the external magnetic force. Maxwell and others again attempted to explain this property by assuming a frictional "sticking" of the molecules, but Professor Ewing considers all these ideas as essentially arbitrary. The only view of the subject that he believes can succeed in getting rid of these arbitrary distinctions, must abandon all conception of forces other than those of the neighbouring molecules. Each molecule, the lecturer said, has a social duty to perform in restraining and controlling the radical tendencies of its neighbours. The efforts of this restraint is manifested in the three stages observed in the process of magnetization, a primary stage in which little magnetism is produced, a second stage in which magnetism increases very rapidly with increase of magnetic force, and a third stage in which a saturation value is quickly attained. In the curve obtained by the Japanese investigator, Nagaoka, for a twisted bar of nickel, these three stages are very marked, so that evidence points to an essential distinction between the three processes. Professor Ewing proceeded to demonstrate the mutual dependence of molecules recognized in his theory with the aid of small magnets in an uniform field of magnetic force. The movements of the magnets were rendered isible to the entire audience by the projection of their hadows upon a screen. In the case of two magnets, epresenting the simplest domestic relationship, the agnets take a highly stable position that is scarcely ffected by a weak external deflecting magnetic force. Vith a stronger force a stage of instability is reached, which the molecular magnets tend to part company nd the strained relations finally end in a complete upture. Upon removal of the external magnetic force, owever, the original position is taken up, so that no esidual magnetism obtains. With a group of four agnets, which left to themselves arrange themselves two pairs, the latter phenomenon can also be bserved, for they do not return so readily to the riginal position, but persist in the position acquired nder the influence of the external force. The lecturer lso repeated the same experiments with models conaining seven magnets arranged at the centre and ngles of a hexagon and with a larger number of agnets arranged without regard to order. Upon eing allowed to come to rest after disturbance the agnets in these more complex groups were also bserved to pair off as far as possible, so as to give e least possible resultant, and the resultant agnetism was also greater on account of the greater ability of the group. To this stability is due e property of hysteresis or lagging that is noticed bars of iron under alternating magnetic forces. It as interesting to observe how the disturbance produced by an external magnetic force appeared to be first confined to one magnet in less stable position han the others, but that frequently the rearrangeent of the one magnet affected the stability of its eighbours, so that the disturbance rapidly spread hroughout the whole group, just like a flock of sheep llow its leader over a hedge. The quaint gyrations nd movements of the magnets frequently excited the isible faculties of the audience. This experimental bservation throws light upon the gradual increase magnetism that often occurs in soft iron under e influence of a weak magnetic force. Professor wing then directed attention to the quantity of ergy expended in the completion of the cyclic change the position of the magnets or molecules under the lternate influence of opposite magnetic forces. This ss of energy, he said, is a matter of commercial imortance, as the available amount of magneto-motive rce obtained with machines in which transformers e employed and cyclic changes effected, and achines in which the use of transformers is avoided, as 7½ to 17. Further, Professor Ewing demonstrated ow the theory he propounded satisfactorily explained e results obtained in magnetization under various nditions, as under mechanical stress or strain, subcted to mechanical vibration, or at different degrees temperature. The conditions of mechanical strain ere rendered exceptionally comprehensible by means of agnets disposed at the joints of a piece of lattice work, d the different arrangements assumed by the mag-ets according to the different positions in which they ere placed with regard to one another by the opening closing of the lattice work. Such changes would cur in the loading and unloading of a wire, and under e influence of a magnetic force a certain amount of ergy would be spent in overcoming the hysteresis nsequent upon the stability of the molecular posions. As the influence of greater or less magnetic rces can scarcely be avoided, it will be readily seen at there is no such thing as perfect elasticity in a etal, which bears out what engineers have experiiced with metal girders, etc., subjected to varying resses. Vibration produces an analogous effect, since will be recognized that any mechanical disturbance at would cause the molecules to vibrate would tend precipitate them over the verge of instability in the ocess of magnetization. Hence the results obtained by tapping an iron bar in a magnetic field. Hopkinson showed that a bar of iron was more susceptible to magnetic influences with moderate increase of temperature, but that at about 700° C., it lost all capability of being magnetized at all. According to the lecturer's theory, any increase of temperature, since it sets the molecules in more rapid motion, at first causes the body more readily to respond to the rearranging influence of magnetic forces. But at higher temperatures the vibration of the molecules becomes so rapid that they assume a rotatory motion and consequently all polarity disappears, and with it also the property of magnetism. As the setting up of the rotatory motion requires a certain expenditure of energy, the expansion of an iron wire, heated by means of an electric current, is momentarily checked a little above red heat, whilst the corresponding liberation of energy upon cooling and consequent resumption of the normal vibratory motion of the molecules, is marked by a momentary rise in temperature and glowing of the wire. The whole theory has received considerable support in the experimental investigations, published in the *Electric World* of May 16, of a student of Harvard College, who has determined the resultant magnetism and cyclic curves in a large group of magnets. In conclusion, Professor Ewing suggested that the molecules of other bodies besides iron, nickel and cobalt might possess polarity, although this property was not accompanied by such phenomenon as electric discharges, etc.

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

The last meeting of the session was held at Burlington House on Monday, June 1, Mr. T. Tyrer in the chair, who, after explaining that the paper that was originally down for reading, viz., one by Mr. Squire on the artificial production of cold, had had to be deferred on account of the illness of the author, invited Dr. Rideal to bring before the section a communication, standing jointly in his name and that of Mr. W. E. Youle, on "Gum Arabic and its Modern Substitutes."

Dr. Rideal began by saying that the question of the use of gum substitutes was of special importance just now, as true gum arabic was scarce and dear, on account of the Soudan being closed to commerce, and thus a great part of the supply stopped. Substitutes at various prices and resembling true gum arabic more or less closely were largely manufactured. Using commercial samples of gum and gum substitutes, the authors had examined them by various methods, both chemical and physical. Of the latter, the viscosity of their aqueous solutions gave useful indications. The apparatus employed consisted of a bulb communicating by two narrow necks with two smaller bulbs, one above the other below, and connected with a pump, by means of which the pressure in the vessel communicating with the lower bulb could be diminished and thus the flow of the solution of which the viscosity was to be taken, expedited. The effective pressure was measured by a gauge attached to the partially exhausted vessel by a T piece.

By this means the determination of the viscosity could be effected in a reasonable time, even when the solutions dealt with were very thick and viscous. The adhesiveness of gums and gum substitutes was also investigated, that being in effect the property which gave them their chief value.

Gum substitutes that were hygroscopic were objectionable in many ways, and efforts had been made to make a material at once free from this defect, which was usually ascribable to the presence of sugar, and of inoffensive taste and smell. Tables showing the composition of gums and gum substitutes were exhibited, as well as specimens of the substances themselves. Owing to the limited time at the disposal of the authors, only an abstract of the paper was given.

A brief discussion followed, and after Dr. Rideal had replied to the few points raised,

Mr. J. W. Lovibond read a paper "On the Quantitative Analysis of Light and Colour, founded on the Tintometer Colour Scales."

Mr. Lovibond is, as is well known, the inventor of the instrument called the tintometer, designed to match and measure colours with exactitude. By an extension of the principle he has applied it to the further investigation of the subject of colour measurement with considerable success.

The assembly then adjourned, the next gathering of the members being at the annual general meeting, which is held this year in Dublin.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 21. Mr. H. Garnett in the chair.

Mr. J. Plowright read a paper by himself and Mr. R. S. Donington on "May Wild Flowers," describing a large number of species which the authors had met with during the month and of which they had brought specimens for illustration. Besides describing the plants and their habitats, the authors drew attention to any peculiarities of structure as well as to any points illustrating the broader principles of botany.

A discussion followed, in which the Chairman, Messrs. Fuge, Browne, Riches and Roberts took part.

A paper by C. E. Boucher, Reporter on Organic Chemistry, which was entitled "Modern Ideas on the Constitution of Chemical Compounds," was read by Mr. Fuge in the author's absence.

A discussion followed in which the Chairman, Messrs. Browne, Harrison and Fuge joined.

After a further discussion on miscellaneous topics, including the tests for acetanilide, and the formation of a botanical field club, the meeting adjourned.

Parliamentary and Law Proceedings.

POISONING BY A "WEED KILLER."

An inquest has been held at Hastings, by Mr. C. D. Jones, the borough coroner, touching the death of a domestic servant named Minnie Foster, age sixteen years. It appeared from the evidence of Mr. Banks, the employer, that the girl was taken ill and that he was informed that she had drunk some liquid he had purchased as a "weed killer." She was very sick and complained of pain in her stomach. Medical assistance was obtained, but death took place a few hours afterwards. The "weed killer" he had purchased in the afternoon of the day on which deceased was taken ill, at Mrs. Gilbert's, florist, in Queen's Road. The bottle produced, which was labelled "Scotch elder wine" and also bore a smaller label with the words "weed killer," was taken by himself to the shop, and the liquid, about a pint, was supplied in it. He had himself labelled it "weed killer." After he had used a portion of the liquid, he left the bottle with the remainder in a corner of the garden with the label "weed killer" facing outwards. Deceased told him in the presence of the doctor that she had taken some of the liquid. He had never used the liquid before and he was not told and did not know that it contained poison, there being many things that are not poisonous which would kill weeds.

The sister of the deceased deposed to seeing the bottle on the kitchen table and afterwards finding the deceased spitting over the sink. In reply to her inquiry deceased said she thought the liquid in the bottle was elder wine and that she had tasted it, but was certain she had not swallowed any.

Mr. E. J. Adkins, surgeon, said that after taking some of the liquid he had prescribed the necessary treatment. He had made a *post mortem* examination and found the heart, liver and kidneys normal, but the stomach and gullet were very much inflamed. He had analysed the contents of the stomach and found no arsenic, but had detected it in other parts of the body. He had examined some of the "weed killer" and found it contained a great deal of arsenic, caustic soda and methylated spirit. The symptoms observed were consistent with arsenic poisoning.

Ernest Barton, assistant to Mrs. Gilbert, florist, said he served Mr. Banks with the weed killer, and told him how to use it, and Mr. Banks put the label on in the shop. It was Smith's weed killer, but although he knew it was a poison he did not know what it was made of nor that it was such a deadly poison. His employer purchased it in gallon cans, which were labelled "poison," but as Mr. Banks bought so small a quantity he did not think it necessary to put on a label. He had never sold less than a gallon before, and when he sold that quantity a label supplied by the manufacturer, and describing the liquid as a poison, was put on.

The coroner said the death appeared to have been the result of an accident, but it was doubtful whether a florist had the right to sell such a liquid. By the Poisons Act no person other than a chemist was allowed to sell arsenic, and the seller was liable to a penalty if he sold it without making an entry of the sale in his book and labelling the bottle containing it to show that it was a poison. He should have to report the matter to the Pharmaceutical Society and leave it to that body to decide whether any proceedings should be taken against Mr. Gilbert.

The jury returned a verdict of death by misadventure, and expressed the opinion that more care ought to have been exercised in the selling of a liquid of such a poisonous nature.

Obituary.

Notice has been received of the death of the following:—

On the 9th of May, Mr. Thomas Hetherington, Chemist and Druggist, late of Foochow, China. Aged [illegible] years.

On the 19th of May, Mr. John C. Parkes, Pharmaceutical Chemist, Hare Street, Woolwich. Aged [illegible] years. Mr. Parkes had been a Member of the Pharmaceutical Society since 1853.

On the 23rd of May, Mr. John Holden, Chemist and Druggist, St. James' Street, Burnley. Aged 35 years.

On the 23rd of May, Mr. Richard Haigh, Chemist and Druggist, Victoria Street, Shrewsbury. Aged 75 years.

On the 25th of May, Mr. James Harburn, Chemist and Druggist, Staithes, Yorkshire. Aged 66 years.

On the 28th of May, Mr. William Edwin Coles, Chemist and Druggist, High Street, Leighton Buzzard. Aged 33 years.

On the 30th of May, Mr. Robert Ross, Chemist and Druggist, High Street, Old Aberdeen.

On the 31st of May, Mr. Edmund Pegg, Pharmaceutical Chemist, Sherlock Street, Birmingham. Aged 71 years. Mr. Pegg had been a member of the Pharmaceutical Society since 1853.

Errata.—On p. 1075, col. ii., in the signatures of the address presented by the Brighton Junior Association of Pharmacy, *for* "W. J. Trow" *read* "W. J. Snow," and *for* "Alfred J. Morton," *read* "Alfred J. Norton."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Lewis, Alcock, Cripps, Stark, Shapley, [illegible] F. P. Balkwill, Lower Molar.

A STUDY OF COCA LEAVES AND THEIR ALKALOIDS.*

BY O. HESSE.

(Concluded from page 1117.)

III. *Other Alkaloids of Coca Leaves.*

Besides the alkaloids already mentioned the folowing basic substances have also been extracted rom coca leaves, namely, isatropylcocaine or truxilline, cocaidine and cinnamylecgonine methylester, which with the exception of the last are only mixtures. Hygrine, which has now and again been observed in the preparation of cocaine, will be considered in an appendix to this communication.

a. Isatropylcocaine, Truxilline.

This mixture was investigated by Liebermann and called by him at first isatropylcocaine and then truxilline, because he considered it peculiar to the Truxillo or Trujillo coca. This is not the case. I have already previously remarked upon the "mischmasch" nature of this substance, and although Liebermann asserted that it is perfectly pure, yet in a subsequent communication he admitted, indirectly it is true, the correctness of my opinion. This communication by Liebermann also incited me to further investigate the accompanying alkaloids of cocaine that I had derived from the Trujillo coca, especially as at the time of its publication the preparation of cocamine from this coca had not been effected.

As the employment of potassium permanganate might be expected to tend to accelerate the investigation, the solution of the alkaloids in dilute sulphuric acid was treated with potassium permanganate solution until a permanent violet coloration of the solution appeared. An inconsiderable quantity of bitter almond oil was simultaneously formed and removed by shaking with ether. The clear filtered solution, when freed from ether, was treated with excess of ammonia, the flocculent precipitate again dissolved in dilute acid and precipitated afresh with ammonia. These operations were continued until the precipitate was immediately obtained in a light flocculent condition and did not conglomerate upon the filter when washed with cold water. The air-dried substance then corresponded exactly with cocamine, both in external appearance and behaviour towards solvents, but, on the other hand, it melted more readily and yielded upon decomposition with hydrochloric acid a very considerable quantity of acids soluble in baryta, as well as cocaic acid.

By repeated precipitation of the crude bases from acetic acid solution, etc., I ultimately succeeded in obtaining the same mixture, which did not exhibit the formation of bitter almond oil by subsequent treatment with potassium permanganate. Finally, I received a specimen of isatropyl-cocaine from Dr. Stockman that satisfactorily corresponded with the mixture of similar name prepared by myself. With all these specimens the proportion of acids soluble and insoluble in baryta varied between 4:3 and 2:1.

I did not consider it necessary to carry out an analysis of the mixture, as Liebermann has already published several. By drying the preparation in an exsiccator at 60° C., and finally by heating at 120° C., a loss of 1·63 and 1·99 per cent. respectively was observed in two experiments, without any indication of decomposition in the residue. The solutions of the different preparations in dilute hydrochloric acid gave with platinum chloride a platinum salt, which, like that obtained from cocamine, contained more platinum than the formula $C_{33}H_{46}N_2O_8$, $PtCl_6H_2$ requires.

With respect to the acid products of decomposition, although I employed baryta-water for their quantitative estimation, and thus obtained a soluble and an insoluble barium salt, yet I found milk of lime to be a more effective agent for their separation upon a larger scale. The acid precipitated by hydrochloric acid from solution of the soluble salt was dissolved in a little hot glacial acetic acid, from which cocaic acid crystallized upon cooling, whilst homococaic acid remained dissolved. The insoluble calcium salt yielded by similar treatment with hydrochloric acid an analogous product that was extracted from the aqueous solution with much ether. Upon evaporation of the ethereal solution and recrystallization of the residue from hot glacial acetic acid, isococaic acid separated upon cooling, and homoisococaic acid remained in solution.

Homococaic Acid.

In order to purify the crude homococaic acid from a small admixture of cocaic acid, the residue resulting from the evaporation of the glacial acetic acid solution was treated partly with ether free from alcohol, partly with cold glacial acetic acid, in both of which the homococaic acid readily dissolves. By the evaporation of the latter solution the homococaic acid remained as an amorphous mass, whilst by spontaneous evaporation of the ethereal solution the acid crystallized in long colourless, delicate needles, that covered the walls of the vessel like ice-flowers. These crystals melted at 150°, whilst the amorphous acid, probably on account of the presence of traces of foreign bodies, melted at a somewhat lower temperature.

0·1825 gr. substance dried at 100° C. gave 0·4905 gr. CO_2 and 0·097 gr. H_2O.

	Calculated for $C_{19}H_{18}O_4$.	Found.
C. . . .	73·54	73·29 per cent.
H. . . .	5·80	5·90 "

Homococaic acid is easily soluble in ether, alcohol and glacial acetic acid, less so in water; it dissolves readily in ammonia, caustic soda solution and baryta water, and is again precipitated by acids as an oil that soon becomes opaque and solid. It does not dissolve in hydrochloric acid, but if constantly heated with the concentrated acid cocaic acid results. Whether, as is probably the case, methyl chloride is formed during this metamorphosis, could not be determined on account of the want of sufficient material.

An ammoniacal solution of homococaic acid exactly neutralized with acetic acid does not give any precipitate with chloride of barium or of calcium, but with copper and silver sulphates precipitates of the corresponding metallic compounds are formed.

Copper homococaiate is a bright green flocculent precipitate, insoluble in water.

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* Memoir presented to the Pharmaceutical Society on the occasion of the presentation to the author of the Hanbury Medal, May 26, 1891.

0·3035 gr. air-dried substance lost 0·0375 gr. H_2O at 100°, and gave upon incineration 0·0568 CuO.

	Calculated for $C_{19}H_{16}O_4Cu+3H_2O$	Found.
CuO . . .	18·80	18·71 per cent.
$3H_2O$ . .	12·35	12·72 „ „

Silver homococaiate is a white amorphous flocculent precipitate, that is anhydrous in its air-dried condition.

0·2155 gr. substance dried at 100° gave 0·0888 gr. Ag.

	Calculated for $C_{19}H_{16}O_4Ag_2$.	Found.
Ag. . . .	41·30	41·20 per cent.

Isococaic Acid.

This acid was discovered by Liebermann, but, as appears from his statements, it was not obtained in a perfectly pure condition. It received from this chemist the names of δ-isatropic acid and β-truxillic acid successively, both of which terms are, however, unsuitable. As it is isomeric with cocaic acid, I prefer to call it isococaic acid.

If the crude acid precipitated from the insoluble barium or calcium salts be dissolved in hot glacial acetic acid, the isococaic acid crystallizes from the cooled solution and sometimes exhibits a melting point 7° higher than that of the pure substance. To obtain the latter the acid crystallized from the glacial acetic acid solution is dissolved in hot 98 per cent. alcohol and ammonia added until neutralized, whereupon the corresponding ammonium salt crystallizes out. The acid liberated from this salt by hydrochloric acid and recrystallized from boiling glacial acetic acid is absolutely pure. In the following analyses the material for analyis II., as well as for analysis II. of the barium salt, was derived from the portion with higher melting point.

I. 0·1935 gr. dried at 100° C. gave 0·5175 gr. CO_2 and 0·098 gr. H_2O.

II. 0·1696 gr. dried at 100° C. gave 0·4535 gr. CO_2 and 0·0827 gr. H_2O.

	Calculated for $C_{18}H_{16}O_4$	Found. I.	II.
C . . .	72·97	72·93	72·92 per cent.
H . . .	5·41	5·62	5·41 „

Isococaic acid crystallizes in an anhydrous condition in very pretty, concentrically grouped, flat prisms from alcohol* and glacial acetic acid, but in more compact prisms from ether, and melts at 200°—201° C. in Roth's apparatus. If it be heated more strongly in a stream of air or carbonic acid, decomposition occurs and a yellowish rapidly-solidifying oil obtains that consists principally of cinnamic acid. Simultaneously the odour of bitter almond oil becomes perceptible. The remaining properties correspond with those recorded by Liebermann for δ-isatropic or β-truxillic acid.

The *ammonium salt* crystallizes in delicate, colourless needles which dissolve readily in water, but with great difficulty in cold and hot spirits of wine. The aqueous solution has a neutral reaction and gives precipitates with chloride of barium, copper sulphate, lead acetate and silver nitrate. The crystals contain water of crystallization, which is driven off simultaneously with the ammonia at 120° C.

0·2005 gr. air-dried substance gave 0·461 gr. CO_2 and 0·123 gr. H_2O.

0·2725 gr. air-dried substance lost 0·041 gr. NH_3 and H_2O at 120° C.

	Calculated for $C_{18}H_{14}O_4(NH_4)_2+H_2O$.	Found.
C	62·07	62·70 per cent.
H	6·89	6·81 „
$2NH_3+H_2O$.	14·94	15·05 „

The barium salt, prepared by precipitation of the much diluted warm aqueous solution of the ammonium salt with chloride of barium, occurs in small flat needles that have the composition already suggested by Drory.

I. 0·3373 gr. air-dried substance lost 0·0265 gr. H_2O at 170° C. and yielded 0·1688 gr. $BaSO_4$ upon incineration, etc.

II. 0·3202 gr. air-dried substance lost 0·024 gr. H_2O at 160° C. and yielded 0·159 gr. $BaSO_4$ upon incineration, etc.

	Calculated for $C_{18}H_{14}O_4Ba+2H_2O$	Found. I.	II.
Ba . . .	29·33	29·42	29·20 per cent.
$2H_2O$ . .	7·70	7·85	7·49 „

The copper salt is a bright green amorphous precipitate insoluble in water.

0·2905 gr. air-dried substance lost 0·0505 gr. H_2O at 160° C. and yielded 0·0545 gr. CuO upon incineration.

	Calculated for $C_{18}H_{14}O_4Cu+4H_2O$.	Found.
CuO	18·49	18·76 per cent.
$4H_2O$. . . .	16·77	17·38 „

The *methyl ester* of isococaic acid is obtained in an analogous manner to that of cocaic acid and separates as an oil. The oil is dissolved in ether, shaken with a little caustic soda solution, and the ethereal solution evaporated after it has been washed with water, leaving an oily residue that soon crystallizes. By solution of this mass in glacial acetic acid which has been mixed with half its volume of water, the ester is left upon spontaneous evaporation of the solution in long colourless prisms that melt at 76° C. and dissolve readily in alcohol, ether and glacial acetic acid. The methyl ester possesses the composition already determined by Liebermann.

0·2014 gr. substance gave 0·5465 gr. CO_2 and 0·1125 gr. H_2O.

	Calculated for $C_{18}H_{14}O_4(CH_3)_2$.	Found.
C	74·07	74·00 per cent.
H	6·17	6·20 „

In the preparation of the methyl ester traces of an acid are removed from the ethereal solution by the treatment with dilute caustic soda solution. This acid is probably methylisococaic acid, and upon addition of soda lye the sodium salt of the acid is precipitated. If these crystals be separated from the mother-liquor with the aid of a pump, they yield upon addition of hydrochloric acid an acid that crystallizes in delicate needles and dissolves readily in alcohol and ether. Upon evaporation of the ethereal solution an oily residue is left, which gradually solidifies and assumes a radiated crystalline appearance. Hydrochloric acid regenerates isococaic acid from this acid. It possesses great resemblance to the following acid, but differs in its solubility in ether.

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* According to Liebermann this acid crystallizes very badly from alcohol, which peculiarity is according to my observations only possessed by the impure acid. I therefore conclude that Liebermann did not work with an absolutely pure acid, though sufficiently so for the preparation of many derivatives, as of the methyl ester.

Homoisococaic Acid.

By recrystallization of crude isococaic acid 'om glacial acetic acid the homoisococaic acid emains in solution and is obtained as an amorhous residue upon the rapid evaporation of this olution. If this residue be treated with dilute ustic soda solution at a moderate temperature, e homoisococaiate of sodium crystallizes out; fter the separation of the salt from the motherquors and addition of hydrochloric acid, the orresponding acid is removed by ether.

Homoisococaic acid crystallizes very readily 'om ether in long colourless prisms melting at 32° C., which are moderately soluble in ether, ut exceptionally so in alcohol and glacial acetic id. They contain no water of crystallization.

0·0891 gr. substance dried at 100° C., gave 0·2391 gr. O_2 and 0·050 gr. H_2O

	Calculated for $C_{19}H_{18}O_4$	Found.
C	73·54	73·61 per cent.
H	5·81	6·23 „

Homoisococaic acid is converted into isococaic id by heating with concentrated hydrochloric id, but apparently not so readily as the acid otained during the preparation of isococaic acid ethyl ester. Its solution in ammonia, exactly eutralized with acetic acid, even when very dilute, elds with chloride of barium an amorphous flocllent precipitate that rapidly deposits in small eedles, as well as a beautiful green flocculent prepitate with sulphate of copper. The precipitated opper salt is insoluble in water and contains water its molecule that is removed to a great extent in e exsiccator and completely at 160° C.

0·175 gr. air-dried substance lost 0·0153 gr. H_2O at 0° C., and gave 0·0345 gr. CuO upon incineration.

	Calculated for $C_{18}H_{12}(CH_3)O_4Cu+2H_2O$.	Found.
CuO . . .	19·49	19·70 per cent.
$2H_2O$ . . .	8·88	8·73 „

With respect to the original esters or bases from hich these four acids result by decomposition ith hydrochloric acid (and probably also with rium hydroxide), I might mention that the mixre called isatropylcocaine only yields ecgonine d methyl chloride as further decomposition proucts. The amount of methyl chloride thus rmed I have, however, not estimated, but rely pon the estimations of Liebermann, which are early in accordance with two molecules CH_3Cl for s. The presence of derivatives of the homoacids ould theoretically lower the yield of methylloride, but as these acids are also apparently pable of gradually yielding methyl chloride with ydrochloric acid, the minus difference would at ast be made good. Further, the percentage of omococaic and homoisococaic acids is so small compared with that of cocaic and isococaic ids that the corresponding bases can scarcely ercise a perceptible influence upon the quantitave estimation of methyl chloride.

It was much more important to become better quainted with the bases accompanying cocamine isatropylcocaine or truxilline. I have attempted prepare isococamine from isatropylcocaine by bjecting this mixture to the same treatment in the preparation of cocamine, except that the rtion soluble in petroleum ether, and not the insoluble or difficultly soluble portion, was examined.

From this solution I certainly succeeded in obtaining a substance that resembled cocamine externally and yielded by its decomposition a product that afforded decided evidence in favour of its identity with the baryta soluble acids; but no further conclusion could be arrived at. It was therefore necessary to call synthesis to aid for the preparation of isococamine, a task from which I was relieved, since, in the meantime, Liebermann and Drory prepared isococamine, although they described it under the name of *d*-isatropylcocaine.

The preparation of homococamine from a specimen of isatropylcocaine recently obtained from freshly-imported Trujillo coca, resulted more favourably. The alkaloids were treated in a similar way to that adopted for the preparation of cocamine, except that all possible warming of the solution was avoided. After segregation of the respective solutions a pulverulent whitish substance had separated at the point of contact, which could be easily purified in the manner adopted with cocamine. This substance corresponded to isococamine in appearance and behaviour towards solvents, but yielded by its decomposition, besides cocaic acid and an extremely small quantity of isococaic acid, a considerable amount of homococaic acid. The proportion of the latter to both the other acids together was about 1 : 3.

Although this substance is by no means pure homococamine, yet it may be concluded from its behaviour that homococamine possesses great resemblance to cocamine. Like cocamine this substance could not be dried in an exsiccator at 53° C., but, on the other hand, it was not difficult to remove one molecule of water at 115°–120° C. without effecting decomposition.

I. 0·2525 gr. heated at 115° to 120° until of constant weight lost 0·0058 gr. H_2O.

II. 0·2335 gr. heated in like manner lost 0·0054 gr. H_2O.

III. 0·2281 gr. anhydrous substance gave 0·5805 gr. CO_2 and 0·145 gr. H_2O.

Since the substance apparently consists of a mixture consisting of about three-fourths $C_{38}H_{46}N_2O_8+H_2O$ and about one-fourth $C_{40}H_{50}N_2O_8+H_2O$, I have calculated the theoretical values upon this basis.

	Calculated.	Found.	
H_2O . . .	2·63	2·29	2·31 per cent.
C	69·47	69·40	„
H	7·06	7·06	„

The observed values are therefore nearly identical with the calculated. Unfortunately, I did not find it possible to obtain a substance containing a larger percentage of homococamine by again treating the preparation with petroleum ether, or by partial precipitation with platinum chloride, etc., which tends to show that the solubility and behaviour of both bases is nearly the same.

b. Cocaidine

is the name I gave to a basic substance which was found in the mother liquors of cocaine hydrochloride when broad leaved coca had been employed for its preparation. In distinction from cocaine hydrochloride, cocaidine hydrochloride, which was amorphous, dissolved very readily in a mixture of chloroform and ether, and was again obtained amorphous upon the evaporation of the solution. Attempts to prepare the alkaloid itself crystalline also remained unsuccessful.

By its decomposition with dilute hydrochloric acid a methyl group was split off and ecgonine and acids were also formed. The latter consisted to a great extent ($\frac{5}{6}$) of benzoic acid, mixed with cocaic acid, homococaic acid, and isococaic acid.

When the substance was fractionally precipitated from dilute hydrochloric acid solution with platinum chloride, at first a portion was separated from which only amorphous alkaloid could be regenerated. By continued fractionation, especially at a moderate temperature, cocaine platinum chloride was obtained, from which the alkaloid could be easily regenerated by addition of ammonia and extraction with ether.

c. Cinnamylecgonine methylester,

which Giesel and Paul and Cownley found in a specimen of coca almost simultaneously, I could not at first isolate from any of the American cocas investigated by me, although I had long before recognized cinnamic acid among the corresponding products of decomposition. My investigations showed that if the bases remaining after the removal of the cocaine hydrochloride are repeatedly precipitated from hydrochloric acid solution with ammonia, the base yielding bitter almond oil by its oxidation with potassium permanganate remains in solution.

As experienced with cocaidine, the plan of separating the substance hindering the crystallization of the base by means of platinum chloride also succeeded in this instance. At first only an amorphous portion was precipitated, then succeeded a mixture of cocaine and cinnamylecgonine methylester, and finally the latter occurred alone. To what is already known concerning this base I have to add that it occurs in the broad-leaved South American coca to a very slight extent and frequently is completely absent, whilst it occurs regularly and sometimes in considerable quantity in the Trujillo coca.

APPENDIX TO III.

HYGRINE.

As reported by Wöhler,[*] hygrine was obtained by Lossen in the preparation of cocaine, it remaining dissolved in the mother-liquors from that alkaloid. It reacted strongly alkaline, but did not taste bitter, and when taken internally was not poisonous in its action. It could be distilled with water and had an odour resembling that of trimethylamine.

Subsequently Lossen[†] published some information upon the preparation of hygrine, which proved now to be a mixture, from which no body suitable for analysis could be separated. It occurred as a brown liquid having a high boiling point.

Bignon[‡] states that fresh coca contains only odourless non-volatile alkaloid, but if the leaves, after its removal, be boiled with an alkali, a strongly odorous base passes over, which he considers to be hygrine.

Squibb[§] understands under hygrine apparently
a non-volatile alkaloid, the principal part of
is immediately precipitated if a solution of
crude cocaine in dilute sulphuric acid be
with a small quantity of soda. Upon
addition of soda the cocaine is thrown dow
still containing some hygrine.

Further, W. C. Howard[*] connects with
a non-volatile alkaloid, which, however,
bitter taste, and formed with hydrochloric
amorphous salt, and was therefore
different from the hygrine briefly describ
Wöhler. Howard considered amorphous
to be a solution of cocaine in his hygrine.

On the other hand, Stockman[†] actually
through distillation of amorphous cocaine
water small quantities of a volatile base,
formed a dark brown oil that did not,
boil at 170° C.

These contradictions determined me[‡]
publish some observations upon this
which I will refer to again further on. In a
quent communication upon the alkaloids of
leaves I once more mentioned this hygrine,
now had been observed in the decomposi
amorphous coca alkaloids by means of hydr
acid.[§]

Liebermann[‖] thereupon mentions
grine and cinnamylhygrine ; these are,
only names that this chemist would wish
cover in the previously-mentioned
which, however, does not contain them. As
ther result of this discovery, Liebermann
that hygrine is a mixture of volatile bases,
the lowest boiling one has the composition
sented by the formula $C_8H_{15}NO$, and the
boiling one by $C_{14}H_{24}N_2O$. The copious
used for this investigation was prepared by
from Trujillo coca, which contained abo
per cent. Subsequently it was also obtai
Giesel from Cusco coca, which was said to
the considerable quantity of 0·2 per cent.
mark,[¶] who compares with one anoth
hygrines derived from the two reputed
completes this information with the
statement that the lowest boiling hygrine
cally active, whilst it is known that the
alkaloids show themselves to be in this resp
active.

The chlorinated substance which Ein
tained[**] by prolonged boiling of the cocaine
liquor with concentrated hydrochloric
also stand in near relation to hygrine.

Lastly, it may be mentioned that A
contradiction to Bignon, obtains in the
a volatile neutral body, that bears a rel
hygrine, which according to his opinion
either a carbohydrate or a glucoside.

Of all these statements I am bound only
of Wöhler, according to which hygrine has
reaction and is distillable with water.
caine, cocamine and similar alkaloids fr
when boiled with water, neither vola

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[*] Liebig's *Annalen*, cxxi., 374.

[†] *Ibid.*, cxxxiii., 352.

[‡] *Pharmaceutical Journal*, [3], xvi., 265.

[§] *Ibid.*, [3], xv., 776.

[*] *Ibid.*, [3], xviii., 71.

[†] *Pharm. Journ.*, [3], xviii., p. 701.

[‡] *Pharm. Zeit.*, 1887, 668.

[§] *Berichte der deut. chem. Ges.*, xxii.,

[‖] *Ibid.*, xxii., 674, 675.

[¶] *Ibid.*, xxiv., 408.

[**] *Berichte d. deut. chem. Ges.*, xxii.,

[††] *Pharmaceutische Zeitung*, xxxiv.,

eld volatile bases, the way was thereby indicated which the substance in question might even- ally be obtainable. In fact, it was not difficult obtain very small quantities of an oily volatile se from the bases remaining after the separation cocaine hydrochloride (from Trujillo coca), by iling them with water. It is more advantageous, wever, to precipitate a solution of these bases in lute sulphuric acid with soda and then to distil e separated solution after addition of caustic soda lution.

In other experiments the solution mixed with ustic soda solution was shaken out with much her, the ether distilled off and the residue then so distilled with steam.

In all cases the distillate was slightly super- turated with hydrochloric acid, the solution aporated to dryness, the residue extracted with solute alcohol, and the alcohol driven off from is solution. From the residue, after addition of ustic soda solution in excess, the hygrine was aken out with ether, which upon evaporation ft it as a brown oil. This was first treated with e smallest possible quantity of dilute acetic acid, hich left a small quantity of a dark smeary substance, soluble however in hydrochloric acid. The ear filtered solution was then decolorized with nimal charcoal and shaken out with caustic soda lution and ether. The ethereal solution was en washed with water, and upon evaporation left e hygrine as a residue.

This hygrine formed a yellowish oil, having a ery peculiar odour, recalling somewhat that of uinoline; it reacted strongly alkaline, had a burn- g taste, dissolved easily in ether, chloroform and lcohol, slightly in water, not in caustic soda solu- on, and readily in dilute hydrochloric and acetic cids. From its solutions in acids it is precipitated y caustic soda, carbonate of soda or ammonia, in e form of an oil. These solutions, when very dilute, ow an intense blue fluorescence, but the intensity iminishes with increasing concentration.

With oxalic acid hygrine forms a compound ystallizing in small needles; with hydrochloric cid it forms a salt crystallizing in fine needles. n aqueous solution of the latter gives with ferric loride no reaction. With platinic chloride, on e contrary, a yellow crystalline precipitate is rmed; this contains water of crystallization, hich is driven off rapidly at 100°.

0·2437 gr. substance gave at 100° 0·011 H_2O, and then upon combustion 0·327 CO_2, 0·089 H_2O, and 0·061 Pt.

I. 0·3060 gr. substance gave at 100° 0·018 H_2O, and then upon combustion 0·4125 CO_2, 0·1085 H_2O and 0·074 Pt.

I. 0·2570 gr. substance gave at 100° 0·0122 H_2O, and upon combustion 0·063 Pt.

V. 0·310 gr. substance gave at 100° 0·0135 H_2O, and upon combustion 0·0752 Pt.

. 2775 gr. substance gave at 100° 0·0143 H_2O, and upon combustion 0·0673 Pt.

According to these results the formula for this latinum salt would be $(C_{12}H_{15}N)_2, PtCl_6H_2 + 2H_2O$, hich—

	Requires	Found.				
		I.	II.	III.	IV.	V.
C . .	36·59	36·59	36·76	—	—	—
H . .	3·55	4·05	3·91	—	—	—
Pt. .	24·71	25·02	24·18	24·51	24·25	24·25
$2H_2O$.	4·57	4·51	5·85	4·73	4·35	5·15

The formula for the base would therefore be $C_{12}H_{15}N$. For the purposes of therapeutic experiment I prepared subsequently a fresh quantity of hygrine, for which, however, "amorphous cocaine" was used, obtained in the preparation of cocaine. For this purpose the amorphous portion in question was treated with steam, and the hygrine obtained from the distillate purified by repeated solution in hydrochloric acid, precipitation with caustic soda and shaking out with ether. It occurred as a dark brown oil, which formed with hydrochloric acid a yellowish white amorphous mass. Probably this want of crystallizing power was dependent upon the fact that the substance was not yet quite pure; but a further purification of the base was impracticable as the quantity of the material was too small. I may add that according to Stockman, this hygrine, used subcutaneously, manifested no special action beyond local irritation. I would here recall that even in the statements on the subject by Wöhler and Lossen contradictions occur, notwithstanding that the statements by Wöhler relate to observations made by Lossen. According to Wöhler the use of amyl alcohol as a material for extracting led to the discovery of hygrine, which gave with hydrochloric acid a well crystallizing salt, whilst Lossen, who worked subsequently with ether then obtained hygrine from which a body suitable for analysis was not to be prepared. From these results it can be distinctly seen that the nature and in any case the quantity of the hygrine obtained was dependent upon the agent used for its extraction or its greater or less degree of purity. If the same condition was present in the experiments of Giesel referred to, it would then be not surprising that the yield of "hygrine" was not only a large one, but that this hygrine also corresponded with the volatile base which Merling* obtained in the examination of crude belladonnin, evidently because in the preparation of the crude belladonnin he used a similar, or probably the same, extracting agent as in the preparation of the crude cocaine.

However this may be, the statement of Giesel that he had obtained from a Peruvian coca 0·2 per cent. of hygrine invited fresh experiments. With this object I have exhausted finely powdered coca, after moistening it with sufficient carbonate of soda solution, partly with purified ether and partly with purified petroleum ether. The purification of these solvents was effected by thoroughly shaking them with dilute sulphuric acid and then distilling. From these solutions the alkaloid was transferred to hydrochloric acid and from that, upon the addition of soda, to purified ether; then the ether being distilled off the alkaloid was obtained as a residue.

From this residue the cocaine was separated, chiefly as hydrochloride, and the remaining alkaloid was then warmed with dilute hydrochloric acid, as my experiments, which I had made for four or five years in this direction, had shown that volatile hygrine (which was obtained at that time) does not undergo change with dilute hydrochloric acid, whilst the other alkaloids of coca, without exception, are split up. It was however conceivable that hygrine itself might be a decomposition product. In my new experiments, for which coca of various origin, especially Peruvian coca, was used, in the treatment of the crude base with hydrochloric acid, as a rule besides the above-mentioned decomposition acids and methyl chloride, only ecgonine was obtained; in some experiments, on the contrary, besides ecgonine there were also traces of volatile hygrine. But possibly the latter might be derived from the solution of ammonia, which is now and then used in the separation of the coca bases, so in order to clear up this point also I made another experiment with 88 kilos of Trujillo. This coca was moistened with ammonia solution and further extracted in the manner before described. From the bases obtained, first the greater part of the cocaine was removed by hydrochloric acid and the remaining portion of the bases was warmed with dilute hydrochloric acid. After decomposition had been effected the resulting acids were fixed and the solution evaporated nearly to dryness. The residue obtained was treated with strong alcohol, by which the separation of the principal part of the ecgonine hydrochloride present was effected. The separated solution was evaporated, then mixed with excess of caustic soda solution and extracted with ether. Into the clear filtered ethereal solution hydrochloric acid gas was passed, which caused a milky turbidity, until the separation of some brownish drops, which were a solution of the hydrochloride of the volatile base in water.

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* *Berichte d. deut. chem. Gesells.*, xvii., 381.

The moderately dilute solution of this hydrochloride gave upon addition of platinum chloride first a flocculent precipitate in small quantity, which was separated. Upon further addition of platinum solution there resulted immediately a separation of pale yellow concentrically grouped needles. Upon the evaporation of the mother liquor a further small quantity was obtained. The entire quantity was recrystallized from boiling water, and in this way nearly 0·9 gram of the purified platinum salt was obtained. This was anhydrous.

0·2525 gr. gave 0·312 CO_2, 0·1035 H_2O and 0·0645 Pt.
0·2864 gr. gave 0·0724 Pt.

These results correspond nearly to the formula $(C_{11}H_{17}NO)_2, PtCl_6H_2$.

	Calculated.	Found.	
C	34·4	33·69	
H	4·7	4·55	
Pt	25·4	25·54	25·27.

Without doubt the salt was still not quite pure. It was equally evident that this base was neither my earlier hygrine nor the hygrine ($C_8H_{15}NO$) examined by Liebermann, although it contained the same amount of oxygen as the latter.

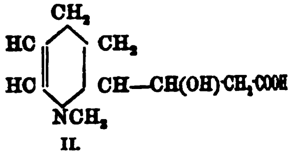
The base separated from the platinum salt formed a dark brown oil, which reacted strongly basic and had a burning taste. Its solution in acids showed a very faint blue fluorescence.

As the above 0·9 gram of platinum salt contained 0·45 gram of organic base, if it were assumed that this base originated from the Trujillo coca, it would give this a contents in "hygrine" amounting to 0·0005 per cent., which, however, was actually due to the solution of ammonia used.

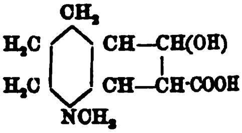
Concluding Observations.

It is apparent from the foregoing that coca leaves contain from 1·7 per cent. to mere traces of alkaloids, which are not volatile, as Bignon has already stated. Cocaine is the most important of these alkaloids, whilst the others, so far as their examination is free from criticism, do not appear to be distinctly noxious, but are at the same time inferior to cocaine in anæsthetic properties. All the coca alkaloids are derived from ecgonine methylester, and the ecgonine, itself from pyridine. With respect to the nature of the latter relation chemists at the present time hold different opinions, since Einhorn derives ecgonine from tetrahydropyridine and Liebermann from hexahydropyridine or piperidine. The first view is expressed in the graphic formula I., the second in II.

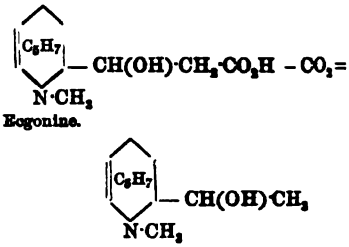
I.



II.



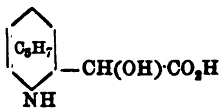
According to Einhorn ecgonine is therefore methyltetrahydropyridyl-β-oxypropionic acid. I consider this to be the more correct assumption, since in distinction to Liebermann's it allows of an unconstrained explanation of the constitution of the products of its decomposition. Liebermann wished to establish a relationship between ecgonine and tropine. Calmels and Gossfin have, however, shown that isotropine and not tropine results from the heating of benzoyl ecgonine with baryta, and that further by the rupture of the ring-linkage of the atoms in this substance, a non-nitrogenous body and probably ethylamine obtain. The actual identity of the base with ethylamine has not, however, been sufficiently proved. Calmels and Gossfin have rather assumed that this base is ethylamine, because this assumption agrees with their view concerning the constitution of the mother-substance. I have just as much right to assume that the base is not ethylamine, but dimethylamine; and the formation and constitution of isotropine would be then represented thus:—



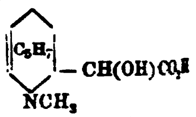
Ecgonine.

Isotropine.

From the latter formula the formulæ for ecgoninic acid and cocayloxyacetic acid, which substances were prepared by Liebermann and Einhorn respectively, can be easily deduced.



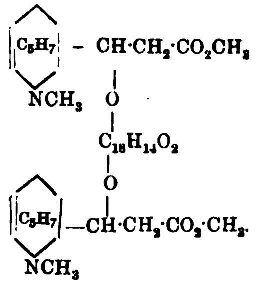
Ecgoninic acid.



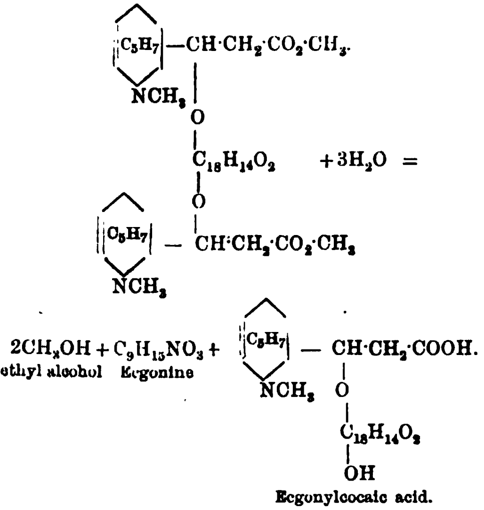
Cocayloxyacetic acid.

The methyl ester of ecgoninic acid would, according to this representation, not be identical with cocayloxyacetic acid.

As ecgonine only contains one atom of hydroxylic hydrogen, only one molecule can enter into reaction when the radicle of a monobasic acid, for example benzoyl, acts upon this substance. On the other hand, if the radicle of a dibasic acid, for example cocamyl, be the reagent, two molecules of ecgonine enter into the reaction. Corresponding to this, cocamine is therefore not $C_{19}H_{23}NO_4$ but $C_{38}H_{46}N_2O_8$.



Thus by retrogressive synthesis ecgonylcocaic acid may be obtained:



Ecgonylcocaic acid.

and the latter is readily split up into ecgonine and cocaic acid by treatment with alkalies or alkaline earths. Accordingly, with the isomeric isococamine, an intermediate product, ecgonylisococaic acid, might be expected, which appears to break up into isococaic acid and ecgonine by treatment with baryta more readily than its isomeride.

Whilst by the decomposition of this alkaloid with hydrochloric acid only ordinary ecgonine results as basic product, yet if baryta be employed as a decomposing agent, conversion into dextro-ecgonine is effected to a greater or less extent. This arises from the presence of an asymmetrical carbon atom in ecgonine; by treatment of the dextro-ecgonine with hydrochloric acid its reconversion into the ordinary form of ecgonine is effected. It is not probable that the bases obtained from dextro-ecgonine have a better physiological action than the corresponding lævorotatory alkaloids, as has been suggested; at least, previous experience with analogous alkaloidal pairs contradicts this conception.

Moreover, as ecgonine contains two asymmetrical carbon atoms, yet another isomeride of ecgonine, besides dextro-ecgonine, is capable of existence, and consequently a second isomeride of cocaine. For if one assumes that these carbon atoms occupy congruent positions in ecgonine, and dextro-ecgonine, and in one position cause laevo-rotation, in the other dextro-rotation, of the plane of polarized light, a third case may still be recognized, in which the carbon atoms do not cover one another, because opposite to each other.

In this case the body in question would possess an optical activity, which in intensity occupied an intermediate position between each of the other isomerides. For these reasons the anticipated new isomeride of cocaine would rotate the plane of polarized light to the left more feebly than cocaine itself.

Finally, with regard to hygrine, this alkaloid cannot be correctly considered along with the coca bases, because it is not contained in coca leaves themselves, but is a foreign body introduced by the impure materials employed for the extraction of the coca bases. The quality and quantity of hygrine, which is thus apparently yielded by coca, therefore naturally depends upon the character of these materials.

WHAT IS ARISTOL, AND HOW IS IT MANUFACTURED?*

BY GEORGE M. BERINGER, PH.G.

The search for a substitute for iodoform, possessing similar antiseptic properties, but devoid of its disagreeable odour, has enriched our materia medica with several other valuable iodine products, such as iodol, soziodol, and bismuth subiodide. Recently attention has been directed to the iodine products of the phenols, resulting in the introduction in practice of an iodine compound of thymol under the proprietary name of aristol. And it has also been discovered that similar products may be produced with phenol, naphthol, rescorcin, salicylic acid, and carvacrol. It must, however, be borne in mind that none of these contain so large a percentage of iodine as iodoform, and to possess equally valuable properties must in a measure depend upon the known antiseptic value of their organic bases.

The exact composition and mode of manufacture of aristol has not been published by the manufacturers, they contenting themselves with the statement that it was an iodine derivative of thymol and differed from the formulas and products published by various investigators.

J. Messinger and G. Vortmann, who first reported upon these iodine derivatives of the phenols (*Ber.*, xxij., 2012, see *Journ. Chem. Soc.*, 1889, 1150), stated that their product, obtained by adding a solution of iodine in potassium iodide to a solution of thymol in potassium hydrate, was a brownish-red amorphous compound having the *composition of di-iodo-thymol* ($C_{10}H_{12}I_2O$). This compound, they state, retains its colour many months when preserved in the dry state in the dark, but decomposes on exposure to light or moisture, with the liberation of iodine, into a yellow compound, an iodine derivative, most likely of dithymol. This yellow substance is also formed when the brownish-red compound is boiled with water, aqueous alkalies or sulphites or thiosulphites. The same writers subsequently proposed the adoption of this reaction for the volumetric estimation of phenols,* and state that one molecule of thymol requires four atoms of iodine for complete precipitation, a statement which is confirmed by my experiments. Dr. F. Goldman (*Apoth. Zeit.*, 1890, 45; also *Amer. Journ. of Pharmacy*, 1890, 129) states that aristol or *di-iodo-dithymol* is made by the action of a solution of iodine in potassium iodide upon a solution of thymol in sodium hydrate. The some statement is made by Dr. Eichhoff (*Pharm. Journ. and Trans.*, 1890, Feb., p. 601).

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* Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, March 17. *Am. Journ. Pharm.*, April.

The writer could find no published chemical examination of the commercial aristol, and several other iodine compounds with thymol are possible. And, as the precipitate obtained by adding iodine in potassium iodide solution to an alkaline thymate solution was so different, it became necessary to make some examination of the article supplied under that name before answering the first part of this query.

An original package of that supplied by the "Farben Fabriken" Company of Elberfeld was obtained, and upon examination showed the following characteristics: a pale yellowish red amorphous powder, easily soluble in ether, chloroform, benzene and petroleum ether, and less soluble in alcohol. It was insoluble in water, but yielded to that liquid a slight trace of chloride. Heating it on the water bath it became lighter in colour, and at 65° C. it gave off sufficient iodine vapours to blue a piece of filter paper moistened with starch solution. On heating at 100° C. for four hours it lost 6·4 per cent. and after six hours 7·4 per cent. It darkens at 124° to 126° C., shrivels into a dark mass at 134° to 136° O., and fuses at 158° C., and yielded on incineration nearly 1 per cent. of ash, which reacted for sodium chloride.

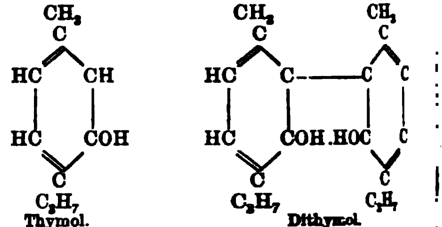
One grm. intimately mixed with pure calcium oxide, and a combustion made thereof, yielded, upon precipitation ·745 grm. silver iodide, corresponding to 40·25 per cent. of iodine. A combustion made with sodium carbonate yielded ·777 grm. silver iodide corresponding to 41·98 per cent. of iodine. Heating ·2 grm. in a sealed tube with silver nitrate and nitric acid (Carius' method) ·155 grm. silver iodide was obtained corresponding to 41·87 per cent. of iodine.

On repeating the experiments of Messinger and Pickersgill (*Ber.* xxiii., p. 2761, see *Journ. Chem. Soc.* 1890, 1403) and reducing aristol by dissolving in ether and adding solution of potassium hydrate in alcohol and then zinc dust gradually in small quantities and boiling on the water-bath in a reflux apparatus, and finally boiling off the alcohol, maintaining the bulk of the liquid by the addition of water, the liquid was obtained was filtered from the excess of zinc, acidulated with sulphuric acid, and extracted with ether. The product was purified by redissolving in alcohol, and yielded a compound possessing a peculiar odour of thymol almost phenol-like. It gave no reaction with ferric chloride, and although impure corresponded fairly well with the properties assigned to dithymol.

DITHYMOL was first obtained by Dianin (see *Journ. Chem. Soc.*, 1882, 130), by treating thymol with neutral ferric chloride or sulphate or ferric alum, the reaction being represented by the equation,

$$2C_{10}H_{14}O + Fe_2(SO_4)_3 = C_{20}H_{26}O_2 + 2FeSO_4 + H_2SO_4$$

The relation between thymol and dithymol is graphically represented by—



Thymol. Dithymol.

Goldman (*loc. cit.*) states that aristol is di-iodo-dithymol $C_{20}H_{24}O_2I_2$, containing 45·8 per cent. of iodine. Accepting his formula, there should be, by calculation 46·15 per cent. of iodine. But the manufacturers drying the product at a low temperature to prevent decomposition, there must be some water retained, as the loss on heating on the water-bath, determined above as about 6·4 per cent., must be due mainly to water. Allowing two equivalents of water to be in combination, there would be present 6·14 per cent. of water and 41·96 per cent. of iodine, figures that [illegible] agree with the results obtained by me, the average of the three determinations of iodine being 41·36 per cent. From these experiments we are compelled to accept the statement that aristol is a biniodide of dithymol in which the hydrogen of the hydroxyl groups is replaced by iodine and is represented by the formula $C_{20}H_{24}I_2O_2 \cdot 2H_2O$.

A formula based upon the experiments of Messinger and Vortmann would be:

Thymol	15	grms.
Soda	20	„
Iodine	50·8	„
Potassium iodide	66·4	„

The thymol and soda are dissolved in 250 c.c. water. The iodine and potassium iodide in 1000 c.c. and gradually added to the first solution, continually stirring. The precipitate is collected, washed and dried. The precipitate obtained by this formula was at first of a purple-brown colour, but while drying gradually became lighter in colour, until when dry it was of the same yellow-red colour as the commercial article. The filter on which the precipitate was collected and dried was stained with iodine. The filtrate gave no indication of free iodine, and a portion acidulated and extracted with ether yielded no thymol, showing that the reaction was complete. It is not believed that this is the process adopted by the manufacturers, as it requires the use of a large amount of iodide of potassium and iodine, the greater portion of the latter being lost in the drying of the precipitate.

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[*] The process given for phenol is as follows—One molecule of phenol requires 6 atoms of iodine. 2 to 3 gm. of phenol is dissolved in solution of NaHO using at least three molecules NaHO. It is diluted to 250 to 500 c.c. and 5 or 10 c.c. of this solution is taken in a flask maintained at about 60°; then $\frac{n}{10}$ iodine solution is added until a dark yellow solution is obtained, which on shaking forms a bright red precipitate. After cooling the solution is acidified with dilute H_2SO_4 and diluted to 250 to 500 c.c., filtered and an aliquot portion (100 c.c.) titrated with $\frac{n}{0}$ sodium triosulphate solution by which excess of iodine remaining determined. The amount of iodine used × factor $\frac{93 \cdot 78}{759 \cdot 24} = 0 \cdot 123518$ gives the quantity of pure phenol.

For Thymol: Iodine precipitates from alkaline solution of thymol a red brown flocculent precipitate, whereby for one molecule thymol used four atoms of iodine are required. The used quantity of iodine is $\times \frac{149 \cdot 66}{506 \cdot 16} = 0 \cdot 2956772$.

Process 0·1 to 0·3 grm. thymol is dissolved in NaHO (four mols. for each molecule of thymol) treated with $\frac{n}{10}$ iodine solution. The solution acidified and the remaining iodine determined as in the phenol investigation.

β-naphthol gives under similar conditions a dirty green precipitate, and is determined by the same method. The factor is likely $\frac{143 \cdot 66}{379 \cdot 62} = 0 \cdot 37843106$.

The alkali used must be nitrite free.—*Chem. Zeitung*, 1890, page 291.

The following formula is offered as an economical rocess :—

Thymol	15	grm.
Soda	20	„
Iodine	6·35	„
Potassium iodide	8·3	„
Solution of chlorinated soda, a sufficient quantity.		

The thymol and soda are dissolved in 250 c.c. of ater. The iodine and iodide of potassium are also issolved in 250 c.c. of water and the two solutions ixed, resulting in an opalescent solution with a dis- inct green tint, the slight precipitate first formed eing redissolved. Solution of chlorinated soda is now dded gradually while stirring, until no further pre- ipitation is produced, and a slight excess is indicated y the odour. About 650 to 700 c.c. will be required. he precipitate, a light red-brown in colour, is col- ected, washed and dried, by spreading on bibulous aper in a suitable room where it can be protected rom the light, at a temperature not exceeding 50° C. he filtrate showed the absence of iodides in any uantity, and a portion acidified and extracted with ther yielded no thymol. The yield by this and the receding formula was about 29 grams, corresponding n colour, melting point and solubilities with the ristol in the market, and closely approximating the heoretical yield 29·285 grm. calculated from the ormula $C_{20}H_{24}I_2O_2 \cdot 2H_2O$.

The thymol used in this formula must be free from ssential oil or thymene, or there is produced some odoform in the reaction, which remains as a con- amination of the finished product. As most of the ommercial thymol contains a small portion of hydro- arbon it must be first purified, which is easily accom- lished by percolating the powdered thymol with a mall quantity of purified benzin, which dissolves f course a portion of the thymol as well as the hymene, but it can be recovered by evaporation of he solvent and used for other purposes. The solution f chlorinated soda used should contain no excess of hlorinated lime, and in its preparation for this pur- ose it is advisable to use an excess of sodium car- onate, as an excess of this latter salt does not affect he product.

In 'Répertoire de Pharmacie,' 1890, page 355, M. ouis Boulé furnishes the following formula for the reparation of aristol: Crystallized thymol, caustic oda and potassium iodide each 5 grams, dissolved in 0 c.c. of water and then poured into 250 c.c. concen- rated solution hypochlorite of soda. It will be ob- erved on calculating the quantities used that there is n insufficient amount of iodine supplied by the otassium iodide to furnish a product of the above omposition. In the absence of sufficient iodine a ertain amount of the thymol combines with the hlorine. Upon adding solution of chlorinated soda to n alkaline thymate solution, there is precipitated a ompound of a pinkish tint soluble in ether, alcohol nd chloroform, and precipitated from its alcoholic olution by water. The filtrate from this precipitate ields but a slight trace of thymol upon acidifying nd extracting with a solvent. A similar product is btained by passing chlorine into an alkaline solution f thymol until there is a decided excess of chlorine.

These are evidently chlorine compounds with thy- mol, most likely a dithymol compound, and worthy of urther investigation.

FORMOSA CAMPHOR.*

Formosa camphor is obtained from the *Laurus cam- hora*, immense forests of which extend over most of the lower ranges of hills in the island, extending up the lower slopes of the mountains inhabited by the savage tribes. Many of these forests have not been touched, and the statement that the camphor supplies in South Formosa are becoming exhausted, applies only to those districts which are purely Chinese. The supply from other parts is practically inexhaustible. Even in purely Chinese districts it is only at certain places that the supply is falling off in consequence of the reckless manner in which the trees have been destroyed, partly for the sake of the timber and camphor, and partly, no doubt, simply to clear the ground for cultivation.

It has been often stated that the method of obtaining crude camphor in Formosa is by steeping the chopped branches in water, and boiling until the camphor begins to adhere to the stick used for stirring, when the liquor is strained, and by standing the camphor concretes. By this method it does not necessarily follow that the tree is destroyed, in fact with a little care there is no need that it should be. But although this method may have been in use in former days, it certainly is not now. On the contrary, I am assured by several natives, engaged in the trade, whom I have questioned on the subject, that the yield of camphor from the branches is too small to repay the labour of extraction.

The method in general use now is as follows:—The camphor expert selects a tree and scrapes into the trunk in different places, using an instrument somewhat resembling a rake, with the view of ascertaining whether it contains sufficient camphor to repay the labour of extraction. A tree is said not to be worth anything for camphor purposes until it is fifty years' old, and the yield is very unequal; sometimes one side only of the tree contains enough camphor to satisfy the expert, and in this case that side alone is attacked. The trunk is scraped to as great a height as the workmen can conveniently reach, and the scrapings are pounded up and boiled with water in an iron vessel over which an earthenware jar, specially made for the purpose, is inverted. The camphor sublimes and condenses on the jar, which is removed from time to time, scraped, and replaced. The root of the tree and the trunk, for some eight feet up, contain, as a rule, the greatest quantity of camphor. If the scrapings obtained from the trunk yield well, the chipping is continued until in the end the tree falls. The roots are then grubbed up as it is certain they will give a proportionately good return. If, however, the scrapings do not turn out well the tree is abandoned, and work is commenced on another. No attempt is made to extract camphor from the fallen trunk or from the branches. In some cases, the trunk is sawn up into timber, but this depends on the locality; from many districts, owing to absence of roads, timber would not pay for its transport.

It is impossible to imagine a more wasteful method of procedure, and it is fortunate that the camphor forests of Formosa are practically inexhaustible.

The quantity of camphor produced depends, of course, simply on the amount of labour employed in the business. Ten of the iron pots mentioned above and their accompanying jars make up what is called a "set," and are worked by four men. One set will produce about 65 lbs. in ten days, or, say, 1¾ cwt. a month, but this only under the most favourable circumstances, a fair average is about 1¼ cwt.

Recently a change has been made in the camphor monopoly. It is now proposed by the Chinese authorities that the camphor stills should be licensed before they are permitted to work. The cost of the license will be equivalent to a tax of about 22*s.* 6*d.* per cwt., a heavy tax, seeing that the actual value of the camphor at the place of production is very little over this amount.

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[*] From a report by Mr. Consul Warren on the trade of ainan, Formosa.

The Pharmaceutical Journal.

FIFTIETH YEAR OF PUBLICATION.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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ALKALI WORKS INSPECTION.

THE experience gained in the execution of the work of inspecting chemical factories in accordance with the provisions of the Alkali Works Regulation Act, continues to furnish interesting evidence of progress. In the report of the Chief Inspector, Mr. ALFRED E. FLETCHER, which has just been published, it is stated that in all chemical works of importance the testing of the waste gases which escape up the chimney shafts is now acknowledged to be an essential part of the daily routine. The fact that the effluent gases can be closely examined and controlled in their composition has been generally recognized, and manufacturers have found that by this means they can avoid the disagreeable consequences of a discovery that the amount of acid or objectionable gas discharged is above the limit allowed by the Alkali Act. A most important means of control has thus been brought to bear on these chemical industries, so as to protect manufacturers from loss on the one hand, while on the other the nuisance and injury caused by such works have been materially reduced. The number of works now brought under inspection is very considerable; among them there are in England and Ireland 117 alkali works and 791 works for the production of sulphuric acid, nitric acid, chlorine, etc. In Scotland there are 16 alkali works and 110 other works, making a gross total of 1034 registered works. The records of observations made during the past three years show a very constant uniformity in the amounts of hydrochloric and sulphuric acids escaping in the discharged gases. During the past year there have not been any prosecutions for exceeding the limits laid down in the Act for the permissible amounts of noxious gas. Neither have their been any complaints made by farmers or others in the neighbourhood of registered chemical works throughout the country. It may therefore be inferred that in every respect the result of the systematic inspection of chemical works has been beneficial, and that the difficulties which had to be encountered have been very successfully overcome.

There has, however, been one notable exception to this generally successful result. It relates to a manufacturing process that has not yet been placed on the schedule of the Alkali Act—the CHANCE-CLAUS process for recovering sulphur from the "tank waste" of alkali works. In carrying out that process there have been serious complaints of the escape of sulphuretted hydrogen. The prospect of the CHANCE-CLAUS process becoming a means of getting rid of the nuisance arising from "tank waste" was looked forward to by manufacturers with much satisfaction. But unexpected difficulties have attended the working of the process, causing much disappointment. The main feature of the process is the decomposition of the tank waste by carbonic acid, so as to recover the sulphur contained in it, and an account of the operation was given in the Journal of 10th March, 1888. This process appeared to be so complete and advantageous that nearly all alkali manufacturers adopted it, and unfortunately in all cases it has been found that some escape of the sulphuretted hydrogen produced, though small in proportion to the total quantity to be dealt with, has been sufficient to constitute a very great nuisance. The desire to work this new process was so great that as much as half a million sterling has been expended in plant for the purpose at the different works, and thus the difficulty of dealing with the nuisance has been augmented. Various means have been tried with the object of preventing the escape of sulphuretted hydrogen, due to incomplete reaction when that gas is burnt with a restricted supply of air, but as yet none have been fully successful. The relation between the LEBLANC and the ammonia processes of producing soda is shown by a statement of the quantities of salt decomposed, which shows that in the year 1890 the quantity consumed in the ammonia process was considerably more than one-third of that consumed in the LEBLANC process. The rate of increase in production during the last three years has also been much greater in regard to the ammonia process than in the LEBLANC process. Under the head of sulphate of ammonia it is stated that upwards of 134,000 tons of that salt were produced in 1890. This quantity is obtained by the exercise of care and skill in saving what would otherwise have been a waste product. Even the ammoniacal liquor of gas works was not very long ago a source of trouble to get rid of; but the value of the salt obtained from that source last year was much above one million sterling. More recently the gaseous products of shale works, coke ovens and iron works have been operated upon, so as to remove the ammonia they contain, and in that way a very considerable addition has been made to the production of sulphate of ammonia. The increase in the production of that salt from gas works has been promoted by the inspection under the Alkali Act, and the work is now conducted so that there is no escape of sulphuretted hydrogen to cause nuisance in the neighbourhood while loss of ammonia is also prevented.

Of the two soda-producing processes now working the ammonia process is less costly, but it has the disadvantage that the chlorine is not utilized. Other processes have been tried with the object of combining both products. One of these, devised by Messrs. Haddock and Leith, is intended to recover sulphur from vat waste, and to convert salt cake into carbonate of soda by a wet process, and without the use of ammonia. Calcium sulphydrate is made by forcing sulphuretted hydrogen into a mixture of vat waste and water. The clear solution thus obtained is mixed with a solution of salt cake; the calcium sulphate is separated, and the solution of sodium sulphydrate decomposed by carbonic acid; sodium bicarbonate is thus produced, and sulphuretted hydrogen, which is used for converting a fresh quantity of vat waste into calcium sulphydrate. As compared with the ammonia process it may claim the advantage of saving the chlorine of the salt; the cost of loss of ammonia and the production of sodium sulphydrate without furnace operations is another advantage. This and two other processes are now being tried on a commercial scale, and by such modifications, aided by the sulphur recovery processes, the old Leblanc process of producing soda is still maintaining a position side by side with the production of soda by the ammonia process. Attempts are again being made to carry into practice the decomposition of sodium chloride by electrolysis. The economic success of this method depends upon the cheap production of electricity. The question to be determined is whether the energy of coal can be best utilized by burning it to produce steam power for driving a dynamo or by using it in the black ash furnace of the Leblanc process, or for the operations of the ammonia process.

An interesting illustration of the antagonistic action of poisons is given in a letter we have received from Mr. W. Rushton, addressed to his brother in Tasmania by Dr. Mueller, of Yackandandah, Victoria, in which he states that in cases of snake bite he is using a solution of nitrate of strychnine in 240 parts of water mixed with a little glycerine. Twenty minims of this solution are injected in the usual manner of a hypodermic injection, and the frequency of repetition depends upon the symptoms being more or less threatening, say from 10 to 20 minutes. When all symptoms have disappeared the first independent action of the strychnine is shown by slight muscular spasms, and then the injections must be discontinued unless after a time the snake poison again reasserts itself. The quantity of strychnine required in some cases has amounted to a grain or more within a few hours. Both poisons are thoroughly antagonistic, and no hesitation need be felt in pushing the use of the drug to quantities that would be fatal in the absence of snake poison. Out of about one hundred cases treated by this method, some of them at the point of death, there has been but one failure, and that arose from the injections being discontinued after one and a quarter grain of strychnine had been injected. Any part of the body will do for the injections, but Dr. Mueller is in the habit of making them in the neighbourhood of the bitten part or directly upon it.

* * *

On Wednesday next, at noon, a meeting of the Members and Associates in Business of the Pharmaceutical Society residing in Scotland will be held at 36, York Place, Edinburgh, when the result of the election of the Executive of the North British Branch for the ensuing twelve months will be declared.

* * *

According to the eighth annual report of the Comptroller-General, the total number of applications for patents received during the year 1890 was 21,307. Of these 14,003 were from persons resident in England and Wales, 1,005 from persons living in Scotland, and 361 from persons living in Ireland, while of the remainder no less than 2,597 came from the United States, 1,336 from Germany, and 772 from France. The total number of applications for registration of trade marks in 1890 was 10,258, as compared with 11,316 applications in 1889. During the same time 6,014 were registered, of which 228 applied to chemical substances prepared for use in medicine and pharmacy, bringing the total number of registered trade marks for articles in this class up to 2,988.

* * *

In a communication read recently before the Royal Society of Queensland, Dr. T. L. Bancroft expressed the opinion that the distillation of essential oils in that colony cannot be profitably undertaken. Referring especially to five oils that have been highly spoken of, those from the leaves of *Eucalyptus Staigeriana*, *E. dealbata*, *E. Baileyana*, *E. citriodora*, and *Backhousia citriodora*, Dr. Bancroft says that the raw material for distillation cannot be obtained in Brisbane at a cost less than the value of the oil that can be distilled from it.

* * *

Preparations are already being made for the meeting of the British Association for the Advancement of Science, which will take place at Cardiff from the 19th to the 26th of August next. Circulars of invitation are being sent to members of the Association by the General Secretaries according to usual custom, and the local secretaries at Cardiff are also sending out circulars stating that the meeting will be under the presidency of W. Huggins, Esq., and on behalf of the Local Committee cordially inviting attendance at the meeting. The office of Mayor of Cardiff is this year held by the Marquis of Bute, who joins with the other members of the Corporation and other public bodies in Cardiff in the invitation. Later announcements will indicate the chief features of scientific interest which may be expected to mark the Cardiff meeting.

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According to a report by Mr. Consul Payton it seems probable that a considerable proportion of the material of the candles, other than wax candles, imported into Mogador is re-exported as a constituent of Moorish beeswax.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH—ELECTION OF THE EXECUTIVE.

The following is a list of the persons who have been nominated, and have expressed themselves willing to serve, if elected, as members of the Executive of the North British Branch for the ensuing twelve months. The result of the election will be declared at 36, York Place, Edinburgh, on Wednesday next.

1. Bethune, William John, 99, Academy Street, Inverness.
*2. Boa, Peter, 119, George Street, Edinburgh.
3. Coats, John Thomson, 64 and 65, Tolbooth Wynd, Leith.
4. Coull, George, 17, Smith's Place, Leith Walk, Edinburgh.
5. Currie, William Little, 223, Byres Road, Dowanhill, Glasgow.
6. Ewing, James Laidlaw, 52, North Bridge, Edinburgh.
*7. Fisher, John Hutchison, 66, High Street, Dunfermline.
8. Fowler, George Ross, 38, Castle Street, Forfar.
9. Fraser, Jonathan Innes, 13, Dundas Street, Edinburgh.
*10. Frazer, Daniel, 127, Buchanan Street, Glasgow.
*11. Gibson, Adam, Thistle Street Lane, East, Edinburgh.
*12. Gilmour, William, 11, Elm Row, Edinburgh.
*13. Hardie, James Millar, 68, High Street, Dundee.
14. Jack, James, 102, High Street, Arbroath.
15. Johnston, John, 45, Union Street, Aberdeen.
*16. Kermath, William Ramsay, 1, North Bell Street, St. Andrews.
*17. Kerr, Charles, 56, Nethergate, Dundee.
*18. Kinninmont, Alexander, 69, South Portland Street, Glasgow.
19. Laird, George Hardie, 40, Queensferry Street, Edinburgh.
20. Lunan, George, 20, Queensferry Street, Edinburgh.
*21. Maben, Thomas, 5, Oliver Place, Hawick.
*22. M'Adam, Robert, 34, Virginia Street, Glasgow.
23. Maclaren, David, 42, South Clerk Street, Edinburgh.
*24. Nesbit, John, 162, High Street, Portobello.
*25. Paterson, James, 15, Regent Quay, Aberdeen.
*26. Stephenson, John Bertram, 48, Frederick Street, Edinburgh.
*27. Strachan, Alexander, 138, Rosemount Place, Aberdeen.
28. Sutherland, John William, 68, High Street, Dumfries.
29. Thompson, Thomas, 35, George Street, Edinburgh.

THE JUBILEE CELEBRATION.

Address from the Pharmaceutical Society of St. Petersburg.

In addition to the addresses published in the Journal of May 30, as having been presented at the ceremony of the celebration of the Society's Jubilee, one has been received from the Pharmaceutical Society of St. Petersburg, of which the following is a translation. The address, which is beautifully illuminated, is bound in crimson velvet, the cover bearing a silver inscription plate and corner ornaments.

"The Pharmaceutical Society of St. Petersburg, established by imperial authority, sends the most sincere congratulations to the most worthy Pharmaceutical Society of Great Britain on the Jubilee Festival of its fifty years of existence.

"*May* it be permitted to the sister corporation of Great Britain long to enjoy in full fruition the renown that it has known how to attain by its beneficial activity, exerted far beyond the actual necessities.

"Habenda ratio valetudinis. May God grant it.

"St. Petersburg, May 26, 1891.

"*Director*, Magister T. Martenson
"*Secretair*, F. Weigelin."

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* Those marked with an asterisk are members of the retiring Executive, but are eligible for re-election.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 3rd inst., at No. 11, Harcourt Street, Dublin, the President, Mr. William Hayes, in the chair.

The other members of the Council present were:—The Vice-President, Mr. W. F. Wells, Dr. Burnes, Professor Tichborne, Messrs. Beggs, Grindley, Simpson, Robinson, Moore, Gibson, Merrin, Rankin, Johnston, and Boyd.

The President observed that allusion had been made in some of the trade journals to the circumstance that no congratulatory address had been presented by the Council of the Society to the Pharmaceutical Society of Great Britain upon the recent occasion of the completion of its centenary. The facts were that a week after the last meeting of the Council he received an invitation, as President of the Society, to attend the centenary celebration meeting and dinner at Bloomsbury Square. Not being able to accept the invitation he declined it with thanks. But as no previous notification of the centenary had been received there was no opportunity of summoning a special meeting of the Council for the purpose of adopting an address.

The Vice-President said he felt it necessary to correct an inaccuracy in the report of the proceedings of the last meeting of the Council. He was made to say, speaking of the English examinations, "that there was some talk of having only one examination for pharmacists' assistants and for Preliminary candidates." What he said was that "there was a great deal of talk about, and a good many were in favour of doing away with the Minor as a qualifying examination and of having only one qualification, namely, that of pharmaceutical chemist." Another examination would be substituted for the Minor, which would have to be passed after apprenticeship, but would not qualify to keep open shop. He remarked that that would be an arrangement similar to what the Council were about establishing for assistants here.

The Registrar, Mr. Ferrall, read a letter from the Privy Council inquiring why in the arrangement of the Preliminary Examination marks a smaller number of marks had been allotted to Latin than to English, as it was the opinion of the Committee of the Council that Latin was an equally important subject. Mr. Ferrall stated that by direction of the President a reply had been sent to that letter stating that in the opinion of the Council of the Society it was much more important that their candidates should have a thorough good English education than that they should have a moderate knowledge only of both Latin and English.

The President: Gentlemen, are you satisfied with the reply?

The Vice-President: I think it ought to be entered on the minutes.

The reply was approved of.

A letter was read from the Privy Council stating with reference to two applications for registration as chemists and druggists that the matter was not one in reference to which the Privy Council could advise the Council of the Society.

The Registrar stated that one of these applications was from Mr. John J. Cowley, of Rathdrum, and the other from Mr. Michael Lavan, of Ballyhaunis.

The President: It was decided at the last meeting to refer these applications to the Privy Council, and now they refuse to have anything to do with the matter.

Dr. Burnes: The Privy Council virtually uphold the decision of this Council.

The Registrar: There are further applications from these gentlemen which cannot come before the Council to-day. Mr. Cowley has sent in a fresh declaration.

The President: We have been talking all these things over anxiously, and if we can find any way by which we can admit anyone who is at all entitled to it we shall be pleased to do so. At the same time the Committee have to endeavour to do what is right as regards those who are on the Register, as well as those wishing to be admitted.

The Registrar in reply to a question from a member said Mr. Cowley had been in the business since a long time before 1875, but he was not a druggist. He was only a grocer.

The President: After having admitted some persons we received letters of remonstrance from others in the same town saying that it was a most unfair thing to admit persons who were only grocers; and we found that we had been imposed upon in one or two cases.

The Vice-President: We have evidence of such a character that if we send it to the Attorney-General he would be bound to have the parties prosecuted for perjury.

Mr. Moore: What is the definition of a druggist?

The Vice-President: In a great many cases men have styled themselves grocers and druggists and we have registered them.

The President: And in addition some who did not style themselves druggists have shown us by their invoices that they dealt very largely in drugs and we have endeavoured to admit them. But it does not follow that every man who sells a few pounds of sublimate or arsenic is entitled to style himself a druggist.

Dr. Burnes: It is time that the rights of the chemists and druggists should be defended from not only the pharmaceutical chemists, but also the grocers.

The Vice-President: One of the two applicants wrote stating that he never styled himself a druggist or kept a poisons book; and he only produced one invoice to prove that he was in business prior to the Act. He refused to sign our form.

The Registrar: He claimed as a general merchant.

The President: If Mr. Moore were on the Committee he would see how difficult it is to do right.

Mr. Moore asked what evidence was really wanted. The applicant might not be able to produce invoices. Very few people after they settled their quarterly accounts kept invoices at all; they destroyed them. His point was that if the Committee had proof from a house like his own or that of McMaster, Hodgson and Co., that a man had been dealing in drugs that ought to be sufficient.

The President: I think we have passed every one that it was possible for us to pass. We have not thrown out a single one who gave evidence that he dealt in drugs largely and in a general way, even though he was a grocer.

Mr. Moore said his house was most particular in writing nothing that they could not stand by. Within the last ten days they had had applications to write out invoices of transactions before 1875, and to add some poisons.

The Vice-President: Our friends in Belfast will tell you that one gentleman got labels printed with 187- on them.

The President: This discussion is a little out of order, but I am not sorry that we have had it.

Mr. Boyd: Might I make an application that the cases of these two gentlemen, Mr. Cowley and Mr. Lavan, be reconsidered?

The President: Yes; if there be any evidence to bring before the Committee.

The Registrar: Their applications will be before the Committee again.

A letter was read from the Privy Council, enclosing copies of three orders approving of (1) new regulations for the Preliminary examination, in which some alterations were made; (2) a regulation enabling candidates who had passed the Preliminary examination of their societies to come in for the Pharmaceutical examination within a year; and (3) a regulation that assistants who had been in business before the passing of the Act of 1875, should be accepted for examination on the same terms as those who went into business subsequently.

Mr. Rankin said the last mentioned regulation should have been framed so as to include those who were serving their apprenticeship at the time of the passing of the Act of 1875.

The President said it was he who drafted the regulation, and it was indicated to him that if it were made to include apprentices it would be opposed. It was not his own intention to have included apprentices.

Mr. Simpson: How many apprentices would there be? I suppose a hundred at the most.

Mr. Rankin: It would mean about 50 in the north.

The Vice-President: It would mean a loss of £1 13*s.* for each man.

Mr. Grindley: You might as well bring in druggists' porters.

Mr. Rankin: When those young men whom I desire to include went into business there was no Act at all. The case of those who went into business after the passing of the Act of 1875 is different.

The Vice-President: A man who has had twenty years' experience ought to be able to pass the modified examination. It is simply a matter of letting them in at a lower scale of examination fee.

A letter was read from the Honorary Secretary of the International Congress of Hygiene and Demography asking for the names of the members of the Society who would attend its meeting as delegates.

The Registrar was directed to write saying that Professor Tichborne and Dr. Whitla had already been appointed delegates.

A letter was read from Mr. A. H. Jones, asking to be allowed to present himself at the licence examination at the expiration of one year from last April. He stated that he had served three years' apprenticeship to an apothecary, and that before April, 1892, he would have been a year carrying on business on his own account as a registered chemist and druggist. He passed the Society's Preliminary examination last April.

The President: It cannot be done.

Letters were received from the Smithsonian Institution, Washington, and from Mr. F. B. Kelmer, pharmaceutical chemist, New York, acknowledging the receipt of copies of the Society's calendar which had been sent to them.

Mr. Rankin said he desired to correct an error in the report of the proceedings of the last meeting of the Council. He was reported as having said that "they had nothing to do with what chemists and druggists might be doing throughout the country." What he said was that "the Council while dealing with the certificate question which was then before them, had nothing to do with what chemists and druggists might be doing through the country; that they had plenty of power under their Acts to deal with them."

A letter was read from Mr. William Deane Bateman enclosing a petition from applicants at Cork, praying that an examination under section 7 of the Pharmacy Amendment Act might be held in that city, notwithstanding that there were not twelve candidates.

Professor Tichborne moved that the application be complied with.

The Vice-President seconded the motion.

Mr. Gibson: How many applicants are there?

The Registrar: Three.

The motion was unanimously agreed to.

Mr. Gibson moved pursuant to notice:—

> "That regulation 15 in the Calendar for 1891, which provides that the President, Vice-President, and Honorary Treasurer must be elected from members of the Council, who are also members of the Pharmaceutical Society, be rescinded."

He believed that that regulation was unjust and illegal. It was passed on November 29 last before representatives of the chemists and druggists had seats on the Council, and he thought it would have been more becoming to have kept the matter over in order to afford them an opportunity of speaking on it. Again, it was illegal, because under sections 13 and 14 of the recent Act the representatives of the chemists and druggists were "members of the Council," and as such, under the Act of 1875, which was to be read with the other, they were entitled to be elected to the offices in question. What was thus given by the statutes no regulation of the Council could take away. While the Amendment Act was before the House of Lords an attempt was made to make this proviso part of it, but the House of Lords refused to sanction it. The making of the regulation afterwards by the Council was getting the thing in by a back door. They were all members of the Council, and he objected to a bar being put on any of them. It was starting the new Act in the same way as the previous Act was chopped up, as regarded the rights and privileges conferred on the chemists and druggists, which were taken from them by regulations.

The Vice-President: No. Name one privilege that was taken away. You have made a charge against the Council. Prove it by giving an instance of anything that we took away from the rights of the old druggists.

Mr. Gibson: It is not necessary for me to name one instance, because the whole course they adopted—

The Vice-President: That is very wide.

The President: Mr. Gibson, I do not think you should make a charge unless you can prove it.

Mr. Gibson: I am not accustomed to make charges that I cannot prove. The bye-laws that you passed took away——

The Vice-President: Name a single item.

Mr. Simpson said Mr. Gibson ought not to make statements that he could not substantiate.

Mr. Mertin: I think the statement should be withdrawn.

Mr. Gibson said the intention of the original Act was that there should be two grades. Were they established?

The President said the old Council considered that matter from the very beginning and found that if they created two grades both would be doing the same work, and the druggists of the period themselves preferred that there should be only the one grade with power to compound physicians' prescriptions. It was therefore unfair to be reiterating this charge about the non-establishment of the two grades.

Mr. Beggs, as a member of the Council, called on Mr. Gibson to withdraw his statement.

Mr. Gibson: Well, Mr. President, you and the other members of the Council seem to have rather misunderstood what I intended.

The Vice-President said that at the request of the Dublin and Belfast druggists the Council sent a deputation to the Government asking them to give power to register the old chemists and druggists who would not have the right of dispensing medicines, but the Government would not do it.

Mr. Gibson: I beg to withdraw what I said, but I think that by rescinding the clause to which my present motion relates the Council will be doing a fair thing.

Mr. Boyd said he seconded Mr. Gibson's motion for two reasons. The first was that any gentleman who was worthy of being elected a member of the Council was, he submitted, worthy of being elected to any of its offices. The second was that this very proviso was one which the House of Lords refused to sanction as part of the Bill after it had been keenly fought before them. Therefore the Council had no business to have submitted such a regulation to the Privy Council, and he was sure that the latter had given their assent to it under a misapprehension.

Mr. Rankin supported the motion. The Council were amply safeguarded by the existing state of its representation. The druggists did not aspire to the offices in question, but they objected to the slur which was put upon them by the regulation.

The Vice-President said that while the Amendment Bill was before the House of Lords the pharmaceutical chemists proposed that it should appear on the face of the Act that a chemist and druggist or a druggist should not be President or Vice-President of the Society. The Earl of Erne, who was the druggists' representative, said it would be hardly fair to put it into the Act, as it would be a slur on the druggists, and the Marquis of Waterford, the able representative of the pharmaceutical chemists, asked them was it worth fighting for? saying at the same time, "It will always have a majority." The Earl of Erne said he thought nobody but a pharmaceutical chemist should ever hold the position in question. Consequently the matter was not discussed in the House of Lords, and the representatives of the pharmaceutical chemists withdrew their proposal. Afterwards, when the Council came to consider the matter, they found grave difficulties in their way. He was sorry to be obliged to say that there was not union amongst them yet. The pharmaceutical chemists were suspected still. They did not get credit for being honest with the druggists. They were looked on as if they were doing everything they could to keep them from being registered. Would it do to put the gentlemen who were now mixed up with the chemists and druggists as a body and who were yet fighting against them (the pharmacists) in as President and Vice-President of the Society, when by virtue of the office they would become members of all the Committees including the Law Committee, which had to deal and was dealing at the present moment with cases of illegal dispensing? They would be in the unfortunate position of taking proceedings against some of the men whom they were there to represent. Unfortunately men were breaking the law, and it would be the duty of the Council to make examples of them. Therefore he thought it would be a very unwise course to alter the regulation in question at present. He believed that if they had pressed it in the House of Lords they would have got it into the Bill. But it was now in the Calendar, and stated in such a way that not one person in fifty would notice that druggists were not allowed to take the chair. Therefore he must oppose the motion.

Mr. Moore said he did not aspire to any of these positions, but he thought it a matter of justice to the druggists that the regulation in question should be rescinded. The unpleasantness to which Mr. Wells had referred would pass away. They were in their infancy, and after a year or two all those difficulties would have vanished.

Dr. Burnes: The certificates have to be signed by the President of the Pharmaceutical Society. I do not see that it would do to have them signed by a chemist and druggist or by a druggist.

Mr. Robinson said he thought Mr. Gibson would have acted more in the interests of chemists and druggists if he had postponed this motion for a year or so; and probably then not one of them would have any objection to it. A great deal had been said about the state of affairs at present. The Council had shown that they were desirous of assisting and encouraging every druggist to become registered; but they could not shut their eyes to the fact that some of the chosen and selected representatives of the chemists and druggists had stated there publicly that if they did get what they wanted they would repudiate the authority of the Council and its officers, and issue a certificate for themselves. As a pharmaceutical chemist he (Mr. Robinson) objected to the offices in question being thrown open at present to members of the Council, who were in such a frame of mind. Gentlemen who should be elected to those offices would govern the interests of the pharmaceutical chemists, and he objected to that unless they became members of the higher grade. By and by when everything should be smoothed down and all should see that they had a common interest these offices could then be thrown open.

Mr. Moore: On behalf of the druggists of Dublin I repudiate the reference which this gentleman has made.

Mr. Robinson: Which reference?

Mr. Moore: As to our wanting to issue our own certificates.

The Vice-President: You are only doing what Mr. Boyd did on the last day.

The President: I am glad to hear Mr. Moore make that statement. I believe that the gentleman who made the statement which is now repudiated did so in the heat of the moment, and in a cooler moment would not have done so. He (the President) did not think that this bye-law was brought up for the purpose of in any way hurting the feelings of the chemists and druggists throughout the country. On the contrary, it was done from a sense of what was right; and he thought the time would come when the Council would be a united body, and would feel it a privilege to ask the Privy Council to amend the bye-law; and possibly in future years they would be proud to see a druggist president of the Council. At present he thought it would be unwise to dispense with it.

Mr. Boyd: Perhaps Mr. Gibson, with the consent of the Council, will withdraw his motion?

Mr. Gibson: All right, Mr. President; I withdraw it with pleasure.

Mr. S. P. Boyd, M.A., moved the following resolution:—

> "That the Privy Council having approved of the Resolution passed by this Society on January 15, 1891, admitting those who were assistants prior to August 11, 1875 to become registered as 'Druggists' under the provisions of Section 7 of the Amendment Act, the time for receiving applications from such assistants be extended to August 18, 1891."

In consequence of the delay which had taken place before the approval of the Privy Council was given to the resolution passed by the Council on January 15, it had become absolutely impossible for the assistants to comply with the provision of section 7 of the Act that they should make their applications to be registered on or before June 1 in the present year. Consequently, the extension of time which his motion proposed was absolutely necessary.

The Vice-President said he had great pleasure in seconding the motion.

The motion was unanimously passed.

The President: The Privy Council are anxious to do anything that we propose with a view to assisting druggists to obtain the benefit of the Act.

A report was read from the School Committee.

The President said he had received a letter from Dr. Ninian Falkner, withdrawing the application which he had made for leave to take pupils, and stating that he would adhere to the terms of his appointment so long as he should continue to be an examiner for the Society.

The report was adopted.

A report was read from the Declarations Committee, from which it appeared that the following persons have been accepted for registration as chemists and druggists who had been in business prior to August 11, 1875:—

Beatty, Alex., Ballymena.
Buckley, Cornelius, Maynooth.
Lyons, Robert, High Street, Omagh.
Johnston, Mary Eliza, Glenavy, co. Antrim.
Keary, Patrick, Woodford, co. Galway.
Mahaffy, James, Belturbet.
Plunkett, George, Market Street, Trim.
Price, George R., 59, Moyne Road, Dublin.
Smithwick, John Francis, High Street, Kilkenny.

On the motion of Mr. Moore, seconded by the Vice-President, Mr. Joseph Smyth, chemist and druggist, of Wicklow, was admitted an associate druggist.

On the motion of Mr. Beggs, seconded by the Vice-President, Mr. Charles Evans was elected a member of the Certificates, the House and General Purposes and the Pharmacy Amendment Act Committees and Mr. Grindley was elected a member of the Declarations Committee.

The President: I have to mention—and the announcement is a painful one to me—that this is the last meeting of the Council that I shall be able to attend, at all events for the next five or six months. I have unfortunately to accompany a sick son to Australia, and I shall be obliged to leave with him at the end of this month. At the time I accepted my present post I had not the most remote idea that I would be called on to fulfil that duty, but I have since found that I cannot avoid it. Mr. Wells, as your Vice-President, will of course take the chair until October, when you can elect as your President whoever you shall think will serve you best. I had not at first desired to continue in office longer than October, but we have been getting on so pleasantly at the last two meetings that I would not have any objection, if it should be your wish, to continue on a little longer. At the same time I do not aspire to the position if there be anyone else that you wish to place in it.

Mr. Gibson: We are all very sorry that you have to leave us, and are glad that you place your services at our disposal for the future.

The Vice-President: I am sure I express the feelings of all present when I say that we hear with great sorrow of the cause which obliges Mr. Hayes to leave us. I would ask him to allow us to nominate him again for the office of President in October.

The President: I have indicated that if it should be the wish of the Society, I shall feel it my duty not to shirk the duties of office. I hope to be back not later than the first meeting of the Council in January next; possibly I may be back by December 1.

Mr. Moore said he endorsed all that Mr. Wells had said, and heartily sympathized with Mr. Hayes in his present position. He had known Mr. Hayes for a great number of years—indeed since he served his apprenticeship—and there was no member of the Council whom he would rather see President than Mr. Hayes.

Mr. Rankin said he would add that as long as Mr. Hayes desired to continue in office they felt that they would be only honouring themselves in putting him in the chair; for he had all along acted in a wise and discreet manner during the crisis which the Society had experienced. He had always taken a fair view of the questions that had arisen between the two parties, and if he desired to continue longer in office, their opinion was that he was deserving of the honour.

The Council then adjourned.

EXAMINATION FOR LICENCE TO ACT AS A REGISTERED DRUGGIST.

The following have passed the examination:—

Miss Fanny Pierse, Wexford.
Mr. Alexander Andrews, Banbridge.
Mr. Richard Barry, Midleton.
Mr. James Clancy, Dublin.
Mr. Patrick Dromgoole, Dublin.
Mr. Richard Ellis, Limerick.
Mr. Thomas Lorell Harte, Dublin.
Mr. Wm. C. Spencer, Dublin.
Mr. John H. Dudgeon, Belfast.
Mr. Thomas John Field, Belfast.
Mr. S. Edgar Kee, Belfast.
Mr. James Mahon, Belfast.
Mr. William Miskelly, Belfast.
Mr. Thomas Spratt, Belfast.
Mr. Samuel Suffern, Belfast.
Mr. David S. Thomson, Dundalk.
Mr. Thomas G. Wilkinson, Belfast.

One candidate was rejected.

Provincial Transactions.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first of a series of excursions which have been arranged for Wednesday afternoons during the summer, was held on June 3, when the Chemical Works at Carnoustie, belonging to Messrs. Charles Tennant and Co., Limited, of St. Rollox, were visited. The party—numbering about 20—were shown over the extensive works where the manufacture of sulphuric acid is chiefly carried on. The visit proved most enjoyable and instructive, the party returning to Dundee about 7 p.m., the hour at which business is resumed.

American Pharmaceutical Association.

The following paper was read before the Section on Scientific Papers at the recent meeting at New Orleans:

A SCHEME TO ESTABLISH A COMPARATIVE STANDARD FOR ALKALOIDAL GALENICALS.*

BY J. U. LLOYD.

This subject is introduced in accordance with the desire of the Cincinnati Chemical Society, before which, at the request of the president, Professor T. H. Norton, who was acquainted with my laboratory methods of assay, the subject was presented experimentally at the February meeting.* Acknowledging the necessity at this time for contributions to the subject of assay determinations, I cheerfully comply, and hope that the scheme introduced herewith may (either as I use it or as it may be modified) assist those who seek speedy and simple methods for approximate standardization of galenical preparations. This paper is contributed directly to this Society by suggestion and request of some of the members of the Chicago College of Pharmacy, before whom it was my pleasure recently to perform a few experiments of a kindred nature.

When the assay experiments aforenamed were introduced, I stated that neither the use of small amounts of bicarbonate of sodium as an antacid or neutralizer, nor the washing methods of the subsequent steps were claimed by me as new, but that in other respects the general process was such a marked innovation on all others known to me as to probably make it an original one.

In considering assay methods, corrections must, I believe, be made for varying conditions seemingly of apparent unimportance, as, for example (a point that many perhaps overlook), the time consumed in some portions of the process. If, for example, ipecac, aconite, lobelia, belladonna, and other drugs possessed of delicate alkaloids, are permitted to linger during certain stages of the manipulation, especially in water, acid, and alkali contact, the operation, in my opinion, is in itself more or less disastrous to accuracy, and the result may be questionable. If heat is applied to some of the organic bases while in process, especially in the presence of mixtures of water and acid, or alkali, the alkaloids may be more or less split or disintegrated, and may materially vanish. Hence, to arrive at fair comparative assay determinations, the operator must in many cases avoid possible destructive features that may be either thoughtlessly overlooked or considered unimportant, and he should, in my opinion, complete his work within the shortest possible period. Indeed, I make it a rule to so arrange that neither delay nor interruption occurs in assay determinations of certain drugs while their alkaloids are in water contact, whether (as in the process herein introduced) it be while in the mortar or the acid solution. No perceptible loss follows during chloroform contact (in my experience), but my entire process, from beginning to end, consumes but a few moments.†

In my method the possibilities of loss from the first step of the usual processes for assaying fluid extracts are avoided (evaporation of the alcohol after making them alkaline or acid), for I dispense with that step entirely.

I will briefly state that the advantages of my method over those in general use result, in my opinion, chiefly from

1. The dispensing with an evaporation of the fluid extract in the presence of alkalies and acids, avoiding thereby the consequent destruction of delicate alkaloids (the first step of other methods).

2. There is no loss of alkaloid from precipitation with resins during such evaporation, a loss that may result in such cases from their mechanical envelopment by the precipitated resin, which is often thrown down in large amount, and in which the alkaloid is often so firmly embedded or associated as to resist the action of solvents.

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* I recognize the fact that objections may be offered to all methods of assay. This is not proposed as a perfect process, but as one that is worthy of consideration and within reach of most apothecaries.

* The Society then requested me to send the detail process to the Revision Committee of the United States Pharmacopœia.

† Some stable organic bases, such as strychnine, caffeine, and quinine, do not perceptibly disintegrate or split. Others, like the alkaloids of hyoscyamus, belladonna, aconite and ipecac, should be handled cautiously while in manipulation.

3. The displacement of the alkaloid from natural combination, largely accomplished by the action of the cold acid of the ferric chloride.

4. The simultaneous fixing of tannates and vegetable astringents in an insoluble condition by the ferric chloride (and the ferric hydroxide produced when the sodium bicarbonate is added), thus keeping them out of the alkaloidal solvent; and the freeing of much of the alkaloid from natural combination, in a condition to be easily dissolved by chloroform.

5. The final liberation of the total alkaloid in a nascent, or at least very soluble, condition by action of the great excess of sodium bicarbonate, which, from its weak, alkaline nature, will not immediately affect it disastrously, while the protective action of the carbonic acid gas generated at the time possibly assists in preventing its decomposition.*

6. The distribution of the alkaloid throughout a substance for which it has no affinity, but rather a repulsive action, which enables appropriate solvents to abstract it rapidly and completely, as may be shown by drying the soda magma in the mortar after extracting nux vomica or cinchona, and applying thereto the delicate sense of taste test; and as may also be shown by comparative experiments and final weighings in which different amounts of extracts are worked, or known amounts of alkaloids are added to similar proportions of the fluid extract that is to be assayed.

7. The avoidance of exasperating or provoking delays in the subsequent manipulation by reason of the formation of emulsions that often (or usually) refuse to allow the liquids to separate; for by my method the chloroform that washes the alkaloid from the soda magma in the first step is practically colourless and nearly destitute of foreign bodies, especially of the substances that usually accompany the alkaloid and subsequently form emulsions.

The operator may, by using this magma process, begin and finish the assay with despatch and without an interruption. Only a few moments are required to assay any fluid extract named in the following paper, and those cited are simply individualized examples of what is possible, with slight deviation of method, with others, and with other classes of galenicals.

Some factors are present in my process that will strike other persons as questionable innovations—they did myself, although I had less reason to fear the application of the method in assay amounts than most other persons will have. I have been forced in my work to meet some peculiar problems, problems that have confronted me for many years, in connection with eclectic drugs, usually unimportant with others; and few pharmacists have probably, until recently, felt the urgent necessity for methods of assay that did not apply to such well-known officinal alkaloid-yielding drugs as opium and cinchona. To some of the self-recurring questions concerning my process, questions that surely will arise, I briefly refer as follows:

It will appear as though the solvent (chloroform in examples cited herein) cannot, by its brief contact, abstract the alkaloid from the bulky soda magma. This point has been settled (favourably as compared with other processes of assay) to my satisfaction for many years. It will perhaps also appear that the chloroform must dissolve appreciable amounts of sodium or iron compounds from that magma, by reason of their great abundance and contact with it—a point that may be readily established (negatively, as I have worked) by conducting the process with fluid extracts of non-alkaloid drugs and noting the result. It is my experience that the minute amounts of such contaminating bodies (excepting oils, fats and some resins which are afterward practically separated) are usually unimportant, even in the first chloroform. These contaminations do not, in my opinion, amount to the uncertainties of the first step of other methods that I have employed; for defects of manipulation that may result in destruction of more or less of the alkaloid can never be overcome, while in my process the traces of foreign bodies abstracted by the first chloroform are left in the acid water.

Some may prefer titration with Mayer's solution to final weighing of the alkaloid. In my experience, the corrections necessary, after titrating with Mayer's solution—owing to discordant results from disturbing conditions, such even as the degree of dilution of the menstruum; uncertainty concerning exact point of the end reaction; solvent action an excess of the reagent exerts upon the alkaloid precipitate; the action of heat and influence of time that must be preliminarily employed to free the fluid extract from alcohol and resin, in order to apply that test with any degree of accuracy—render that process exceedingly unsatisfactory, whether applied volumetrically or gravimetrically. Part of this trouble is largely overcome, however, if volumetric titration is preferred, by using my process and titrating the alkaloidal acid solution that results from washing the first chloroform. I value Mayer's test as an indicator to establish the presence of alkaloids, but not as a satisfactory agent for quantitative alkaloidal assay.* Predisposition and habit, however, have much to do in framing our preferences, and some who are accustomed to assay by other methods, the details of which have become familiar, may not care to vacate a beaten road.

To those of limited experience proposing to establish commercial or home-made fluid extracts by my process, I suggest, first, assay fluid extract of guarana, then nux vomica and members of that class, after which the methods of manipulation will be familiar, and members of the class embracing hyoscyamus will offer no difficulties. I would particularly urge the inexperienced manipulator to bear in mind that patience and care are as much a necessity in simple methods as in those more complex, and that it is evident that no process can be formulated that will apply to all substances.

Finally, I must say that, in my opinion, assay determinations of this description are not designed to, and cannot, prevent fraud. In addition to such general methods as those that are used to roughly estimate the total alkaloid present, tests must be devised to show that cheaper or foreign alkaloids have not been introduced, if it is proposed to prevent adulteration. It would be an easy matter to sophisticate a poor fluid extract of ipecac and make it show by the usual tests the presence of 2 per cent. of a crude alkaloid, and yet it might be destitute of emetine. Distinguishing tests to correct intentional abuses are not yet practical in the majority of cases. I question, however, if any established American manufacturer would be guilty of such an offence, and in assaying commercial fluid extracts I exclude such a supposition. If a commercial pharmaceutical specimen is inferior, in my opinion it is because of carelessness in manipulation, or the use of either a faulty process or a poor drug, or from deterioration. Manufacturers cannot risk their reputations by inviting disasters that would surely follow systematic adulteration, and I believe that they appreciate attempts to help establish uniform products. Probably this paper will be received in that spirit as a contribution to current literature, for I believe that all are anxious to avoid some of the confronting perplexities and uncertainties and find easy methods to overcome tedious processes.

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* While I acknowledge the fact that caustic alkalies are usually employed by assayists to precipitate alkaloids, I need only say that where great economy is necessary, as in competition in business, such disastrous processes are to be avoided, excepting with bases of the most permanent character. Such influences are often unnoticed in working small amounts, but in large batches they cannot be ignored. It is evident that the rule should apply alike to small determinations.

* I need only refer to corrections authorized in Lyon's "Assay," and to remarks on pp. 22 to 27 of that excellent work, and to the papers of H. W. Snow, to show that I am not alone in this view.

We should recognize, however, that an element of suspicion adheres to all methods of assay whereby standardization is attempted by estimation of the proportion of crude or natural alkaloids. These approximate assay methods are makeshifts. Possibly their evolution will lead to the discarding of natural conglomerates such as fluid extracts. Possibly standards of value closer than proportions of mixed crystallizable and amorphous natural alkaloids will be evolved. Where two or more mixed alkaloids of varying physiological values prevail in a drug, it seems to me that only a part of the object is attained when we assay to "total alkaloid."

Where amorphous and crystallizable alkaloids abound under one name and different activities, it seems to me that we should discriminate and individualize. Where it has not been established that alkaloidal constituents dominate the entire therapeutical energy of a drug, it seems to me that alkaloidal standardization should be valued as a part and not the whole. Where it has been shown that the full force of a drug can be obtained from one permanent alkaloid (if that has been shown), it seems a relic of empiricism to use either the drug in substance or any preparation thereof.

Scheme to Assay Fluid Extract of Guarana.

[Fluid extract of guarana should assay from 3·00 per cent. to 4·00 per cent. caffeine.*]

In a flat-bottomed porcelain mortar with a good lip mix 5 c.c. of the fluid extract with 2 c.c. solution perchloride of iron. Add sodium bicarbonate to it, with constant trituration, until a stiff magma results. Abstract the magma by repeated triturations with chloroform, using first 20 c.c. and then three portions of 10 c.c. each, decanting them severally. (This excludes tannates, gums, albuminates, mineral salts, most vegetable acids and salts and most colouring matters. The chloroform extracts the caffeine and an insignificant amount of colouring matter.) Throw the contents of the mortar away. Mix the chloroform solutions and divide into two parts. Reserve one portion for possible mishaps. Evaporate the other part in a tared dish. Weigh the residue, express in grams, and multiply the amount by 40, which will give the percentage of caffeine. The caffeine will be but little coloured and will be crystalline. It should dissolve completely in chloroform.

Remarks.—If very pure caffeine is desired, dissolve the dry residue in chloroform, filter the solution, and wash the filter-paper well with chloroform, then evaporate it. This operation must be repeated if the caffeine is still coloured. The testimony offered by the caffeine in the first chloroform solution is a better criterion of the caffeine value of the fluid extract than that of subsequent determinations, for the traces of impurity present therein are more than balanced by the caffeine wasted by the subsequent manipulations.

Scheme to assay Fluid Extract of Ipecac, Belladonna Root, Aconite and Nux Vomica†.

Fluid extract of ipecac should assay 1·50 per cent. natural alkaloid.

Fluid extract of belladonna root should assay 0·30 per cent. natural alkaloid.

Fluid extract of nux vomica should assay 1·50 per cent. natural alkaloid.

Fluid extract of aconite should assay 0·40 natural alkaloid.

In a flat-bottomed porcelain mortar with a good lip mix 5 c.c. of the fluid extract with 1 c.c. solution perchloride of iron. Add sodium bicarbonate to it, with constant trituration, until a stiff magma results. Abstract the magma by repeated triturations with chloroform, using first 20 c.c. and then three portions of 10 c.c. each, decanting them severally. (This excludes tannates, gums, albuminates, mineral salts, most vegetable acids and salts, and most colouring matters. The chloroform extracts the alkaloids, mixed with some wax, resin, and the fats.) Throw the contents of the mortar away. Mix the chloroform solutions and divide into two parts. Reserve one portion for possible mishaps. Extract the other part by rotating it in a bulbed separator with diluted sulphuric acid (1 part in 50), using successively three portions of 10 c.c. each. (This acid water abstracts the alkaloids, leaving the fats, resins, and wax in the chloroform.) Throw the chloroform away.* Make the mixed acid solutions alkaline with ammonia water, quickly rotate in a bulbed separator with three portions of 10 c.c. each of chloroform, abstracting the chloroform solutions severally. (This abstracts the natural alkaloid, forming a chloroform solution that is practically free from impurities.) Throw the water solution away. Mix the chloroform liquids and evaporate in a tared dish. Weigh the residue, express the amount in grams, and multiply by 40, which will give the (practical) crude alkaloidal per cent. of the fluid extract. (This alkaloidal residue should dissolve completely in diluted sulphuric acid.)

Scheme to Assay Fluid Extracts of Hyoscyamus, Belladonna Leaves, and Coca.†

Fluid extract of hyoscyamus should assay 0·20 per cent. natural alkaloid.‡

Fluid extract of belladonna leaves should assay 0·40 per cent. natural alkaloid.

Fluid extract of coca should assay 0·50 per cent. natural alkaloid.

In a flat-bottomed porcelain mortar with a good lip mix 5 c.c. of the fluid extract with 1 c.c. solution perchloride of iron. Add sodium bicarbonate, with constant trituration, until a stiff magma results. Abstract the magma by repeated triturations with chloroform, using first 20 c.c. and then three portions of 10 c.c. each, decanting them severally. (This excludes tannates, gums, albuminates, mineral salts, most vegetable acids and ,salts, alcohol, and most colouring matters. The chloroform extracts the alkaloids mixed with wax, some resins and chlorophyll, and the fats.) Throw the contents of the mortar away. Mix the chloroform solutions and divide into two parts. Reserve one portion for possible mishaps. Extract the other part by rotating it in a bulbed separator with diluted sulphuric acid (1 in 50), using successively three portions of 10 c.c. each. (This acid water abstracts the alkaloids and some chlorophyll, leaving the fats, resins and wax in the chloroform liquid.) Throw the chloroform away.* Extract the mixed acid solutions by rotating n a bulbed separator with two portions of 10 c.c. each of stronger ether, severally abstracting the acid solutions from beneath. (This washing with ether separates the adhering chlorophyll.) Throw the ether away. Make the mixed acid solutions alkaline with ammonia water, quickly rotate in a bulbed separator with three portions of 10 c.c. each of chloroform, abstracting the chloroform portions severally. (This abstracts the alkaloid, forming a chloroform solution that s practically free from impurities.) Throw the water solution away. Mix the chloroform liquids and evaporate them in a tared dish. Weigh the residue, express the amount in grams, and multiply by 40, which will give the (practical) alkaloidal percentage of the luid extract. (This alkaloidal residue should dissolve n diluted sulphuric acid.)

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* The alkaloidal percentages suggested in this paper are designed to come within the yield that is feasible with good qualities of commercial drugs. In my opinion the standard should not be established above the average shop product, and there should be an allowance for variation in manipulation and material.

† The method, with slight variations, may be applied to the quick assay for other alkaloidal galenicals, detailed reports on which will perhaps yet be given by the author.

* If the operator prefer the titration method with Mayer's solution, this acid solution is ready, after evaporation of the chloroform, for volumetric assay. I prefer to dry and weigh the natural alkaloid.

† This process, with slight modifications, may be applied to the assaying of galenical preparations of other alkaloidal herbs.

‡ The term "alkaloid" is used with reference to the mixed associated crude (amorphous and crystalline) alkaloids, regardless of their several therapeutical values. There is no question but that the establishing of crude alkaloidal standards is open to objections.

Parliamentary and Law Proceedings.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* CERNES.

Before his honour Judge Jordan, at the Hanley County Court, on the 10th instant, the Council of the Pharmaceutical Society of Great Britain sued James Cernes, an assistant in the employ of the Hanley Drug Company, Limited, of 10, Tontine Square, Hanley, to recover three penalties of £5 each for having sold poisons contrary to the provisions of the Pharmacy Act, 1868.

Mr. Grey appeared for the plaintiffs.

Mr. Hunt (solicitor) appeared for the defendant.

Mr. Grey referred to the statute under which these proceedings were instituted, and then stated that the action was to recover three penalties incurred by the defendant in selling poisons on the 20th of March, 1st and 3rd of April in the present year. The defendant was an assistant in the employ of the Hanley Drug Company, Limited. He was not a qualified person, and except that he was an assistant to a limited liability company the case was on all fours with the case of the Pharmaceutical Society *v.* Wheeldon, to the judgment n which case he called his Honour's attention. The offences which would be proved were incurred on—

Mr. Hunt: I admit that the defendant sold the poisons on the dates mentioned in the particulars.

Mr. Gray: The penalties are fixed at £5 for each offence.

His Honour: Then I have no discretion as to the amount of the penalty.

Mr. Grey observed that the defendant was unqualified to sell poisons and thus incurred the penalties, which must be £5 in each case. That was the amount fixed by the Act of Parliament.

Mr. Hunt said he would not dispute the plaintiffs right to a verdict. He only wished to point out that t was rather hard upon these young men, who were in the employ of the Hanley Drug Company, Limited, which had amongst its shareholders five qualified chemists and which employed a qualified chemist to manage the shop. When these sales were made they were unfortunately without the qualified manager. What he had to ask was that his Honour would make an order for easy payment of the penalties.

His Honour: I cannot feel disposed to do that; the Company should pay the penalties.

Mr. Hunt: I am afraid the shareholders would complain at that.

His Honour said these people got cheap servants when they were very well acquainted with the Act of Parliament. It was a very serious thing for the public. Mr. Justice Hawkins had stated that the object of the Act was, beyond all other considerations, to provide for the safety of the public. Had the Drug Company done that?

Mr. Hunt: They tried their best. They have a qualified assistant now as they had before.

His Honour said the Act of Parliament stated that unqualified chemists must not meddle with poisons. There was nothing else for him to do but to inflict the penalties of £5 for each offence.

His Honour gave judgment for the Society for the penalties sued for with costs.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* RUSSELL.

At the same Court the Council of the Pharmaceutical Society of Great Britain sued Elias Russell, an assistant in the employ of the Hanley Drug Company, Limited, of 10, Tontine Square, Hanley, to recover two penalties, of £5 each, incurred by the defendant in selling on the 28th of March and the 7th of April, in the present year, poisons contrary to the provisions of the Pharmacy Act, 1868.

Mr. Grey appeared for the Society.

Mr. Hunt, for the defendant, at once admitted that the defendant had sold the poisons on the date enumerated in the particulars, and only desired to reiterate the observations made by him in the previous case, as the two cases were identical, both defendants being in the employ of the same company.

His Honour gave judgment for the penalties claimed, with costs.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* GARDINER.

At the same Court, on the 10th inst., the Council of the Pharmaceutical Society of Great Britain sued George Frederick Gray Gardiner, an assistant in the employ of the Central Drug Company, Limited, of 26, Tontine Street, Hanley, to recover four penalties, of £5 each, incurred by the defendant in selling poisons on the 23rd and 26th days of March, the 1st and 3rd days of April in the present year, contrary to the provisions of section 15 of the Pharmacy Act, 1868.

Defendant appeared in person.

Mr. Grey explained that there were four offences committed by this defendant, who was in the employ of the Central Drug Company, Limited. On each occasion the defendant had sold laudanum.

His Honour: Why do you go in for so many as that? The object of the Society is to put down the practice.

Mr. Grey said he was acting according to instructions. He was bound to say it was not an isolated case. Defendant was an unqualified assistant and had sold a certain poison, a preparation of opium called laudanum, on the dates alleged.

His Honour directed the defendant to be sworn.

His Honour: Do you admit these sales?

Defendant: I admit that I sold the laudanum on these dates, and that I am not qualified. I am an assistant, not an apprentice.

His Honour: I suppose you are compounding prescriptions every day?

Defendant: Not poisons.

His Honour (addressing Mr. Grey): Do not you think you had better strike out two cases?

Mr. Grey: At present I have no instructions. We tried to get defendant to admit the offence, and had he done so the analyst's expenses would have been saved.

His Honour: I think, considering the defendant's station in life, the verdict might be reduced to £10. The master was evidently much to blame, and it is a pity he cannot be compelled to pay the penalties.

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* If the operator prefer the titration method with Mayer's solution, this acid solution is ready, after evaporation of the chloroform, for volumetric assay. I prefer to purify and weigh the natural alkaloid.

Mr. Grey: After your Honour's observations I will agree to a judgment for two penalties and costs.

His Honour gave judgment accordingly.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* KENT.

At the same Court the Council of the Pharmaceutical Society of Great Britain sued Thomas Kent, an assistant in the employ of the Central Drug Company, Limited, to recover one penalty of £5, incurred by the defendant in selling poison, namely, a preparation of opium, contrary to the provisions of the Pharmacy Act, 1868. Mr. Grey appeared for the Society.

The defendant appeared in person.

His Honour desired the defendant to be sworn.

His Honour: Do you admit selling this laudanum?

Defendant: I do not remember. I am in the employment of the Central Drug Company, Limited. I am sixteen years old. I have been with them since February last. I have sold laudanum two or three times. I have not entered anything.

Henry Lewis Bayne, examined by Mr. Grey, stated that he went to the Central Drug Company's shop in Tontine Street on March 20 last, and the defendant sold him an ounce of laudanum in the bottle produced.

His Honour (addressing defendant): What have you to say to that?

Defendant: I remember this man coming. He did not ask me for it. I was not at the counter. I have not served Bayne.

The defendant in the previous case was called by defendant, and in answer to the judge said he did not remember having sold the laudanum to witness on this occasion.

His Honour: I have no doubt whatever that the defendant did serve the witness, because he has himself admitted that he has sold laudanum on two or three occasions. I give judgment for the plaintiffs for one penalty with costs.

In addition to the foregoing cases, we are in a position to state that another person, against whom proceedings had been instituted, paid five penalties without going into court.

Obituary.

Notice has been received of the death of the following:—

On the 20th of May, Mr. Robert Henry Jones, Chemist and Druggist, Beacon Lane, Everton, Liverpool. Aged 43 years.

On the 26th of May, Mr. William Bradley, Chemist and Druggist, Dixon's Green, Dudley. Aged 57 years.

On the 2nd of June, Mr. John Thomas Atton, Chemist and Druggist, Tinwell Road, Stamford. Aged 58 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE TRADE AND THE SOCIETY.

Sir,—One of the weakest points in our battle for good is the fact of the large number of chemists who do not belong to the Society and by their abstention from the ranks weaken the efforts of our representatives.

I would suggest that the excellent article, entitled "A Retrospect," which appeared in the Journal for the 30th of May, should be printed in pamphlet form and a copy forwarded to every chemist who is not connected with the Society, or local Secretaries might be furnished with copies for distribution in their districts, at the same time making a special appeal to the recipients to carefully consider their position and decide to support the Society.

The local Secretaries are, I am quite sure, loyal enough to the Society to willingly undertake this duty if the Society will give them such a good opportunity of trying to increase the number of members. CHAS. SHAPLE

11, *Strand*, *Torquay*.

THE PRESIDENCY OF THE SOCIETY.

Sir,—I cannot allow the opportunity to pass without expressing the great pleasure that it affords me to learn that Mr. Carteighe has again consented to occupy the Presidential chair, which he so ably fills. The time occupied in dealing with the multifarious claims connected with the Society, very few outside the Society are aware of, but those who, like myself, who have worked with Mr. Carteighe can realize the sacrifices which he makes in devoting so much time and energy for the best interests of the Society. I was therefore pleased to find that the first business on Wednesday last was the vote proposed by the Vice-President, and, as a country member, I can with much pleasure endorse all that was said. W. D. SAVAGE.

23, *Freshfield Road*, *Brighton*.

THE JUBILEE CELEBRATION.

Sir,—I believe it is on record that one of Curran's clients did not know how much he was injured till Curran put his case to the jury, and until I read the Jubilee number of the *Pharmaceutical Journal* I had no idea of the extent to which our Society was loved and venerated throughout the whole civilized world. Here at least I find "what the Society has done for me," in giving me the high honour and privilege of being one of its 5000 members of all grades. This is a nut for the outsiders to crack, especially as, according to their version, the Society has always been hopelessly wrong. HENRY LONG.

48, *High Street*, *Notting Hill*, *London*, *W*.

Lower Molar.—By section 3 of the Dentists' Act, 1878, a penalty is imposed upon any person not registered under that Act who shall take or use the title of "dentist," either alone or in combination with any other word or words, or of "dental practitioner," or any title, addition, or description implying that he is registered, or that he is a person specially qualified to practice dentistry. Provision is made for the registration of persons *bonâ fide* engaged in the practice of dentistry at the time of the passing of the Act. For information respecting the examinations apply to the Registrar under the Act, Mr. W. J. C. Miller, 299, Oxford Street, London.

J. E. C.—A proper reply to your question would involve more medical knowledge than we are possessed of.

W. J. Cocks.—A formula for "Lapis vulnerarius externus" appears in Jourdan's 'Pharmacopœia Universalis.' It is made by fusing together powder of alum 1 part, sulphate of iron 6 parts, sulphate of copper 3 parts, subacetate of copper 1 part, and muriate of ammonia one-half part.

K.—If the assumption be correct, the explanation would probably be that of the two the carbohydrates are already oxidized to the greater extent.

Mr. H. D. Frampton asks for advice as to a colouring matter to give a creamy tint to "soluble sanitary nursery powder (pulv. acid. boric. subtiliss.)."

Erratum.—On page 1124, col. i., *for* "Mr. Walter Martin," *read* "Mr. Waller Martin."

NOTICES OF MEETINGS.

Pharmaceutical Society.—Wednesday, June 17, at noon, at 36, York Place, Edinburgh.—Meeting of Members and Associates in Business resident in Scotland.

Chemical Society.—Thursday, June 18, at 8 p.m.—Papers: "The Action of Sulphuric Acid on Dehydracetic Acid," by Mr. N. Collie; "The Refractive Power of Certain Organic Compounds at Different Temperatures," by Dr. W. H. Perkin, F.R.S.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Alcock, Sutton, Bartlett, Bond, Thompson, Grierson, Cornish, Tarbutt, Ellis.

NOTES ON CHINESE DRUGS.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

It is well known to most students of the materia medica of the far east, that many of the identifications of Chinese drugs published in Dr. F. Porter Smith's ‘Chinese Materia Medica,’ and in other subsequent works, were founded on very imperfect data. The first step made towards a more exact knowledge of the materia medica of the Chinese was taken by Daniel Hanbury, and the results he arrived at were published in the *Pharmaceutical Journal*, [2], vols. ii. and iii.

At that date (1861–62) the flora of China was very imperfectly known, and hence it was impossible to determine the plants yielding many of the drugs of vegetable origin. During the last few years much has been done to elucidate the flora of China, but very little from a materia medica point of view, until Dr. Augustine Henry, during his residence in Ichang, paid especial attention to the plants collected by the Chinese for use in medicine. The large series of Chinese plants brought home by him have, during the last year, been carefully investigated at the Kew Herbarium, and amongst the new species recently described by Professor Oliver in the ‘Icones Plantarum’ are several which yield Chinese drugs. Dr. Henry having examined the large collection of Chinese drugs in the Museum of the Pharmaceutical Society and compared them with his plants, the results obtained by him may appropriately find a place in this Journal.

It may be observed here that although the names of some of these drugs are practically unknown in Europe, the amount in circulation in the Chinese Empire is, in many cases, as large as that of well known drugs in Europe. It seems hardly probable that drugs which have been largely used for centuries by so shrewd a people as the Chinese can be all of them inert, and doubtless there are some among those more extensively used that are worthy of attention.

Huang-ch‘i.—Astragalus Henryi, Oliv.—One of the drugs very largely used by the Chinese is the root of a kind of *Astragalus*. Several varieties of the drug are known respectively as “T‘iao-ch‘i,” produced in Shantung and Manchuria, of which about 700 piculs are annually exported from Newchang; “huang-ch‘i,” produced in Chihli and Mongolia, and of which 3,500 piculs are exported annually from Tientsin; and “pai-ch‘i,” “hung-ch‘i,” and “huang-ch‘i,” produced in Szechwan, Hupeh, and Shansi, and of which 2,000 piculs are exported from Hankow. Other local names used are “chin-ch‘i,” “ch‘uan-ch‘i,” “hsi‘-ch‘i,” “hsi-fênch‘i,” and “pei-chi‘.”

The plant brought home from China, by Dr. A. Henry, as the source of the “huang-ch‘i,” collected in Hupeh and Eastern Szechwan, and perhaps in Shensi, has been identified by Professor Oliver as a new species of *Astragalus*, and has been named after Dr. Henry. *Astragalus Henryi*, Oliv., is figured in Hooker's ‘Icones Plantarum,’ pl. 1959, and occurs in the National Herbaria under the number “Henry, 6902.”

Dr. Henry believes that another species, *Astragalus Hoantchy*, Franchet (‘Pl. Davidianæ,’ I., p. 86), collected by Père David in Mongolia, is probably the source of the “pei-ch‘i” and “t‘iao-ch‘i” exported from Newchang and Tientsin. Another species (*A. moupinensis*), a native of Thibet, may be one of the sources of the Szechwan drug. One variety of the drug is figured in the Chinese Herbal “chi-wu-ming, vii., 3.”

A drug used under the same Chinese name, “huang-chi” in Japan, is the produce of *Astragalus reflexistipulus*, Miq., while other kinds of the same drug are yielded by *A. adsurgens* and *Hedysarum esculentum*, Ledeb. The plant affording “huang-chi” in Shansi is described in the Customs Trades Reports, 1869, p. 59, as an herbaceous plant “which grows 2 and 3 feet high. In early autumn it bears a yellow and purple flower, and the seeds are contained in a pod about 1 inch long. The root is 6 or 8 inches long, yellowish white in colour, with a thick rind and a pithy centre.”

T‘ang-shên, Codonopsis Tangshen, Oliv.—A very important Chinese drug, used by the poor as a substitute for the costly ginseng and known under the name of “t‘ang-shên,” proves to be the root of *Codonopsis Tangshen*, a new campanulaceous plant, which was brought home by Dr. A. Henry from China, and is figured in the ‘Icones Plantarum,’ pl. 1966. The dried plant may now be seen in the National Herbaria under the number of ‘Henry, No. 6468.’ It grows in the mountains in the Tang district of Hupeh, with two other species, the root of one of which (Henry, No. 6527, *Codonopsis lanceolata*) is also said to be used as medicine, but it is inferior in quality and has a disagreeable odour and commands a low price, and the third, “Henry, No. 6651,” is not utilized as a drug. Dr. Henry believes that the drug which is exported from Hankow and Ichang to the extent of about 500 tons annually is the produce of *C. Tangshen*. The name means ginseng from the district of Shang-t‘ang in Shansi, but the drug is now produced in the provinces of Hupeh, Shensi and Shansi. The kind exported from Tientsin and distinguished as Lu-t‘ang (meaning T‘ang-shen from the Luan prefecture in Shansi), is perhaps the root of *Campanula pilosula*, Fr. This plant was collected by Père David near Peking, who remarks that it is a valuable Chinese remedy (‘Pl. David.’, I., p. 193). Another form of the same drug which is produced in Anhwei and exported from Wuku to the extent of 60 tons annually, is probably derived from an *Adenophora*, but specimens of the plant have not yet been obtained.

When fresh the Tangshen root exudes a white sticky juice and it, as well as the leaves, has a peculiar odour.

Mu-hsiang, Inula racemosa, Hook. f.—In a note upon this plant in ‘Icones Plantarum’ (pl. 1975), by Dr. A. Henry, it is stated to be cultivated in the mountains of Hupeh, in China, as a substitute for putchuk, the root of *Aplotaxis auriculata*, D.C., which is so largely imported into China from Kashmir, by way of Bombay and Calcutta. The name given in China to the root of *Inula racemosa* is “k‘uang mu-hsiang,” *i.e.*, Canton putchuk. The *Inula Helenium*, L., is cultivated in Japan under the name of “t‘u mu-hsiang,” or local putchuk.

K‘ao-pen, Ligusticum sinense, Oliv.—This is another new species collected by Dr. A. Henry in China, which proves to be the source of a drug used by the Chinese. It is found in the province of Hupeh, in the district Hsingshan, and in the province Szechwan and the district No-Wushan, and occurs in the National Herbaria under the number "Henry 6759, A and B." Dr. Henry contributes the following information concerning the drug to the 'Icones Plantarum,' in which publication (Pl. 1958) an illustration of the plant is given.

The root of this plant is dug up in the mountains of Western Hupeh, and is one source of the Chinese drug known as "kao-pên," which was the name given to the plant by the drug collectors in the mountains of Hupeh. It seems, however, that the drug is exported from Hankow (5 tons annually) under the name of "hsi-hsiung," so called from the resemblance of the root to another of much greater importance, ch'uan-hsiung. In the Customs list of Chinese medicines, p. 342, we find the entry, "kao-pên" or "hsi-hsiung," an article of export from Canton of about 3 tons annually. Whether this product of Kwang-tung and Kwang-si is the same as the Hupeh plant, it is impossible for me at present to determine. In Japan the name kao-pên is applied to *Nothosmyrnium japonicum*, Miq.

The determination of the umbelliferous plants used in Chinese medicine, which nearly all come from the internal provinces of Hupeh, Szechwan, Shansi, etc., is very difficult; and the attention of travellers ought to be directed to the obtaining of specimens of the plants in fruit with the root attached. There is still considerable doubt regarding the sources of the following drugs of this category:—Pai-chih, tang-kuei, ch'uan-hsiung, tu-huo-ch'ien-hu and fang-fêng. These are all exported in enormous quantities from Hankow.

Meng-hwa or *Mi-meng-hua.*—A Chinese drug under this name has recently been identified by Dr. A. Henry as the flowers of *Buddleia officinalis*, Maxim. The plant was found in Shansi and Kansuh by Piasezki, who says that the flowers are sent from Shansi and Kansuh to Hankow for sale as a drug under the name of Mun-chua (*Mel. Biol.*, x., 676). The flower buds are the part used, and a comparison of a specimen of Peter Smith's type specimen in the Museum of the Pharmaceutical Society confirms the correctness of Piasezki's statement.

But in Ichang, although *Buddleia officinalis* is common it is not collected as Mêng-hwa. That name is there applied to the flowers of *Edgworthia chrysantha*, Lindl., and a specimen in the Ho-kao collection of Chinese drugs in the Society's Museum evidently belongs to the latter species.

K'ou-t'eng, Nauclea sinensis, Oliv.—This is one of the new species from China, brought home by Dr. A. Henry, and recently described and illustrated in the 'Icones Plantarum,' pl. 1956. Dr. Henry states that the hardened peduncles which take the form of hooks, are used in Chinese medicine, together with the attached portions of the stem, in the form of a tincture prepared with wine. The plant grows in the province Nan-t'o and mountains to the northward. It is known to the Chinese as kou-t'êng, *i.e.*, "hook-creeper." The chief place of production of the drug is Hupeh, and it is exported from Hankow to the extent of about twenty tons annually. The plant is figured in the Chinese Herbal Chih-wu-ming, vol. xxii., p. 57, and occurs in the National Herbaria under the number "Henry, 4501." Specimens of the Chinese drug and of a similar product from Japan, which is identified by Matsumura as the product of *Uncaria rhyncophylla*, Miq., occurs in the Museum of this Society. The drug has an astringent taste and is chiefly used for children's complaints.

Ngai Camphor.—*Blumea balsamifera*, D.C., which produces Ngai camphor, is a native of India from the Himalayas southward, and extends to Singapore and the Indian Archipelago. It occurs in China, at Hainan, and on the coast of Formosa. It is figured in the 'Icones Plantarum' for April, pl. 1957. Dr. Henry states that the camphor is produced in Kwangtung and Hainan. The crude product is known to the Chinese as ngai-fên; it is exported from the port of Hoihow in Hainan to the extent of about 15,000 pounds annually. The crude camphor is refined at Canton, and is then known as ngai-p'ien or refined camphor. From Canton about 10,000 pounds of ngai-p'ien is exported annually. Hanbury described this camphor (see 'Science Papers,' p. 394) and mentioned that a crude form of the drug was prepared in Burmah. The abundance of the plant in that country is mentioned by Mr. W. T. T. Dyer in the *Journ. Linn. Soc.*, (Bot.), xx., p. 414, and the properties of the camphor were described by Mr. Plowman, *Pharm. Journ.*, [3], vol. iv., pp. 710, 712, and in *Neues Repert. für Pharmacie*, xxiii., p. 325.

FURTHER NOTE UPON OIL OF ROSEMARY.

BY R. A. CRIPPS, F.I.C.

In the *Pharmaceutical Journal* for April 18, Messrs. Schimmel's report is quoted as follows:—

1. "The sp. gr. of rosemary oil is not below ·900 (certainly not lower than ·890).

2. "Rosemary oil dissolves at a temperature of 20° C. in one-half to one and a half parts of 90 volume per cent. alcohol to form a clear solution, which upon further addition of alcohol of the same strength remains clear.

3. "Rosemary oil rotates polarized light to the right."

The first and third of these characters are remarkably inconsistent with the results obtained by me and published in the same number of the *Pharmaceutical Journal*, and would, in fact, condemn samples 1 and 4 as adulterated with oil of turpentine.

The second of these tests is practically in accordance with my results, for I find that sample 4 dissolves in 1·55 parts of 90 per cent (vol.) alcohol, at 20° C., the other samples being much more readily soluble.

The purity of sample 1 is unquestionable, being guaranteed by Mr. J. C. Sawer, who had distilled the oil; it therefore follows that the statement that oil of rosemary, if pure, should rotate to the right, does not apply to the oil distilled from English grown plants.

The odour of sample 4 was exceptionally fine for foreign oil, which alone would render adulteration with oil of turpentine improbable, but in order to demonstrate more fully the absence of that substance I have submitted the oil to fractional distillation; before describing the results obtained I add the remarks of previous workers upon oil of rosemary.

1. *Specific Gravity.*—In addition to those quoted in my former paper I find the following:—

Gladstone and Dale, one sample, ·908.

Zeller, ·88 to ·91.

Bruylants, ·885 at 12° C.(=about ·882 at 15·5° C.)

I would recall the fact that in a former report Messrs. Schimmel give the sp. gr. of two samples of French oil as ·881 and ·883.

2. *Rotation*.

Gladstone and Dale.— -17°.

Lallemand.—Dextrorotatory, consisting of a lævorotatory hydrocarbon and a dextrorotatory camphor.

Bruylants.—Lævorotatory, consisting of a lævorotatory hydrocarbon, and a dextrorotatory camphor.

Flückiger and Hanbury.—A lævorotatory hydrocarbon constitutes about four-fifths of the whole.

3. *Boiling Point and Distillation*.

Kane.—Boils at 165° to 168° C.

Lallemand.—By fractional distillation yields a mobile hydrocarbon at 165° C., and another fraction boiling at 200° to 210°, which at low temperature deposits a camphor.

Bruylants.—Begins to boil at 150°, the temperature gradually rises to 200°, where it remains stationary a short time, and finally rises to 260°. By fractional distillation it may be separated into three portions, boiling from 150° to 180°, from 180° to 210°, and from 210° to 260° C.

Oil of rosemary contains—

A hydrocarbon . .	$C_{10}H_{16}$	80 per cent.
A borneol-camphor .	$C_{10}H_{18}O$	4 to 5 per cent.
A camphor	$C_{10}H_{16}O$	6 to 8 per cent.

Schimmel.—Two French oils of *best commercial quality* yielded in one instance 39 per cent., in the other 46 per cent., below 170°, whilst with two Italian oils, in one case only 4·5 and in the other 13 per cent. passed over below 170°. In their last report it is stated that two adulterated (?) samples contained a considerable quantity of constituents boiling below 170°.

I will now proceed to describe the results obtained by the fractionation of 300 c.c. of my sample, No. 4.

A small proportion of water passed over at about 100°, but the liquid commenced to boil at 150° C., and rapidly rose to 157°, between which temperature and 158° C., nearly 30 per cent. of the whole distilled; then the temperature gradually rose to 161° C., and more rapidly from 161° to 180°, though a considerable amount passed over at and near 163°; the distillation was continued up to a temperature of 210°, much of this fraction passing over slightly above 200°. The following table represents the results :—

Temperature.	No. of c.c. obtained.	Sp. gr. of distillate at 15·5° C.	Rotation.	Solubility of salicylic acid in distillate.
150–158	98	·866	–48°	1 in 60
159–161	91	·868	–48°40′	1 in 50
162–170	47	·8755	–34°30′	1 in 20
171–180	16·5	·8894	–13°	1 in 10
181–210	26·0	·9302	+20°50′	1 in 6
Residue	18·5	·9482	+42°	1 in 7
Original oil	—	·8835	–33°	1 in 25

Temperature of Distillation.—This agrees fairly well with Bruylants and Flückiger, 84 per cent. distilling below 180°, nearly 9 per cent. between 180 and 210, and rather over 6 per cent. remaining. It only partially agrees with Lallemand, and is not in agreement with the bald statement of Kane, or with Schimmel; the two latter, however, do not agree among themselves.

Specific Gravity.—Each of these fractions possesses a sp. gr., which is higher than that which oil of turpentine usually exhibits.

Rotation.—These results confirm those of Lallemand, Bruylants, and Flückiger and Hanbury.

Solubility of Salicylic Acid.—This was applied as directed by Langbeck,[*] who states that oil of rosemary should dissolve one-tenth part of salicylic acid, but if it contain 10 per cent. of turpentine the solubility is reduced to 1 in 24; oil of turpentine when freshly distilled dissolving only $\frac{1}{28}$ part. The solubility in the original oil taken by itself would indicate rather over 10 per cent. of turpentine; it is, however, impossible for the presence of 10 per cent. of turpentine to account for a –rotation of 33° if, as stated by Schimmel, the pure oil is dextrorotatory. It is, however, most probable that the larger the proportion of hydrocarbon present in oil of rosemary, the smaller the quantity of salicylic acid it is capable of dissolving, and that this particular sample contains more than the usual amount of hydrocarbon.

Finally, I am of opinion that: 1. The use of the *dried* plant by Messrs. Schimmel has led them to form erroneous conclusions; the drying would almost certainly profoundly modify the nature of the oil obtained, both by giving opportunity for oxidation and also by loss of the more volatile hydrocarbon. 2. That variations of soil and climate greatly alter, not only the *yield*,[†] but also the *nature* of the oil, which consideration also appears to have received insufficient attention.

STUDIES OF THE TERPENES AND ALLIED COMPOUNDS.

The Nature of Turpentine Oils, including that obtained from Pinus Khasyana.[‡]

BY HENRY E. ARMSTRONG.

Among the compounds which attracted my attention when I began to study terpenes and allied compounds, now many years ago, was the crystalline substance of the formula $C_{10}H_{18}O_2$, briefly described by Sobrero, in 1851 (*Compt. Rend.*, xxxiii., 66; *Annalen*, lxxx., 106), obtained by exposing oil of turpentine together with moist oxygen to sunlight—a substance which was rendered none the less interesting by Sobrero's statement that, when boiled with dilute sulphuric acid, it was converted into a volatile product having a strong odour resembling that of camphor as well as that of turpentine.

It was to be supposed that Sobrero had worked with French oil of turpentine, and therefore this was first submitted to air-oxidation in sunlight; the results obtained were in complete accordance with the account given by Sobrero. On substituting American for French turpentine, a substance was obtained identical with that resulting from the oxidation of the French hydrocarbon, except in its optical characters.

These results led me to study the behaviour of oils from various sources containing $C_{10}H_{16}$ hydrocarbons, in the hope that information might be gained which would serve to elucidate the complex problem presented by the existence of an apparently infinite variety of essential oils.

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[*] "Year-Book of Pharmacy,' 1885, p. 126.

[†] *Pharm. Journ.*, [3], x., p. 327.

[‡] From the *Journal of the Chemical Society*, June.

It was soon ascertained that a clear atmosphere and a bright, high sun—conditions which are always exceptional in London—were requisite for the formation of the crystals. It has rarely happened that crystals began to form until late in May, and each exposure has usually lasted from two to three months. Necessarily, therefore, the information has been acquired at a slow rate. The earlier experiments were carried on at the London Institution, Finsbury Circus, on the roof—a particularly unsuitable locality. But very little progress was made during the subsequent years in which the arrangement of the laboratory and the organization of the teaching, first at the Finsbury Technical College, and very shortly afterwards at the Central Institution, claimed my attention. During the past three summers, the experiments have been regularly resumed at the Central Institution, and it has been possible, chiefly owing to the important assistance which one of my students, Mr. Pope, has rendered me in submitting the products to crystallographic examination, to collate the scattered results.

The conclusions arrived at are, I venture to think, of some importance, and justify the hope formed at an early period of the inquiry, that a comparative study of the air-oxidation products from various oils would not be without interest.

The following passage from the second edition of my 'Introduction to the Study of Organic Chemistry' (London: Longmans, Green and Co.), published in 1880, is here quoted as an indication of the views which guided me in the inquiry, and which are justified in the present note:—

"The hydrocarbons of the formula $C_{10}H_{16}$, derived from plants, may be divided into two classes, viz., (1) those boiling at about 156°, which are conveniently termed *terpenes*, as they are the chief constituents of ordinary turpentine oils; and (2) those boiling at about 176°—178°, which may be termed *citrenes*, as they are the chief constituents of the oils derived from the various species of *Citrus*. The terpenes and citrenes are all capable of rotating the plane of polarization of light, but no two plants furnish terpenes or citrenes of identical rotatory power, and often different parts of the same plant yield different products; the different terpenes appear, however, to agree in all other physical properties, and also in their chemical properties; and the same is true of the different citrenes. It is probable that the number of isomerides of the formula $C_{10}H_{16}$ is very much smaller than has been supposed, and that the differences observed in the rotatory powers of the hydrocarbons from various sources are due to their being mixtures in varying proportions of two or more isomerides" (p. 106).

In a paper read before the Society of Chemical Industry, in 1882 (their Journal, p. 478), detailing the results of the examination of a very large number of samples, representing many thousand barrels of different kinds of commercial turpentine, after calling attention to the almost absolute uniformity of the French oil and the wide variation which was noticeable on comparing the rotatory powers of different samples of the American oil, I stated that I had been led to think it not unlikely that the low dextrorotatory power of American turpentine is due "to the presence of a lævorotatory turpentine; this would serve to explain the difference in optical character of products from different localities." That this is actually the case I have no longer any doubt. The crystalline product from French turpentine is all but uniform; that from American turpentine is but rarely so: the earlier crystallizations usually consist of a substance which may be said to be the image of that from the French oil, but although the crystals in later fractions may exhibit the same melting point as those separated at an early stage, the rotatory power of the fraction as a whole is lower. The explanation of the difference was discovered in the course of an examination of a very beautiful turpentine oil from British Burmah, the produce of *Pinus Khasya*, which came into my possession in 1881, through the kind assistance of Mr. Thiselton Dyer, the Director of the Royal Gardens, Kew. This oil is in every respect, so far as I have been able to ascertain, the counterpart of French turpentine, but its optical image, and if it could be obtained in quantity would form a most valuable article of commerce; a description of its derivatives will form the subject of a later communication. The air-oxidation product of the Khasya terpene is the image of that from French turpentine and identical with that obtained from American oil, the difference in the Burmese and American oils being that the former, like the French oil, affords a more nearly uniform product.

When the two varieties of equal opposite rotatory power of the oxidation product are mixed, an inactive substance is obtained of much lower melting point, and it is this substance which is present in considerable quantity in the product from American oil along with the dextrorotatory active form. The melting point observed in the case of the later fractions of the product from American turpentine is a matter of accident, for if the crystal used in the determination is not specially selected from the mass, it may be either the active or the inactive substance.

As the relation of the crystalline oxidation product to the parent hydrocarbon cannot yet be determined, and as it is not improbable that, as, in other cases, a molecular change has attended its formation, and as it is not a simple derivative of the hydrocarbon, I would suggest that in giving it a name (as one or both of its oxygen atoms possess alcoholic functions), and to recognize its discovery by Sobrero, it be termed *sobrerol*.

The numerous observations which I have made lead me to think that sobrerol is only obtainable from the terpenes proper; and that, according as an oil yields either dextro- or lævo-sobrerol, or a mixture of either modification with the inactive form, it is to be regarded as containing one or other of the corresponding terpenes, or, as in the case of American turpentine, a mixture of the two. In other words, *that there are two terpenes*, viz., those represented by the active components of the French and Burmese oils.

Bearing in mind that we are indebted to Berthelot for the first systematic study of the varieties of turpentine oil, and that he proposed the name *terebenthene* for the characteristic hydrocarbon of such oils, as a matter of justice, it would appear but right to retain this name, terming the two optically different varieties *dextroterebenthene* and *lævoterebenthene*.

So long as we are unaware of the structure of the terebenthenes, it is impossible to pronounce an opinion on theoretical grounds as to the possibility or otherwise of a distinct inactive modification; the argument from analogy alone makes the existence of such an intracompensated modification conceivable, however.

The oil which Sobrero obtained by distilling the crystalline oxidation product with acid has proved to be identical with the isomeride of camphor which Wallach and Otto obtained by the interaction of turpentine and nitrous acid (*Annalen*, ccliii., 249), and they have named *pinol*. Being a strict adherent to the view that the *ol* termination should be reserved for hydroxy-derivatives exhibiting alcoholic functions, as the compound does not appear to be of this class, I have ventured to suggest ('Proc.,' 1890, 99) that it should be named *sobrerone*, to indicate its relationship to sobrerol. Having succeeded in reconverting "pinol" into the crystalline oxidation product, $C_{10}H_{18}O_2$, Wallach (*Annalen*, cclix., 313) proposes to name the latter *pinol hydrate*; unfortunately this name is unppears to me to be inappropriate, for the reason that is desirable to restrict the term hydrate, as far as ossible, to compounds containing so-called water of rystallization.

The "sobrerone" obtained from the two active modifications of sobrerol is optically inactive, and then reconverted into sobrerol by Wallach's method, ields the inactive form of the latter.

It is to be mentioned that the proportion of crystal-ne oxidation product obtained is relatively very small, he greater part of the turpentine being converted nto the well known non-volatile, viscid oil. Much etter results would be obtained, I imagine, if the xidation were effected under the influence of a tropi-al sun. As it appeared possible that the viscid oil might contain some sobrerol, it was digested with ilute sulphuric acid and steam-distilled; a consider-ble amount of volatile oil was obtained, but hitherto all attempts to separate "sobrerone" from this have ailed. Notwithstanding that the greater part of the hydrocarbon is converted into products other than obrerol, as dextro- and lævo-terebenthene are appa-ently oxidizable at the same rate under similar con-ditions, it is to be supposed that when a mixture is xidized the crystalline product will regularly betray ts origin, unless, indeed, pressure have a perceptible nfluence on the rate of oxidation. On oxidizing American turpentine fractionally, that is to say, if when the oxidation has gone on for some time, the crystals are collected and the unoxidized oil is sepa-ated by steam-distilling and re-exposed to oxidation, tc., a series of products are obtained, the first of which has a higher dextro-rotatory power than subse-quent fractions. This is exactly what should happen f dextroterebenthene be the chief constituent of American turpentine.

It appears not unlikely that sobrerol may occur naturally; I have, however, only on one occasion met with evidence of its presence. In the course of the investigation of so-called terebene which Professor Tilden and I carried out several years ago, I had occa-sion to distil a large quantity of American turpentine which I had received in a wooden barrel. The most volatile portion was collected separately, and put away in a blue Winchester quart, in a dark cellar; after a time the sides and bottom of the bottle were found to be encrusted with crystals, which were col-lected and recrystallized from alcohol. Only a very few grams of the crystals were thus obtained from 10 gallons of turpentine. This substance has proved to be *inactive* sobrerol, chiefly mixed with some dextro-sobrerol.

CAMPHOR INDUSTRY IN FLORIDA.*

The possibilities for the establishment of a paying industry in the line of camphor production in the southern states, notably Florida, are very promising. Last year attention was called to the fact that the camphor tree can be profitably grown in the south, and at the recent meeting of the A. P. A. further state-ments to this effect were made.

Messrs. A. J. Beach and Son for some time have been experimenting at Palatka, Fla., and from them is gathered some interesting information.

For the growth of the camphor tree the preparation of the soil is very easy and simple, the tree growing with very little care after first starting. All timber should be cut and piled, not burned, and left to rot on the ground. The soil is thoroughly grubbed where the tree is to stand. The tree is planted and carefully staked to prevent the wind from swaying it when it is first set out. For three or four years the ground should be carefully worked around the trees and kept clean, the growth of timber being kept down and grubbed out, but after this time the tree will take care of itself.

The first trimming of the camphor tree is to a suffi-cient height for the body of the tree; after that thin out the top and shear off the outside of the top, as the young wood is the most productive of camphor.

The extraction of the gum is very simple. There is used for the purpose a still consisting of an iron pot holding about five pailfuls, and provided with a wooden cover into which is fitted a one inch pipe lead-ing to the condenser. The top of the kettle and cover are plastered with clay to prevent the escape of cam-phor vapour during the process. From the kettle the pipe turns and runs horizontally into a wooden trough about eight feet long, and then turns down and dis-charges into a tin can which catches any water con-densing in the pipe. To charge the still the cover is removed from the kettle, which is then filled with small limbs and leaves of the camphor tree. A few quarts of water are then added to keep the leaves from burn-ing (they burn very easily). The cover is then fitted on securely and under the kettle is placed a very small fire, and the pipe connected with the pipe in the trough, which is kept full of cold water supplied through a hose. As soon as the water produces the least steam, the camphor volatilizes, passing over very rapidly. As it leaves the still it follows along until it comes in contact with the cold portion of the conden-ser where it condenses and sticks to the inside of the pipe in the shape of fine crude camphor. The con-denser pipe is slanted a little so that any water con-densed may be delivered into the can. Long before the water reaches boiling point the camphor is nearly all volatilized, but the water is allowed to form a little steam that all the camphor vapour may be driven into the condenser. Every portion of the still must be securely sealed to prevent the escape of the vapour.

To remove the gum from the condenser pipe the pipe is removed from the trough, stood upon end, and struck sharply with a hammer, when the gum will rattle out of the lower end.

Messrs. Beach and Son have carried on the camphor industry in a very small way as yet. They have only a few trees which are too small to cut much from. Nearly all the wood for experimenting has been ob-tained from other places. All the trees, except what were imported, were provided by the Department of Agriculture several years since and consequently are now quite large. Other experiments are to be under-taken as fast as the wood can be procured. The yield, as nearly as can be estimated by weighing limbs and leaves, is almost one to twenty-five, that is, one pound of crude gum to twenty-five pounds of limbs and leaves.

THE BORDERLAND BETWEEN PHYSICS AND CHEMISTRY.*

BY GEORGE F. BARKER.

In thanking the American Chemical Society for the honour it has done me in electing me as its President for the year 1891, it seems fitting that I should use the present opportunity for the purpose of outlining very briefly one or two of the more important relations existing between chemistry and physics, which are now shaping the direction of investigation. The con-ception of the periodic law, first by Newlands, and subsequently by Lothar Meyer and Mendeléeff, will ever be regarded as marking an important epoch in the progress not only of pure chemistry, but also of the physics of chemistry as well. For not only does this law assert that the purely chemical properties of the elements are periodic functions of the masses of their atoms, but it asserts also that their physical properties are like functions. In consequence, the impetus which these assertions have given to investigation seems but little short of marvellous. Not only were new researches undertaken by the chemist to fix more precisely these atomic masses, new calculations made upon data already accumulated, and new relations experimentally established going to show the position of the doubtful elements in the periodic series; but the most elaborate experiments were begun also by the physicist upon the phenomena of solution, of density, of specific heat, of refraction, of electric conductivity, and the like, in order to connect these physical properties with the mass of the atom; and thus to establish the predominant influence of the atom, even in molecular physics. Maxwell long before had pointed out the advantages to be secured by what he happily called "the cross fertilization of the sciences." And Lord Rayleigh in his presidential address at Montreal, in following out this suggestion, had instanced "the neglected borderland between two branches of knowledge" as that "which often best repays cultivation." "I cannot help thinking," he says, alluding to the progress already made by general chemistry, "that the next great advance, of which we have already some foreshadowing, will come on this side." "If I might without presumption," he adds, "venture a word of recommendation, it would be in favour of a more minute study of the simpler chemical phenomena."

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* From the *Pharmaceutical Era*, June 1.

* An address delivered on assuming the chair as Presi-dent of the American Chemical Society for 1891. From the *Journal of the Society*, January.

At the outset, however, it seems to me that a word should be said concerning the terminology of these closely allied sciences. If it be true that in both physics and chemistry, taken separately, precision of thought and consequent precision of language, are dependent upon a precise use of terms, how much more true is it in that limiting region which lies between them. The terms here employed are borrowed in the main either from chemistry on the one side or from physics on the other. So that the chemist is quite as much bound to use the terms of physics in the physical sense as the physicist is to use those of chemistry in the chemical sense. As an illustration of this let us take the terms atom and molecule for example. To the chemist they represent perfectly definite portions of matter, the latter in general larger than the former, since the molecule is itself made up of atoms. So that in chemistry the molecule is commonly defined as the smallest particle of any substance which can exhibit the properties distinctive of that particular kind of matter; while the atom is considered to be the smallest particle of simple matter which can enter into the formation of a molecule. To the physicist, however, this distinction is not so obvious. In a lecture delivered in 1883 before the Royal Institution of Great Britain upon the size of atoms, Sir William Thomson said: "I speak somewhat vaguely, and I do not do so inadvertently, when I speak of atoms and molecules. I must ask the chemists to forgive me if I even abuse the words and apply a misnomer occasionally. The chemists do not know what is to be the atom; for instance, whether hydrogen gas is to consist of two pieces of matter in union constituting one molecule, and these molecules flying about; or whether single molecules, each indivisible, or at all events undivided in chemical action, constitute the structure." The evidence upon which this criticism is founded is unfortunately too common. Vagueness in the use of these terms even among chemists is far too frequent. Bloxam, for example, defines molecules as "the smallest physical particles of matter," and an atom, he says, is "the smallest imaginable particle of matter." The subsequent use of the terms atom and molecule as synonymous in Sir William Thomson's lecture, however, shows that his atom is the atom of the physicist and corresponds to the molecule of the chemist. It is greatly to be desired that some agreement should be reached in the definition of these words. The simplest solution of the problem would be, of course, the abandonment of the word atom by the physicist, except when he makes use of it in the purely chemical sense.

In recent years, perhaps no terms in physics have been more sharply and more properly differentiated than the terms "mass" and "weight." The former is a quantity of matter and its standard unit of measure is the gram. The latter is a quantity of force and its unit is the dyne. Hence, strictly speaking, it is as unscientific to speak of a weight of 10 grams, or of a mass of 10 dynes, as it is commonly regarded to refer to the length of a rod as having the value of twenty seconds, or to a time as being six yards long. Unfortunately, however, custom has so long sanctioned the use of the former expressions that we have ceased to regard them as inadmissible. Moreover, the law of gravitation tells us that the force of this attraction measured in dynes is directly proportional to the product of the attracting masses, measured in grams. Whence by ellipsis we speak of a weight of 10 grams as meaning the attractive force which the earth exerts upon a mass of ten grams; *i.e.*, 9800 dynes. And of a mass of 10 dynes as the mass upon which the earth's attraction would be 10 dynes of force; *i.e.*, nearly one centigram. In consequence, units of mass have come into use as gravitation units of force.

This confusion of terms is most unfortunate. Mass is invariable for any given body, no matter in what part of the universe it is, and no matter to what conditions it may be subjected. It is an invariable attribute of matter itself. Weight, on the other hand, depends upon the presence and attraction of other bodies in the vicinity of the body in question, and is therefore an entirely accidental attribute of matter. Indeed, a body may have no weight, even in presence of other matter, provided that the sum of the attractions in opposite directions be zero; as is the case, for example, at the centre of the earth. It is not surprising, therefore, that in physics it has been found essential to scientific precision, to use the word "mass" whenever quantity of matter is meant, and the word "weight" whenever the force of the earth's attraction is referred to.

Moreover, the distinction now drawn is practically recognized in ordinary life. Because of its convenience weighing is the process by which mass is ordinarily measured. Coal is bought by the ton, beef by the pound and quinine by the ounce. In all these cases the purchaser desires the particular quantity of these substances indicated by these standards of mass respectively. Not only is the weight concerned, *i.e.*, the earth's attraction, entirely immaterial, but it is often undesirable. In other words, the less the weight provided the mass be the same, the better. In some cases it is true that weight as such is the thing purchased; as lead for the keel of a vessel or stone for ballast. In the same sense that mass, though proportional to weight, is not weight, the standards used in weighing, while proportional to the earth's attraction, are not standards of weight but standards of mass; *i.e.*, are not weights but are masses.

This confusion, so far from being lessened, is much increased by the fact that the word "weight" is used in two senses. Not only is it employed to signify force, which is its legitimate definition, but it is also used as a synonym for "mass"; so that in many cases it is quite impossible to determine the particular sense intended. A definition, it has been well said, should clearly distinguish the thing defined from everything else. What place, then, can a term have in exact science, which, like the word "weight" connotes two entirely distinct ideas? For this reason it is that the use of the word "weight" in the sense of mass is well nigh disappeared from the terminology of pure physics. The quantity of matter in a body is now always called its mass, and is expressed in units of mass or grams. The earth's attraction upon this quantity of matter is called its weight, and is expressed in units of weight or dynes. Standards used in determining mass by weighing are properly termed standard masses and not standard weights. Moreover, the same is true of the terms derived from these fundamental ones. Density is the mass contained in unit volume, and the density of a substance is the number of grams of mass which occupies a cubic centimetre. The idea of specific gravity is retained in the term "relative mass," which is defined as the ratio of the mass of a body to the mass of an equal volume of water. In the same way, one body is said to be more massive than another when its mass is absolutely greater, and denser when its mass is relatively greater, instead of using the term "heavier" in both cases. In short, physics has decreed, in order to secure the precision essential to scientific progress, that an absolute divorce should be granted between the terms "mass" and "weight," each being used only in its proper sense.

Chemistry, however, has hardly yet begun to recognize the importance of this decree; and in consequence serious confusion of ideas continues to result. In the seventh edition of an English chemistry of considerable repute, just issued from the press, I find for example the following definition: "Matter, in a chemical sense, is anything which possesses weight." Evidently the word "weight" cannot here be used in its legitimate sense of gravitative force; because at the centre of the earth matter exists, although it has no weight. It must therefore be employed in the sense of mass; and the sentence may be read, "matter is anything which possesses mass;" *i.e.*, quantity of matter. Thus read it becomes a truism and not a definition. It is this use of the word "weight" as a synonym for "mass," and which is clearly illegitimate, which is so common in chemical literature and which is so unfortunate. Thus I find in the Chemistry just referred to, the statement that "the unit of weight now very generally adopted by scientific chemists is 1 gram of hydrogen, which measures 11·16 litres at 0° C., and 760 m.m. Bar;" a statement most perplexing to the average student, in comparison with the declaration "the unit of mass is a gram," which is all that the quotation really states.

If all this be granted, and I think it must be, then another and more radical change should be made in chemical terminology. I allude to a change in the expressions "molecular weight" and "atomic weight." Using the word "weight" absolutely and in its legitimate sense, these terms, as they are commonly used, have no meaning whatever. Neither the absolute attraction of the earth for a molecule nor its attraction for an atom, expressed in dynes, can have any constant value, since the earth's attraction is not the same at different points of its surface. How much more absurd then is it to speak of the absolute weight of an atom, say of hydrogen, as being the same upon the sun or upon a fixed star. If, however, the claim be made that the word "weight" is here used, not in an absolute, but in a relative sense, then it appears to me that the whole question is conceded; since it is granted that the attribute implied in the term used must of necessity be an invariable attribute, independent of time and place, and this, in its essence, the word "weight" is not. It is true, of course, that relative atomic and molecular weights are invariable; but this is evidently only because the absolute weight of the standard of comparison varies from place to place, and in the same direction. Precisely as the apparent weight of a mass of lead would be constant everywhere if balanced against a standard kilogram.

But this use of the word "weight" is not the use generally implied in the terms atomic and molecular weight. It is used in chemistry almost without exception as a synonym of the word mass. The very conception of an atom or of a molecule is that of a definite mass of matter. Atoms, says Lothar Meyer, are "individual isolated particles of matter, possessing definite and unvarying weights;" *i.e.*, masses. Even vortex atoms "are small but finite systems of matter which rotate about an endless curve as axis, and which, according to the investigations of Helmholtz, possess the peculiar property that their mass cannot be affected by external influences." Muir tells us that "the symbol of an element, *e.g.*, H, O, Cl, or of a compound, *e.g.*, H_2O, HCl, represents a definite mass of that element or compound;" and he defines 'the maximum atomic weight of an element" as "the smallest mass, in terms of hydrogen as unity, of that element in a molecule of any compound thereof." "To every element," he says, "a number may be given which expresses the smallest mass of that element which combines with unit mass of some element chosen as a standard. These numbers also express the smallest masses of the various elements which severally combine with each other." So Remsen, in stating the law of multiple proportions, says: "If two elements, A and B, form several compounds with each other, and we consider any fixed mass of A, then the different masses of B which combine with the fixed mass of A, bear a simple ratio to one another." In illustrating this law he states: "The mass of oxygen combined with a given mass of carbon in carbon dioxide is exactly twice as great as the mass of oxygen combined with the same mass of carbon in carbon monoxide." Again, the law which underlies all chemical action is known as the law of the conservation of mass. It asserts that "the mass of matter which takes part in any change, whether physical or chemical, remains unaltered." And finally we have the important law of the action of mass, which is thus given by Remsen: "Chemical action is proportional to the active mass of each substance taking part in the change."

Moreover, the terms "atomic mass" and "molecular mass" refer equally to invariable quantities of matter, whether the word mass be taken in the absolute or in the relative sense. The absolute mass of an atom of sodium is the same, at least if we may judge from the period of its vibration, upon the sun, Sirius and Aldebaran, as upon the earth. The invariability of absolute mass necessarily involves invariability relatively. At present the atomic masses of the elements given in our text-books, are all relative, being expressed in terms of that of hydrogen, taken as unity. But it is evident that from these relative masses, the absolute atomic masses of all the elements can be obtained by simple multiplication, so soon as we know the absolute mass of the hydrogen atom. According to Lothar Meyer, "under a pressure of one atmosphere and at the mean temperature of about 20°, 1 cubic millimetre of any gaseous substance which obeys Avogadro's law contains about 21 trillions of molecules. But as 1 cubic centimetre of hydrogen under the given conditions weighs (*i.e.*, has the mass of) 0·0835 milligram, the weight (mass) of a molecule of hydrogen must be

$$\mathfrak{H} = H_2 = \frac{0{\cdot}0835}{21\cdot10_{18}} = \frac{}{10_{21}} = 0{\cdot}000,000,000,000,000,000,004$$

milligram; or a quadrillion molecules of hydrogen weigh (have a mass of) about 4 (milli) grams."* Hence if we may assume that such a molecule as this is the molecule of Avogadro's law and consists of two atoms the conclusion is easy that a quadrillion hydrogen atoms have an absolute mass of 2 milligrams. Whence the absolute mass of a quadrillion chlorine atoms is 70·74 milligrams, of a quadrillion oxygen atoms, 31·92 milligrams, of a quadrillion nitrogen atoms 28·02 milligrams, etc. In other words, the number expressing the relative molecular mass of an element, represents in milligrams the absolute mass of a quadrillion atoms of that element.

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* 'Modern Theories of Chemistry,' p. 111.

These considerations make sufficiently evident, I think, the great gain that would accrue to chemistry in clearness of conception and precision of expression, were the word "mass" always to be employed whenever quantity of matter is referred to and the word "weight" only when the force of the earth's attraction is meant. True it is indeed, that the adoption of this rule will oblige us to give up the older and more familiar terms "atomic weight" and "molecular weight," and to substitute in their places the newer ones "atomic mass" and "molecular mass." But true progress in any science is attended with frequent revisions of its terminology; and in none more than in chemistry. It is a sufficient reason for such a change to show that thereby the science becomes better equipped for the further conquest of truth.

Returning now from this digression, it seems to me that one of the most noteworthy steps of progress recently taken is to be found in the analogy pointed out by Van't Hoff, between gases and dilute solutions. In pure physics, the kinetic theory of gases as developed by Clausius, Maxwell, Boltzmann and others has led to the most important generalizations and has established the constitution of gaseous masses upon a firm foundation. From the simple assumption that the molecules of matter in the gaseous state are moving in straight lines, and that they are subject in consequence only to the laws of mass motion, conclusions have been derived which agree so closely with the facts as to make it appear that the properties exhibited by substances when in the gaseous state are necessary results of this fundamental hypothesis. Permit me briefly to recapitulate some of these conclusions. It follows in the first place that the pressure exerted by a gas outwardly is due simply to the impact of its molecules; so that if m be the mass of a molecule and v its speed, $\frac{1}{2}mv^2$ will represent its kinetic energy, and $\Sigma \frac{1}{2}mv^2$ the kinetic energy of the mass of unit volume; a value which becomes $n.\frac{1}{2}mv^2$, if n like molecules having a mean speed v are contained in unit volume. For a second gas the kinetic energy of unit volume will be $n'.\frac{1}{2}m'v'^2$, of course. But since the outward pressure exerted by the gas is due to its kinetic energy, this energy must be the same for equal volumes of any two gases when they are under the same pressure: *i.e.*, that of the atmosphere. Whence we have $n.mv^2=n'.m'v'^2$. If now these two gases have the same temperature, they are in thermal equilibrium and $mv^2=m'v'^2$; whence $n=n'$ and the number of molecules in unit volume is the same for both gases; which is the law of Avogadro. Moreover, since $mv^2=m'v'^2$, we have $v^2:v'^2::m':m$; or the speed of translatory motion in a gas is inversely proportional to the square root of its molecular mass; *i.e.*, of its density; which is Graham's law of diffusion. Again, since the molecules are moving in all directions we may resolve this motion along three perpendicular axes; so that the actual pressure in any one direction is $p=\frac{1}{3}mnv^2$. Now although we may not know the actual value of either m or n, yet we do know their product mn, which is the mass of the molecules in unit volume; *i.e.*, the density of the gas. Representing this by δ, we have $p=\frac{1}{3}\delta v^2$. Hence the density of a gas varies directly as the pressure upon it; which is the law of Boyle or Marriotte. Since $V=1/\delta$, or the volume of a gas is inversely as its density, the law may be stated in its ordinary form—the volume of a gas varies inversely as the pressure upon it. So, since $\delta=mn$, $\delta'=m'n'$, and $n=n'$, we have $m:m'::\delta:\delta'$; or the molecular masses of two gases are directly proportional to their densities, which is the law of Gay Lussac. If the temperature is constant the mean speed is constant, and pV, which equals $\frac{1}{3}v^2$, is also constant. As pV is proportional to the absolute temperature, v must be so. Hence the volumes of all gases are proportional to the absolute temperatures, and therefore expand and contract equally by heat; which is the law of Charles. From the equation $v^2=3p/\delta$ we may calculate this mean speed of translation. Thus for hydrogen at 0°, Clausius obtained

$$v = \sqrt{\frac{3 \times 1033 \times 980}{\cdot0000896}}$$

or 1844 metres per second. For oxygen it is 461 and for nitrogen 492 metres. The fruitfulness of the kinetic theory, it will be noticed, is not confined to physics, even in the case of gases, since it is upon the law of Avogadro, a direct conclusion from it, that the ordinary method of fixing molecular masses by means of vapour-density depends.

(*To be continued.*)

COMPRESSIBILITY OF HOT WATER AND ITS SOLVENT ACTION ON GLASS.*

BY C. BARUS.

It has been found that the compressibility of water between 0° and 63° continually decreases, but that above the latter temperature it increases. The author proposed to measure the compressibility between 100° and 300°, but found that at 185° water attacks glass so rapidly as to make measurements in glass tubes worthless.

Pressures were applied by aid of Cailletet's large force pump. The thread of water is enclosed in a capillary tube, between two end threads of mercury, and the distance apart of the two inner menisci, corresponding with any given temperature and pressure, measured by a cathetometer. The tube, suitably closed above, is exposed in a vapour-bath. At 185° the thread of water soon loses its transparency, becoming white and cloudy. After the action has continued for about an hour, the column is solid at high pressures (300 atmos.), although it is probably only partially so at 20 atmos. In consequence of this threads of mercury break off during advance and retrogression of the column. Further measurement is, therefore, not feasible. The glass was common lead glass, and distilled water was used.

The dissolution of the glass in the water at 185° causes a shrinkage in the volume of the system of pure water and solid glass of more than 11 per cent. up to the point of solidification. The hot, turbid column, after exposure at 185° for about fifty-five minutes, is absolutely shorter than the original clear, cold column at 24°. The hot compressibility, after fifty-five minutes, has increased to five times the cold compressibility, and to three times the original hot compressibility. Making allowance for the shrinkage due to chemical action, the normal compressibility of pure water at 185° is estimated as not greater than $70/10^6$. Above 100°, therefore, the compressibility increases at a very low rate with temperature, which the author thinks indicates exceptional stability of the water molecule.

The author regards the action above described as due to the instability of the glass molecule at 185°, and as a general deduction infers that in many instances a definite dissociation temperature of the solid must first be surpassed, before solution will set in.

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THE USE OF METHYLATED SPIRIT.

WE understand that in Scotland excise officers are actively engaged in the search for tinctures and other medicinal preparations made with methylated spirit, and it would therefore appear that some suspicion exists on the part of the revenue officials as to such an unlawful application of methylated spirit. This may have been excited by the case reported in the Journal for the 16th May last or by other circumstances of which we are not aware. But in any case it is probable that chemists may be put to some inconvenience by the examination of their premises and stock by excise officers. The inconvenience would be still more serious if it were ascertained that any medicinal preparation was made with methylated spirit, and the person on whose premises such an article was found would be liable to a heavy penalty. In veterinary practice certain preparations are sometimes made with methylated spirit, and although the practice cannot be fairly regarded as an infringement of the law, there is still some danger that it might be so regarded by excise officers and even by magistrates. Even in the section of the Spirits Act, 1880, which specially relates to this subject, the provisions are not free from some uncertainty as to their intention and scope. The main object of that section is to make unlawful the use of methylated spirit as, or for, a beverage, whether prepared for that purpose or not. It also states that neither methylated spirit nor any derivative of it may be used in the preparation of any article capable of being used wholly or partially as a beverage or internally as a medicine. The excise authorities are disposed to take a very strict interpretation of this part of the Act as that which is to be upheld. Some years ago a question was raised as to the legality of making aconite and belladonna liniments with methylated spirit when that was desired on the score of economy, as is sometimes the case with hospitals and other charitable institutions. Under such conditions it would appear that there should be an exception to the strict interpretation of the Act. But for some time that view of the matter was opposed on the ground that though aconite and belladonna liniments could not be used as beverages, either of them might be used internally as medicine.

We mention this circumstance for the purpose of illustrating the extreme tenacity with which the excise authorities adhere to the precise terms of the law and to its most stringent interpretation. It is probable that in doing so they are justified by their experience, and that it is not because they are disposed to interfere with or unreasonably embarrass any class of legitimate traders. It will be evident, therefore, that the greatest care should be exercised, in the use of methylated spirit, to avoid any possibility of being held to infringe the provisions of the Spirits Act. From the more purely pharmaceutical or medicinal point of view it might be inferred from the terms of the Spirits Act that the prohibition of the use of methylated spirit in making liniments, tinctures, etc., extended only to those which in themselves would not be capable of being used as beverages, for instance, tincture of opium; but from the point of view of the Excise authorities that would be a totally erroneous inference, and one that might occasion very serious consequences to anyone who acted upon it. This will be seen when it is remembered that even amongst liniments the only ones for which the use of methylated spirit was formerly permitted were the compound camphor and soap liniments of the British Pharmacopœia. The subsequent addition to these of aconite and belladonna liniments was only effected with considerable difficulty. But according to the general order issued by the Board of Inland Revenue in October, 1876, these four preparations are the only ones that may lawfully be made with methylated spirit for use in such cases as it may be desirable to effect an economy. In regard to any other preparation the only safe course is to apply to the Board of Inland Revenue stating the purpose for which it is desired to use methylated spirit and asking for permission to use it. A retailer of methylated spirit who desires to use the spirit in that way would, however, have not only to obtain permission from the Board, but also to give security that he will not use methylated spirit for any other purpose than that allowed by the Board, and that he will observe the prescribed regulations. Under such an arrangement liability to inspection of premises and stock by the excise officers would also be a necessary consequence.

While referring to this subject of the use of methylated spirit, and pointing out the mode in which any risk of inconvenience can be avoided, so far as the Excise authorities are concerned, it must of course be clearly understood that even in those instances where permission to use methylated spirit is given by the Board of Inland Revenue, the sale of preparations made with methylated spirit is justifiable only when it is the express desire of the purchaser that the preparations should be of that nature. The substitution of any one of the methylated liniments above named for that made, as the British Pharmacopœia directs, with rectified spirit, would be an offence punishable under the Food and Drugs Act. We have reason for believing that in some instances chemists and druggists are under the impression that they can use methylated spirit for medicinal purposes when requested to do so, and it will therefore have been of service to point out that this cannot be done without incurring the risk of a heavy fine, unless due permission is first obtained from the Board of Inland Revenue.

The annual meeting of the Members and Associates of the Society resident in Scotland took place last Wednesday at the Society's House in Edinburgh. Mr. Gilmour was unfortunately prevented by illness from being present, and the chair was taken by Mr. Storrar. An address, written for the occasion by Mr. Gilmour, was read, and then the Assistant-Secretary read the report of the Scrutineers upon the election of the members of the Executive for the ensuing year, which is given at page 1160. After the adoption of this report some discussion took place on the subject of the patent medicine stamp duty, and upon the desirability of taking some steps to increase the number of members of the Pharmaceutical Society in Scotland.

* * *

A correspondent in this week's Journal takes exception to a passage in the article "A Retrospect," in which reference was made to irregular competitors of chemists and druggists. Writing as a registered man in the employ of "drug stores," and from his experience of the men he has known in that position, Mr. Boor thinks that the passage referred to by him was unjust to those so employed. But upon consideration we think he will find that is not the case, inasmuch as it applied only to those who fail to pass the examination requisite for legal qualification. The account Mr. Boor gives of the assistants employed in "drug stores" carried on by companies may, if it be generally applicable, serve to mitigate the objection to that class of business and to show that it is now being conducted more in accordance with the spirit and intention of the Pharmacy Act. For the good thus effected credit must be given to the action taken by the Pharmaceutical Society. But the cases reported in last week's Journal will suffice to show that irregular competitors of chemists and druggists still carry on business contrary to the law and in such a manner as to justify the remarks we made.

* * *

Last year, by a "Consolidation Act," the laws in the colony of Victoria relating to medical practitioners, dentists and chemists, were brought within the limits of a single statute. A copy of the part of the Act relating to "chemists" has been supplied to us by the courtesy of Mr. Harry Shillinglaw, the energetic Secretary to the Pharmacy Board of Victoria and the Pharmaceutical Society of Australasia, and he has at the same time taken the opportunity to point out that some of the provisions now being sought for in the Pharmacy Acts Amendment Bill have already been in force in Victoria for several years, with excellent results. Thus, for instance, under the colonial Act, no person is entitled to receive from the examining board a certificate that he is qualified for registration unless he has served for not less than four years as an apprentice, and passed the Preliminary examination before the commencement of this term of apprenticeship. In addition, he must show that he has attended a course of lectures and passed examinations during one session at the University of Melbourne, or other approved school or college, in materia medica, botany, chemistry and practical chemistry, and afterwards satisfy the Board of Pharmacy in the subjects in which it examines. Moreover, the colonials are happy in the possession of an Act not merely applying to dealings in poison, but restricting the carrying on of the business of a chemist and druggist to registered pharmaceutical chemists, with a specific provision that the word person shall be deemed to include any corporation.

* * *

A short time since reference was made in these columns (before, p. 723) to a Bill that had been introduced into the House of Commons for the better prevention of frauds in the manufacture and sale of artificial manures and feeding stuffs. This Bill has been withdrawn, but, notwithstanding the late period of the session, another, having a similar object in view and bearing the same names as promoters, has been introduced. The second Bill is to a great extent identical with the first, but in the third clause, instead of a misrepresentation in the invoice certificate being made absolutely an offence, an exemption is provided in favour of a person who may be able to prove that the misrepresentation has been made without intention to defraud. But the principal alteration consists in the substitution of the "Board of Agriculture" fer "county councils," as responsible for the discharge of various duties. Thus the new Bill would vest in the Board of Agriculture the appointment of competent persons as analysts, the allotment to them of districts, the determination of their remuneration, and the drawing up of regulations as to the manner of taking samples and the methods of analysis to be adopted. The analysts appointed would report quarterly to the Board.

* * *

The suggestion made in this Journal recently for the adoption of the term "pharmister" has been taken up by a writer in the *Pharmaceutical Era* for June 1, and developed to an extent that possibly may exceed the views of our own correspondent. Starting with the assumption that "phar*mister*" must of course mean the master of the pharmacy, the American commentator proposes to extend this principle to pharmassist for the assistant or pharm*assister* when the assistant happens to be of the gentler sex, and pharm[illegible] for the bottle washer.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 17 *and* 18, 1891.

Present on each day.—Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Davies, Druce, Fletcher, Gerrard, Greenish, Holmes, Ransom, Saul, Symons, Tanner and Taylor.

Dr. Stevenson was present on the 17th on behalf of the Privy Council.

MAJOR EXAMINATION.

17*th.*—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:

Green, Edward Joseph	Boroughbridge.
Hayton, Thomas Irwin	Wigton.
Kemp, Cecil Tabor	Bournemouth.
Linstead, Edward Flatman	London.

18*th.*—*Four* candidates were examined. *Two* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:

Morley, Charles	Beverley.
Wynne, William Arthur	Mold.

MINOR EXAMINATION.

17*th.*—*Twenty-eight* candidates were examined. *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allenby, Henry Edmund	St. Albans.
Ashton, Henry Maitland	London.
Bertales, Prosper	London.
Browning, Edwin	Newton Abbot.
Carr, Harry Ja	Brighton.
Cattell, Charles	Ely.
Davis, George Ernest	London.
Felce, Albert	Norwich.
Hatton, Foster James	Weymouth.

18*th.* — *Twenty-seven* candidates were examined. *Seventeen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barnes, Ivor Paxon	London.
Donington, Robert Spencer	London.
Gale, Richard Percy	Hull.
Hill, John	Birmingham.
Hinde, Albert Henry	Lowestoft.
Liggins, Thomas Pearson	Putney.
Nicholson, Thomas Brough	Sunderland.
Parsons, Ernest Alsager	Wolston.
Tiltman, William John	Launceston.
Walton, Joseph Woodruff	Wilmslow.

PRELIMINARY EXAMINATION.

18*th.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Barnes, Victor George H.	Tillington, Staff.
Blaydes, Arthur George	Stamford.
Bloomfield, Frank Harrison	Masborough.
Caley, Norris Clague	Liverpool.
Daglish, William R. D.	South Shields.
Durbin, Henry Eastman	Stockwell.
Edwards, William Howard	Tunbridge Wells.
Freear, Alexander	London.
Furber, Robert Arthur	Whitchurch, Salop.
Haigh, William	Stocksbridge.
Hepper, Charles Henry	York.
Jeremy, Harold	Dowlais.
Pentrey, Fred	Peterborough.
Perrédès, Pierre Elie Felix	Jersey.
Smith, Alfred	Forest Hill.
Speedy, William	Dundee.
Thomas, William Owen	London.

MEETING IN EDINBURGH.

ELECTION OF EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the members and associates in business of the Society residing in Scotland was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, June 17, at 12 noon. The chair was taken by Mr. David Storrar, Kirkcaldy.

Apologies for absence were received from Messrs. D. Fraser and MacAdam, Glasgow; and Watt, Haddington.

The minutes of last meeting were read and approved.

The Chairman said he was sure they would all regret that Mr. Gilmour was prevented from occupying the chair by a temporary indisposition. Fortunately for them he had committed to manuscript the remarks which he (Mr. Gilmour) had intended to make on the present occasion, and with the leave of the meeting he would now ask the Assistant Secretary to read the statement which Mr. Gilmour had sent.

The Assistant Secretary then read the statement as follows:—

Gentlemen,—We have come to the close of another year of executive work, and it may not be amiss in me to say a parting word by way of summarizing the more important points in our latest history.

The past year, I suppose, like most years, contains light and shade, encouragement and discouragement, as most of our histories do; but it is pleasing to note that of the two the former largely predominate. It is gratifying to note, for example, that this year there is an increase of chemists in Scotland connected with the Society; an increase not very large, it is true, being only 308 as compared with 300 last year, but still an increase which places the record the highest yet attained in Scotland. It is to be hoped that the number will never go below this in future, but that on the other hand it will go on rapidly increasing until the Society can be said to represent the great majority of the drug trade. If the proposals for the consolidation of the Society contained in the Pharmacy Bill now before Parliament should fortunately become Statute law, there is every reason to expect that they would tend to facilitate this very desirable end. I have frequently commented on the unfortunate fact that only about 30 per cent. of the registered chemists of the country are connected with the Society. Why should this state of matters exist? The Pharmaceutical Society is the only exponent at present existing of pharmaceutical politics, and if it does not reflect, as some apparently think, the opinion of the trade, my reply is that the Pharmaceutical Society is simply what the trade makes it.

The large number of nominations and the large number of gentlemen able and willing to act as members of the Executive is also a gratifying evidence of increased interest in the welfare of the Society, and of a higher appreciation of its efforts to promote the general interests of pharmacy. It may be said (indeed it has been said) that there is not much work for the Executive in Scotland to do. This is true in a sense, but at the same time the Executive has no reason to be ashamed of what it has done in the past, and the Council of the Society has repeatedly acknowleged its indebtedness for the way in which the business of the Society in Scotland has been conducted. It is further to be remembered that no one can foretell what questions may arise, and it is of the utmost importance to have an elected body representing Scottish opinion on pharmaceutical matters, and always ready to assist and co-operate with the Council in dealing with any such affairs. It is unquestionable, also, that most important benefits must accrue to the general interests of the trade in an indirect way from the mere fact of representative men from all parts of the country meeting together, making one another's acquaintance, comparing notes as to what is going on in the different localities, and discussing with one another, either in the Executive or otherwise, matters of common interest. This, I think, is one of the indirect benefits of having a local Executive, to which the highest importance should be attached.

It is also very gratifying to observe that of the twenty-nine gentlemen proposed, and who have elected to stand as members of the Executive this year, about two-thirds are resident outside Edinburgh. It is inevitable that a considerable number of Edinburgh men should always be on the Executive, and that they should be within easy reach of the Chairman, so as to consult with him in regard to any matters that may require attention between meetings of the Executive; but it is also most desirable that the Executive should as fully as possible represent the whole of Scotland, and therefore it should be our constant aim to keep the number of country representatives as large as possible.

This is not perhaps the place to say much about the Examinations. It is, however, gratifying to notice that along with a marked increase in the number of candidates there is also an improvement in the percentage of passes. The increased number of candidates is doubtless due in some measure to a higher appreciation of the necessity for the legal qualification and an increased demand for qualified assistants. The extended and much more definite schedules for the Minor and Major examinations, recently issued by the Council, although not yet in force, have doubtless enabled students to understand more clearly and definitely the character and scope of the knowledge required, and this probably is an explanation of the improvement in the percentage of passes. But the number of failures is still far too high, and indicates that there is much need for systematic and definite study on the part of pharmaceutical students.. The number of candidates presenting themselves for examination has recently been unprecedentedly high, but this is probably only temporary, and due to causes in connection with the new examination schedule.

It will be noticed from the report published in the *Pharmaceutical Journal*, May 9, 1891, p. 1011, that the Executive again directs the attention of country chemists to the advantages to be gained by a larger use of the Society's Library. Books are sent to country members by post, carriage paid, and the borrower pays the carriage back. In this way valuable books of reference may be had on loan for a few pence. During the year the accommodation for books in the Library has been nearly doubled and should be adequate for some years to come, even although the collection is constantly being added to.

During last winter three largely attended and very successful evening meetings were held, but it is very desirable that more such meetings should be held, and hence the great necessity for members and associates coming forward with suitable contributions. There has been very great difficulty of late in keeping up a supply of suitable contributions, and the causes for this state of matters demands the careful consideration of the coming Executive. I have long thought over and taken a deep interest in this subject, and I may therefore be excused if I dwell for a single moment upon it. If there is one feature more than another which imparts interest to our evening meetings, and which always brings out a large and attentive as well as an appreciative audience, it will certainly be a subject which bears more particularly upon our own calling, and which, let me say, should avoid pharmaceutical politics on the one hand and ultra scientific subjects on the other. This is exactly the point where difficulty begins. Some who might probably contribute valuable papers are deterred from doing so from fear that they are not sufficiently scientific; others who might give the higher scientific papers get little encouragement to do so—at least if considered in the light of compensation—whilst a larger class still, I am afraid, find little time and less encouragement to give their experiences in the dire struggle for bare existence. Beyond all this, however, I have long felt that the development of specialities, which has of recent years been a leading feature in many of our manufacturing establishments, on the staff of which we have mainly depended for scientific papers in the past, has prevented the publishing of many details of general interest to us all. Naturally, when any improvement is discovered the first instinct is to make the most of it possible, and I believe that, in this fact, we have after all the one principle factor in the decline of papers at our scientific meetings. The motto now seems to be: Every man for himself and none for the State.

Probably the two features which will stand out most prominently in the past year's pharmaceutical history are the visit of our President to the different large pharmaceutical centres and the celebration of the Society's Jubilee so recently held in Bloomsbury Square. The one event certainly enhanced the importance of the Society's work at home, while the other was no less calculated to further its importance abroad.

It would ill become me were I to vacate office without bearing testimony to the uniform courtesy and ability with which Mr. Hill, our Assistant Secretary, has performed his duties during my chairmanship. Whoever succeeds me will find in Mr. Hill an able helper, always willing to take the heavier burden of the work, and who will forward to the very utmost of his power the interests of the Society.

The Chairman said they were much indebted to Mr. Gilmour for the interesting statement that had just been read. He had given prominence to several subjects that had engaged their attention during the past year. There was one point especially to which he would direct attention. That was the passage in which he referred to the membership of the Society in Scotland. He was convinced that the only hope for securing such benefits as they desired lay in the whole trade joining the Society and supporting it more thoroughly. It was useless to remain outside and content themselves with merely finding fault and grumbling. It was self-evident that if the whole trade would join the Society then the trade would make its policy. It was very necessary that all registered chemists should have this fact impressed upon them, and he was very glad indeed that Mr. Gilmour had so distinctly referred to it. A very thorough attempt had been made during the past year to obtain an Amendment of the Pharmacy Act, but, as was now generally known, the proposal had been dropped so far as the present session of Parliament was concerned. It was quite certain, however, that a similar important proposal would be brought on the carpet during next session, and if the Pharmacy Acts Amendment Bill was to be carried successfully in face of the opposition brought against it in the House of Commons, it would require to have the undivided support of the whole Society. They would not consider it out of place for him to suggest that they should cordially thank Mr. Gilmour for his services as Chairman, and express to him their regret that he had been unable to be with them and their hope that he would soon be quite well again.

The Assistant Secretary then read the report of the Scrutineers as follows:—

REPORT OF SCRUTINEERS.

"At a meeting held on April 15, the Executive appointed June 17 as the date of the election for the ensuing year. Three hundred and eight nominations ers were issued by the Assistant Secretary on y 26.

The nomination papers returned showed that sixty-e members and associates in business had been inated, of whom the following twenty-nine signi-. their willingness to act if elected:—

thune, William John, 99, Academy Street, Inerness.
, Peter, 119, George Street, Edinburgh.
ats, John Thomson, 64 and 65, Tolbooth Wynd, eith.
ull, George, 17, Smith's Place, Leith Walk, Edinurgh.
rrie, William Little, 223, Byres Road, Dowanill, Glasgow.
ing, James Laidlaw, 52, North Bridge, Edinburgh.
her, John Hutchison, 66, High Street, Dunferm-ne.
wler, George Ross, 38, Castle Street, Forfar.
aser, Jonathan Innes, 13, Dundas Street, Edinurgh.
azer, Daniel, 127, Buchanan Street, Glasgow.
sson, Adam, Thistle Street Lane, East, Edinburgh.
mour, William, 11, Elm Row, Edinburgh.
rdie, James Millar, 68, High Street, Dundee.
k, James, 102, High Street, Arbroath.
inston, John, 45, Union Street, Aberdeen.
rmath, William Ramsay, 1, North Bell Street, t. Andrews.
rr, Charles, 56, Nethergate, Dundee.
ninmont, Alexander, 69, South Portland Street, lasgow.
ird, George Hardie, 40, Queensferry Street, dinburgh.
nan, George, 20, Queensferry Street, Edinburgh.
ben, Thomas, 5, Oliver Place, Hawick.
Adam, Robert, 34, Virginia Street, Glasgow.
claren, David, 42, South Clerk Street, Edinburgh.
sbit, John, 162, High Street, Portobello.
terson, James, 15, Regent Quay, Aberdeen.
ephenson, John Bertram, 48, Frederick Street, dinburgh.
rachan, Alexander, 138, Rosemount Place, Aberleen.
therland, John William, 68, High Street, Dumries.
ompson, Thomas, 35, George Street, Edinburgh.

' A voting list was accordingly drawn up, and on e 6 three hundred and eight voting papers were ed.

' The Scrutineers met last night at 8·30, and proded to examine the voting papers. In the unidable absence of Mr. Gilmour the chair was taken Mr. J. B. Stephenson. The result was found to be follows:—

Voting papers issued	. . . .	308
„ „ returned	. . . .	165
„ „ informal	. . . .	1

' There were thus 164 votes to be recorded.

' The following gentlemen have a majority of es:—

a, Peter, 119, George Street, Edinburgh.
ing, James Laidlaw, 52, North Bridge, Edinburgh.
her, John Hutchison, 66, High Street, Dunferm-ine.
azer, Daniel, 127, Buchanan Street, Glasgow.
bson, Adam, Thistle Street Lane, East, Edinburgh.
lmour, William, 11, Elm Row, Edinburgh.
rdie, James Millar, 68, High Street, Dundee.
ck, James, 102, High Street, Arbroath.
rmath, William Ramsay, 1, North Bell Street, St. Andrews.
rr, Charles, 56, Nethergate, Dundee.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Maben, Thomas, 5, Oliver Place, Hawick.
M'Adam, Robert, 34, Virginia Street, Glasgow.
Nesbit, John, 162, High Street, Portobello.
Paterson, James, 15, Regent Quay, Aberdeen.
Stephenson, John Bertram, 48, Frederick Street, Edinburgh.
Strachan, Alexander, 138, Rosemount Place, Aberdeen.

"The voting papers and all other documents connected with the election are submitted herewith.

J. B. Stephenson, *Chairman.*
"Robert Aitken. Claude F. Henry.
"William Burley. John Robertson."

The actual result of the poll was as follows:—

Gilmour	134	Ewing	78
Boa	122	Jack	77
Kermath	122	Sutherland	76
Kinninmont . . .	122	Currie.	62
Hardie	121	Lunan.	57
Maben	120	Bethune	56
Strachan	112	Johnston.	55
Stephenson. . . .	111	Laird	55
Nesbit	110	Thompson	47
Frazer	107	Fowler	44
Gibson	105	Fraser.	44
Paterson	102	Maclaren. , . . .	39
McAdam	91	Coull . . . . , . .	37
Fisher	89	Coats	27
Kerr	88		

The Assistant Secretary reported that three voting papers had been received by post that morning, and were therefore too late to be included in the enumeration.

Mr. Murdoch, Falkirk, moved the adoption of the report. He would like to say he was pleased to hear that matters were in a satisfactory state so far as the work of the Executive was concerned. He entirely agreed with what had been said by Mr. Gilmour and the Chairman as to the necessity of getting the whole trade to join the ranks of the Pharmaceutical Society. He had met a chemist from a neighbouring town in Edinburgh that morning, and on asking him if he was going to the meeting he replied that he had no intention of having anything to do with the Society at the present time. He (Mr. Murdoch) thought that was an entire mistake; all chemists should join, and the more members they could have in the Society the better it would be for the whole trade.

Mr. Davidson, Montrose, seconded the motion, and the report was unanimously adopted.

The Chairman then declared that the first seventeen names on the list given by the Scrutineers, together with the President of the Society (Mr. Michael Carteighe), the Vice-President of the Society (Mr. Alexander Bottle), David Storrar, Kirkcaldy, and James Watt, Haddington, as *ex-officio* members, would form the Executive for 1891-92.

On the motion of the Chairman a vote of thanks was awarded to the scrutineers.

The Chairman said there would now be an opportunity for any gentleman who desired to refer to any matter of pharmaceutical interest, or to suggest any points for the consideration of the Executive. The past season had been in many respects a very important one, and in the coming year the Society was likely to have a good deal of important work to consider. It had been truly said that the Executive of the North British Branch had not very much to do, and he thought the Council ought to be induced to trust more business to their care. But however that might be it was clear that they ought to perform what little work they had to do to the best of their ability. He would be glad to hear anything that any gentleman might have to say.

Mr. Murdoch, Falkirk, said he would like to draw attention to the question of patent medicine stamps. Recently the inland revenue authorities had been insisting that 6*d.* bottles of cough mixture should have a 1½*d.* stamp affixed to them, and he thought this addition of about 25 per cent. to the price was a great hardship to poor people, by whom this article was largely purchased. He thought that as 1½*d.* was the stamp charge for a shilling article they ought, at least, to have a stamp of half that value for a sixpenny article, and they might have stamps at ½*d.* and 1*d.* in proportion to the value of the bottle or box. They had also to complain that since the reduction of the licence to five shillings, patent medicines of all kinds were being sold in grocer's shops and such like places everywhere. He thought it would be much better to have the licence raised to £1 1*s.* To such a degree had this gone that now they had vans, barrows, and other vehicles employed in hawking medicines about the country, though he was glad to see that in the case of a well known itinerant quack medicine proprietor the revenue authorities had recently interfered to put a stop to the practice. He thought the Society should take up this question and agitate to get these patent medicine stamps reduced in value.

Mr. Maclaren: Is it the case that an ordinary cough mixture label is liable to duty? I understood it was not liable unless the cough mixture was described as a special preparation of the seller's.

Mr. Murdoch: I refer to a preparation well-known throughout the country as Dr. Abercrombie's cough mixture. I have sold many grosses of it, and the authorities require each sixpenny bottle to bear a three-half-penny stamp. I move that this question be remitted to the Executive for consideration.

Mr. Boa said in a recent case the revenue authorities had decided to refuse to license vans for the sale of patent medicines.

The Chairman said this question of patent medicine stamps, referred to by Mr. Murdoch, was of much importance to chemists. He was of opinion that chemists committed a tactical blunder in seeking to have the licence reduced to five shillings. He was not sure that the proposal to reduce the price of the stamp would be a wise step. There was a danger that by lowering the price they would encourage the sale of such articles by outsiders and simply give greater encouragement to the cutting of prices. He did think that was a substantial argument against any proposal for reduction.

Mr. Murdoch's motion not being seconded, the matter was allowed to drop.

The Chairman said there still stood on the minutes of the Executive a motion to the effect that they should consider the question of increasing the membership of the Society in Scotland, and he thought that during the coming year something might be done in this direction, so that in the future they might have a greater chance of securing such reforms as they desired. Then it was generally known that in all probability the British Pharmaceutical Conference would meet in Edinburgh next year; and he thought they ought to show a strong front at that time. He thought it would be well to consider whether or not they might not have some kind of celebration of the Jubilee of the Society, either during the present year or next year, at the time of the visit of the Conference. He was present at the recent celebration in London, and he had pleasure in saying that they had most successful gatherings on that occasion. He was a little disappointed that Scotland was so poorly represented. Whatever might be their private opinions on pharmaceutical politics, they were all thoroughly agreed that the Pharmaceutical Society had done a very great deal of good to pharmacy all over the country, and they congratulated themselves on seeing the attainment of the fiftieth year of its existence. He would like to suggest that the question of increasing the membership of the Society in Scotland should be remitted to the Executive for consideration.

Mr. Stephenson said it was certainly desirable that they should consider in what way the membership of the Society in Scotland could be increased. With regard to the Jubilee celebration, he and others had felt that they could hardly, as an Executive, take any action apart from the Council, as they thought that they, the lesser body, were really included in the greater body, the Council. As to their absence from the meetings in London, it would of course be understood that though absent in body they were all present in spirit.

The Chairman's suggestion to remit the matter to the Executive was then unanimously agreed to.

Mr. Stephenson moved a vote of thanks to the Chairman, which was passed with acclamation.

The meeting then closed.

Proceedings of Societies in London.

ROYAL INSTITUTION.

THE RATE OF EXPLOSION IN GASES.

A discourse on "The Rate of Explosion in Gases," was delivered by Professor Harold Dixon, at the Royal Institution, on Friday, the 12th inst. The speaker said Bunsen's estimate that the wave of explosion travelled less than one yard per second had been accepted as correct for about fourteen years, but that since 1880 facts had been accumulated that necessitated the further investigation of the subject. It had been observed that the flame travels down a tube containing a mixture of carbon monoxide and oxygen too quickly to be followed by the eye, and careful experiment has since shown that the rate of progress of the flame is about one thousand times greater than that assigned by Bunsen. In the explosion that occurred in the gas mains in Tottenham Court Road some years hence, Vernon Harcourt also calculated that the flame must have travelled more than one hundred yards per second. Several other indications forced the conclusion that the velocity attained is greater than Bunsen supposed. Professor Dixon demonstrated the difference in velocity in open and closed tubes with mixtures of carbon bisulphide vapour and nitric oxide, which yield an intense violet flame. In open tubes the progress of the flame, as also in open tubes containing carbon monoxide, can be easily followed, and an increase in velocity as the flame travels down the open tube is observable. The explosion in closed tubes following the passage of an electric spark at one end appears almost instantaneous, though further experiment shows that the rate even in this case is comparatively slow. In the open tube the velocity appears soon to attain a maximum, and then either detonation occurs or the flame goes out. The researches of Berthelot and also of Mallard and Le Chatelier, published in the *Comptes Rendus* since 1881, have thrown much light upon the enormous velocity of the explosion of gases. Berthelot describes the pace of *l'onde explosive* as rapidly increasing from the point of ignition, but after a short time becoming constant whatever the nature of the gas or diameter of the tube. He therefore regards this result as a new physical constant for gases, that can be calculated from the heat of combustion and the density of the products. Mallard and Le Chatelier restricted their investigations to the study of the different stages that obtained in the explosion of gases. They found that upon igniion the flame travelled with uniform velocity a short listance, that then vibrations commenced and the scillations increased in amplitude until either the lame went out or detonation occurred. Three régimes of xplosion are thus distinguished, the régime of uniform velocity, that of intense vibration and that of detonation. These stages were illustrated by Professor Dixon with the aid of a long, upright glass tube, filled from below with coal gas. Ignited at the upper end the flame remained exterior to the tube as long as a certain pressure was maintained, but as the supply decreased the flame suddenly assumed an inverted shape, and ran down the tube at first slowly and regularly, then more rapidly and with an oscillating motion. In the first two trials the flame went out after travelling about two feet, in the third a detonation took place. Experimential evidence and mining experience show that explosions of mixtures of coal gas and air or fire-damp and air do not readily pass into the régime of detonation. The vibrations of the second régime become so violent as either to cause the flame to go out or a return to the slow uniform velocity is effected. Thus it is found that little damage is done in coal mines within 60 or 80 yards of the origin of the explosion, though beyond that distance the effects of a violent detonation are visible. Professor Dixon further illustrated the forms of explosion in a glass tube, 18 feet long, filled with coal-gas and air, closed at one end and open at the other. Fired at the open end an oscillating flame travelled down the tube at no great velocity; fired at the closed end by means of an electric spark an increasing velocity was observed, but the final detonation did not extend to the end of the tube; fired in the middle the flame proceeded quickly to the open end, but slowly to the closed end of the tube. In the régime of detonation *l'onde explosive* passes along the tube at a constant and maximum velocity, and the rate, if not identical, closely approximates to the mean rate of motion of the molecules themselves. Assuming that all the heat of combustion is converted into molecular motion, and that the heated gas remains at constant pressure, the mean molecular velocity for a mixture H_2+O would be 2830 metres per second, as against the observed velocity of the flame, 2810 metres per second. Other gaseous mixtures give the following values:—

	Theoretical.	Observed. Metres per second
H_2+N_2O	2250	2810
$CO+O$	1940	1090
$CO+N_2O$	1897	1106

Molecular mixtures of methane, acetylene and cyanogen with oxygen show a very close approximation between the theoretical and observed values. The differences seen in mixtures containing carbonic monoxide indicate that more complex reactions occur than are represented by the equation $2CO+O_2=2CO_2$, a deduction that may also be drawn from the fact that mixtures of carbon monoxide and oxygen will not explode unless a trace of moisture be present. At the commencement of his investigation Professor Dixon said that he proposed to re-determine accurately the rate of explosion of some easily prepared gaseous mixture, to study the different velocities obtained in mixtures of carbon monoxide and oxygen with varying quantities of the constituents, and to determine how far the presence of other active or inert gases altered the velocity. The apparatus employed in the determination of the velocities by Professor Dixon was exhibited and explained in detail. The tubing consists of the explosive piece in which the velocity of the flame is actually measured and a short anterior firing piece to allow of a flying start being made. A thin silver bridge spans each end of the tubing, through which an electric current runs, and is connected with a chronograph marking upon a revolving table. The force of the explosion breaks each of the bridges successively, and the difference in time is determined with a tuning fork of known vibration. In an experiment made by the lecturer, a lead tube sixty-five yards in length passing around the lecture theatre was employed, yet so rapid is the detonation that the flashes at both ends of the tube appeared almost simultaneously. In laboratory experiments either coiled lead tubing, which can be readily immersed in water if a certain temperature is required, or else lengths of glass tubing packed with asbestos in an iron barrel are employed. Although Berthelot found that no difference exists in the velocity of *l'onde explosive* after a passage of 3, 30, or 300 yards, yet he was unable to explain the divergent behaviour of carbon monoxide from the formula $V=29{\cdot}35\sqrt{\frac{T}{D}}$. He considers carbon monoxide as a gas that detonates with very little vibration, and therefore the general law is not applicable to it, whilst the close approximation of the theoretical and observed results when hydrogen is added to the mixture of carbon monoxide and oxygen in the proportion $CO+H_2+O_2$ is attributed to the property of hydrogen of conferring "the law of its own detonation" upon carbon monoxide. That the differences are really due to the amount of aqueous vapour present is seen from the following results with the mixture $CO+O$—

	Velocity of explosive wave in metres per second.
Well dried.	1264
Dried	1305
Saturated with aqueous vapour at 10°.	1676
" " " " 20°.	1703
" " " " 35°.	1738
" " " " 45°.	1693

Hence a maximum velocity is apparently reached when about 6 per cent. of aqueous vapour is present. These results afford scientific support for the practice of injecting steam into furnaces to increase the combustion. In experiments with various mixtures of hydrogen and oxygen, the observed results agreed with those calculated from Berthelot's formula in the vicinity of the proportions H_2+O, but diverged considerably in the case of extreme mixtures like H_8+O or H_2+O_8. On the other hand, a formula established by Professor Dixon agreed with the experimental results in the extreme cases, but failed in the intermediate. Very unexpected was the result of the comparison of the retarding influences of nitrogen and excess of oxygen. It was found that the addition of nitrogen to electrolytic gas retarded the velocity of the explosion less than the addition of an equal volume of oxygen, although the proportion at which explosion no longer occurred was reached much sooner with nitrogen. The experimental data obtained from investigations with gaseous carbon compounds, as methane, acetylene and cyanogen, show that, judging from the superior velocity of the explosion when only sufficient oxygen is admitted to burn the carbon to carbon monoxide, carbon is more readily oxidized to the monoxide than to the dioxide. This contradicts the statement frequently met with in text-books that carbon dioxide is the primary product of the oxidation of carbon, and that the monoxide is only formed from the dioxide by reduction with excess of carbon. The divergence from the Berthelot formula in such mixtures as H_2+O, Professor Dixon believes to be due to the high temperature attained, about 3000° C., causing partial dissociation of the steam, or in other words preventing the combination of the whole of the constituents. In mixtures containing more or less of hydrogen or oxygen, such a high temperature would of course not obtain and no dissociation occurs. As experimental proof of the presence of free hydrogen and oxygen in the explosion product of electrolytic gas, Professor Dixon exploded a quantity in a tube, the greater part of which was immersed in hot water, whilst a small projecting portion was cooled. After explosion the steam generated rushed to the cooled portion, dragging any free hydrogen and oxygen with it. The steam condensed and left the uncombined gases in the portion of the tube in which a second smaller explosion was caused by the passage of an electric spark. Professor Dixon terminated his discourse with an experiment demonstration of the increase of pressure that occurred during explosion.

THE FARADAY CENTENARY.

On Wednesday afternoon a large audience assembled at the Royal Institution on the occasion of the delivery by Lord Rayleigh of the first of two lectures in celebration of the centenary of the birth of Michael Faraday.

The chair was taken by the Prince of Wales, who in some introductory remarks referred to the fact that twenty-two years ago he presided at a meeting in the same building, attended by many of the most eminent scientific men, the object of which was to select a suitable memorial to the memory of the great Faraday, the eminent chemist and philosopher. He also spoke of the pride with which he remembered that he and his brother, as mere boys, had attended the Christmas lectures by Faraday. The Prince of Wales then called upon Lord Rayleigh.

Lord Rayleigh said that the man whose name and work were being celebrated was identified in a remarkable degree with the history of that Institution. If the Institution could not take credit for his birth, in other respects it could hardly claim too much. During a connection of fifty-four years, Faraday found there his opportunity, and for a large part of the time his home. The simple story of his life must be known to most who heard him. Fired by contact with the genius of Davy, he volunteered his services in the laboratory of the Institution. Davy, struck with the enthusiasm of the youth, gave him the desired opportunity, and, as had been said, secured in Faraday not the least of his discoveries. The early promise was indeed amply fulfilled, and for a long period of years, by his discoveries in chemistry and electricity, Faraday maintained the renown of the Royal Institution and the honour of England in the eye of the civilized world. He should not attempt in the time at his disposal to trace in any detail the steps of that wonderful career. The task had already been performed by able hands. In their own "Proceedings" they had a vivid sketch from the pen of one whose absence that day was a matter of lively regret. Dr. Tyndall was a personal friend, had seen Faraday at work, had enjoyed opportunites of watching the action of his mind in face of a new idea. All that he could aim at was to recall, in a fragmentary manner, some of Faraday's great achievements, and if possible to estimate the position they held in contemporary science. Whether they had regard to fundamental scientific import, or to practical results, the first place must undoubtedly be assigned to the great discovery of the induction of electrical currents. He proposed first to show the experiment in something like its original form, and then to pass on to some variations, with illustrations from the behaviour of a model, whose mechanical properties were analogous. He was afraid that these elementary experiments would tax the patience of many who heard him, but it was one of the difficulties of his task that Faraday's discoveries were so fundamental as to have become familiar to all serious students of physics. Lord Rayleigh then illustrated the discovery, by such methods as were open to Faraday, without calling in aid the more elaborate resources of modern science. But, with all his skill, Faraday did not light upon the truth without great delay and difficulty. In December, 1824, he had attempted to obtain an electric current by means of a magnet, and on three occasions he had made elaborate, but unsuccessful attempts to produce a current in one wire by means of a current in another wire, or by a magnet. He still persevered, and on the 29th of August, 1831, he obtained the first evidence that an electric current could induce another in a different circuit. On September 23, he wrote to his friend, R. Phillips:—"I am busy just now again on electro-magnetism, and think I have got hold of a good thing, but cannot say. It may be a weed instead of a fish that, after all my labour, I may at last pull up." It proved a very big fish indeed. Lord Rayleigh then, by a series of experiments with models, indicated, as he said, with substantial accuracy, all the phenomena of electric induction. He also illustrated the operation of Professor Clerk Maxwell's differential gearing and of Huggins's gearing, and observed that it was a remarkable achievement of modern mathematics that all the results of these different experiments could be represented by the same equation. By a series of interesting experiments he illustrated the propagation of energy across intervening space by means of dielectric rings, and explained the decomposition of water by electricity, which could not be effected solely by a single Daniell cell, but could be done with the aid of self induction. Faraday had always felt great uneasiness as to the soundness of contemporary views, and always experienced a fear of being misled by words. Having proved the complete identity of the electricity in lightning with that in the voltaic cell, he abandoned the term "pole" for "electrode," and considered the expression "electric fluid" a dangerous one. It was, indeed, a term which, as Maxwell observed, ought to be banished to the region of newspaper paragraphs. Diamagnetism was another subject for the researches of Faraday, which had been more fully developed by Sir William Thomson. Lord Rayleigh then illustrated by some beautiful experiments the magnetization of a ray of light, the full significance of which, not fully understood by Faraday, was realized to a great extent by Sir W. Thomson. His observations in acoustics were also of great value. Faraday had made one singular remark as to a particular formation of waves generated under the action of wind, which he had himself, after patient observation for half an hour or three-quarters of an hour, verified at a French watering-place. He was disposed to doubt whether anybody else save Faraday and himself had ever noticed that phenomenon. But it was one thing to have discovered, and quite another to have verified the discovery once made. The philosopher had also made a number of minor observations of great value, and he was reminded of one by a recent lamentable accident caused by the breaking of a paraffin lamp. Faraday had shown a method of holding the breath for a prolonged time by means of successive deep inspirations and expirations, which, if practised, might have proved of saving worth on that sad occasion. The question had often been discussed what effect on Faraday's career would have been produced if he had been subjected to a mathematical training. They must all feel that they would not have wished him to be other than he was. But if the question must be discussed it would have to be admitted that, by such a training, he would have been placed in more thorough *rapport* with his scientific contemporaries. But mathematical training and mathematical capacity were different things, and it did not follow that Faraday had not a mathematical mind. In Professor Clerk Maxwell's opinion Faraday had mathematical powers of a very high order, from which, f he had devoted himself to that science, valuable and fertile methods might by him have been discovered.

At the conclusion of the lecture Sir William Thomon moved a vote of thanks to Lord Rayleigh, and said hat the splendid results of Faraday's labours had contributed in no small degree to the scientific glory of the nineteenth century. Faraday freely gave his discoveries to mankind and left it to others to turn hem to practical account.

The motion was seconded by Sir G. Stokes, and carried unanimously.

The second lecture is to be delivered by Professor Dewar on the 26th inst.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a Council meeting of the Chemists' Assistants' Association, held at 103, Great Russell Street, on the th inst., the following officers were elected for the session 1891–92:—President, Mr. W. Lloyd Williams, A.I.C.; Vice-Presidents, Messrs. Frank A. Rogers and J. C. Umney; Hon. Treasurer, Mr. C. J. Strother; Hon. Secretaries, Messrs. W. A. Morris and J. C. Stead.

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

Annual Excursion.

On Thursday, June 11, thanks to the generosity of Mr. Alderman Cox, a most enjoyable day was spent by about twenty-five members and friends of the Brighton Association of Pharmacy.

Starting shortly after ten, the partly travelled by train to Ford Junction, where on alighting they found Mr. Alderman Cox, who gave them a hearty welcome on board his steam yacht "Sissie." When all were on board the yacht steamed down the river Avon to the sea, then returning up the river, passed the ancient town of Arundel, until a suitable spot for luncheon was found in the Duke of Norfolk's Park. Here the party landed and enjoyed a sumptuous luncheon in picnic fashion.

After luncheon Mr. W. D. Savage, J.P., in a few happy phrases, proposed the "Health of Alderman Cox," complimenting him on his kindness and generosity.

Dr. Ewart added a few words expressive of the appreciation of those who had for four years availed themselves of Mr. Cox's hospitality, and expressed the hope that Alderman Cox would be long spared to give these enjoyable excursions.

In his reply, Alderman Cox said that as long as he could do so his ambition would be to see many old friends and many new friends at these annual meetings.

After a stroll in the park the party rejoined the yacht and steamed down the river to Arundel, where, at the Bridge Inn, Mrs. Cox had prepared an afternoon tea. At half-past six the company again boarded the yacht, which, steaming down the river to Littlehampton, commenced a delightful sea voyage along the coast to Brighton, the latter town being reached about 10 p.m.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

At the June meeting arrangements were made for holding the annual picnic on July 2 at Aboyne. Through the kindness of Sir W. Cunliffe Brooks, Bart., M.P., etc., the company are to be permitted to drive up Glen Tana to the foot of Mount Kean, when after refreshments those so inclined will make an ascent. As usual, members of the craft touring will be welcomed.

At the same meeting hearty votes of thanks were passed to Messrs. F. C. Calvert and Co., for a series of specimens of their products, and to Messrs. Macfarlan and Co. for a series of specimens of the more rare alkaloids of opium.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second botanical excursion of the season took place on the evening of Wednesday, June 10, and was attended by forty members. The company travelled by the 8.30 Caledonian train to Colinton and walked back through Colinton Dell, where some good practical work was done. Last year the excursion took place a fortnight earlier, when it was found that many of the specimens were not sufficiently advanced, and it was expected that by fixing it for a later date this year better specimens would be got. In this, however, the excursionists were disappointed, as vegetation in this neighbourhood is about one month later than usual. Last year, on May 28, the Dell was gay with hawthorn blossom, but this year not a single spray was to be seen, and many oak and ash trees were as bare almost as in mid-winter. Consequently, though many promising specimens were met with, few were sufficiently advanced for collection as herbarium specimens. Among those met with were—*Chærophyllum sylvestre; Myrrhis odorata*; *Sanicula europæa*; *Scilla nutans; Allium ursinum; Ruscus aculeatus*, in flower; *Orchis mascula*, in full flower; *Geum rivale;* and *Geum intermedium*. It is interesting to note that the latter is one of the plants recently investigated by D. J. M. Macfarlane in his research on the relationship between the microscopic structure of hybrids and their parent plants. Many specimens of *Geum urbanum*, not in flower, were seen in the neighbourhood, and the *G. intermedium* is doubtless a hybrid between it and the *G. rivale*, which is also common here. Dr. Macfarlane found that the pollen of *G. intermedium* possessed characters quite intermediate between *G. rivale* and *G. urbanum*; he also found that about 60 per cent. of the pollen of *G. intermedium* is fertile, and therefore there is a probability that it will become a distinct species. Other plants met with were *Barbarea vulgaris*; *Valeriana Pyrenaica; Valeriana officinalis;* *Lychnis dioica*, male and female; *Luzula maxima*; *Mercurialis perennis*, male and female; *Equisetum vulgare; Doronicum Pardalianches; Hypericum perforatum; Cytisus scoparius; Ulex europæus; Caltha palustris; Scrophularia aquatica; Fragaria vexa*; *Acer pseudo-platanus*; and *Symphytum officinale*.

The next excursion is to Duddingston Loch, to assemble at Duddingston Church at 8.45 p.m. on Wednesday, June 24.

Parliamentary and Law Proceedings.

A Seidlitz Powder Case in Glasgow.

In the Glasgow Sheriff Summary Court on Thursday, June 11, before Sheriff Balfour, Messrs. Bayne and Thomson, grocers, 333, Garscube Road, Glasgow, were charged with having, on Wednesday the 29th April last, sold to the City Sanitary Inspector a box containing a dozen seidlitz powders, which, on being analysed, were found not to be of the nature, substance, and quality of seidlitz powders. A plea of guilty was tendered, with the explanation that the powders were bought from a respectable firm of chemists in the city, and that it was thought they would therefore be genuine.

Dr. Clark, city analyst, found that the powders were absolutely destitute of tartarated soda, and had on an average an excess of 170 grains or thereby of bicarbonate of soda, together with 21 grains or thereby of sulphate of soda, and 56 grains or thereby of sugar, which were extraneous to the powders; and the portion of the powders in the white paper was on an average each deficient in tartaric acid to the extent of 16 grains or thereby.

The Sheriff: What would have been the effect of the powders?

Mr. J. Lindsay, writer (who prosecuted): The effect would just be that of an effervescing drink.

The Sheriff: They would have no injurious effect?

Mr. Lindsay: No.

It was also explained that this was the first case of the kind.

The Sheriff after remarking that the defenders had their remedy from the chemists, imposed a fine of 30*s.*

ALLEGED BREACH OF THE PHARMACY ACT.

The *North Cheshire Herald* for June 13, reports that Mr. Richard Swindells, of Market Street, Hyde, chemist, was summoned for selling on April 27, to Edmund Oldham, a person then unknown to him, a certain poison, to wit, strychnine, being a poison named in the first part of Schedule A in the Pharmacy Act, 1868, the said Edmund Oldham not then being introduced to him by some person known to him. Mr. H. Bostock appeared for defendant.

Captain Lingard said defendant was a chemist and druggist in the town, and was charged with selling poison otherwise than by law. He sold it to Mr. Oldham, who had been already charged with laying it down, without Mr. Oldham being properly introduced to him, and that the book was not signed by the introducer.

Mr. Bostock: That is not the charge at all. You had better read the summons or the information; I do not care which.

Captain Lingard having read the summons, he went on to say that Mr. Swindells was not the actual seller. There was another person in the shop at the time—Mr. Ridehough—and that person sold the poison, and signed the book as the introducer. That was not complying with the Act, because Mr. Oldham had stated, and he supposed he would state it again that morning, that he was not aware that he knew him. He asked him the question himself, and he said, "I am not aware that they did know me, further than that I bought my seed there."

Serjeant Bramhall said he visited defendant's shop on May 8. He saw the poison book and the entry of the sale in question. It was signed by F. Ridehough, who was the assistant in the shop at the time. He believed he had since left Mr. Swindells' employ.

Mr. Bostock said the point before the court was, was this man unknown to the seller or not? If he was known then it was not necessary for him to be introduced. They said he was known to them.

Captain Lingard: Then we must put the man himself in the box.

Edward Oldham, who said he resided in Stockport Road, Werneth, said that on April 25 he took some grain—about 2 lbs. weight—to Mr. Swindells' shop. He called for it on the following Monday. He paid for the poison put into it. He was not certain that the person who served him knew him.

Mr. Bostock said the point was, was Oldham unknown or not? The statute said "unknown," and that was what they must confine themselves to. It was for the police to prove that this man was unknown to the seller.

Witness, continuing, said he could not say how often he had been in the shop. He had been in the habit of going in occasionally.

By Mr. Bostock: Occasionally he had gone to the shop for seeds. He could not say what he paid for the poison.

The Clerk: Were you known to Ridehough?

Witness said he did not know.

The Clerk: Is it likely he would know you?

Witness: I cannot say.

Mr. Bostock contended that the prosecution had failed to make out a case against his client. Oldham said he had been going to this shop for some years, and according to the 17th Section of the Pharmacy Act that was quite sufficient. The only question before the court was, was this man unknown to the defendant or not? If he was known, then it was not necessary for him to be introduced by anyone. He handed in his client's book. The Bench would see that the Act had been complied with in every respect. There was the date when the poison was sold, the name and address of the purchaser, the quantity of poison sold, and the purpose for which it was required. It was signed by the purchaser and also by the seller.

Captain Lingard: By the actual seller himself: as the introducer.

Mr. Bostock, continuing, said this was a penal statute, and therefore must be construed strictly. The legislature had made use of the word "unknown." Upon that word he submitted this, that in order for the prosecution to succeed they must satisfy the Bench that defendant had never seen this man before.

Captain Lingard: It stands to reason that that is a moral impossibility.

Mr. Bostock said that if the man had been in the shop once he would not be unknown. An intimate knowledge was not required. All that was necessary was that the seller should be able to identify the purchaser if it became necessary afterwards through his poisoning himself or someone else.

Frank Ridehough said he remembered Mr. Oldham coming to him for the poison. He knew him as coming to the shop for seeds, and in fact he knew him by eyesight outside. He knew him as Mr. Oldham. He would not have sold strychnine to anyone he did not know unless a witness had been brought; but as he knew Mr. Oldham he had no hesitation in selling him the poison.

The Clerk said he did not agree that if a person knew another by eyesight that was sufficient. The object of requiring a witness when poison was purchased was that the purchaser might be traced. They might know a person by sight and still not know where he was to be found. Witness said he knew Oldham by eyesight.

Mr. Bostock said they had the address, so they would know where to trace him.

Captain Lingard said the name and address might have been false.

Mr. Bostock: But he knew him.

The Clerk: It is all right if he knew where he lived.

Witness Ridehough said he knew him as Mr. Oldham of Gee Cross. The seed trade went on from February to April each year, and Mr. Oldham would come to the shop anytime during then.

By Captain Lingard: He was not prepared to swear that he actually knew the man and where he came from. He had seen him frequently in Gee Cross.

The case was dismissed.

Obituary.

Notice has been received of the death of the following:—

On the 2nd of May, Mr. John Maddock [illegible], Chemist and Druggist, Waterloo Road, [illegible]. Aged 62 years.

On the 25th of May, at Lambeth, Mr. Charles Smith, Chemist and Druggist, late of Alford. Aged 36 years.

On the 26th of May, Mr. William Bradley, Chemist and Druggist, Wisbech, Cams. The deceased was last week described erroneously as of Dudley.

On the 9th of June, Mr. William Marcus Cooke, Chemist and Druggist, Wellington, Salop. Aged 51.

On the 9th of June, Mr. William Pattrick, Chemist and Druggist, Measham, Derbyshire. Aged 67 years.

On the 10th of June, Mr. William James Blyth, Chemist and Druggist, Holmeside, Sunderland. Aged 57 years.

On the 10th of June, Mr. Richard Broad, Chemist and Druggist, Bridge Street, Congleton. Aged 74.

On the 11th of June, Mr. Jonas Beaumont, Chemist and Druggist, Halifax. Aged 74 years.

On the 12th of June, Mr. George Jacob Chifney, Chemist and Druggist, High Street, Mildenhall, Suffolk. Aged 58 years.

On the 13th of June, Mr. Alfred Thomas Atkinson, Chemist and Druggist, Much Wenlock, Salop. Aged 61 years.

On the 13th of June, at Chester, Mr. Percival Kossuth Fripp, Chemist and Druggist. Aged 40.

Reviews.

SYNOPSIS DER NEUEN ARZNEIMITTEL, mit kurzen Angaben über deren Darstellung, beziehungsweise Abstammung, Eigenschaften, Wirkung, Anwendung, und Dosirung. Unter Mitwirkung von Dr. M. Kronfeld herausgegeben von Dr. Hans Heger.*

This synopsis of the newer materia medica, compiled by the able editor of the *Pharmaceutische Post*, Dr. H. Heger, with the co-operation of Dr. Kronfeld, will doubtless prove to be of very great assistance to German-speaking pharmacists, and is capable of being a help to others whose acquaintance with that language is of the slightest. It is not issued as a rival to the well known work on the new synthetic remedies, by Dr. B. Fischer, since on the one hand it does not enter into so much detail as to individual substances, while on the other it extends to the vegetable kingdom, and is therefore much more inclusive. In fact it is estimated that within rather more than two hundred pages about three thousand names and synonyms are catalogued, the majority applying to substances that have been introduced into medicine within the last ten or fifteen years. Rather a liberal interpretation is, however, given to the word "Arzneimittel," for while it is made to cover some substances that hardly, if at all, come into use in medicine, it also is stretched to include such articles as "Warner's Safe Cure and Pills." But this rather adds to than lessens the value of the book, for trustworthy information about many substances is given that it would be difficult to find in so compact a form elsewhere. The compiler broaches in the preface a curious *fin de siècle* theory that enrichments of the materia medica have been more numerous in the latter than in the earlier halves of several centuries past.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX FOR 1891.†

The fact that the present represents the ninth annual issue of this valuable work is a sufficient indication of its utility. The amount of labour involved in its production may be inferred from the statement that the volume "contains nearly three thousand references to diseases and remedies."

The editor has a more ambitious aim than others who have attempted to publish a yearly publication of this sort, inasmuch as he attempts to furnish the specialist with the details of the new things in medicine and surgery, as well as to supply references to the general practitioner.

The main object of the work, however, is to set forth the therapeutic side of medicine, and it is in this relation that the book is mainly valuable. The great number of new drugs which each year are advocated for the cure of diseases, from simple ailments to the most malignant tumours, makes it impossible for the busy practitioner to remember them, but in this book he finds them duly chronicled, with their dose and therapeutic action carefully stated on reliable authority.

LECTURES ON DIABETES. By ROBERT SAUNDBY, M.D.*

This volume contains the substance of some previously published lectures and includes, in detail, the interesting and valuable Bradshawe lecture delivered by Dr. Saundby at the Royal College of Physicians, London, in 1890. The long and careful series of observation which Dr. Saundby has made upon this insidious and remarkable disease, render these lectures peculiarly valuable, and they will assuredly be attentively read by all physicians.

The various theories relating to glycosuria are carefully summarized and criticized. The various observations made on the morbid anatomy and histology of the organs in diabetic patients are neatly brought to a focus; the chapter on diabetic coma is the most interesting. The chapter on treatment is short; it has, however, the advantage of being a cautious survey of the various methods recommended for the remedial treatment of the disease, rather than advocating any new or fanciful special mode. The whole book indicates clearly that it is the outcome of years of patient observation at the bedside and in the laboratory of the pathologist as well as in that of the pharmacologist.

A SHORT DICTIONARY OF MEDICAL TERMS.†

This little dictionary is an abridgment of Mayne's 'Vocabulary,' a well known work. It contains very short definitions of the words most commonly found in ordinary text-books of medicine and surgery. It is not likely to be of much service to the student of medicine, but will be found extremely useful to non-medical readers of medical books.

AIDS TO MATERIA MEDICA AND THERAPEUTICS. PART IV. By C. E. ARMAND SEMPLE.†

This is a new edition of a book well known among students working for the examinations in materia medica, in which the section is brought up to date so as to include the additions to the British Pharmacopœia, published in 1890. These additions are neatly arranged in what is called an appendix (though situated at the beginning of the book), and are thirty-seven in number. This is an advantage, as it spares the student the trouble of referring to different pages scattered through the book.

THE POCKET PHARMACOPŒIA. By C. E. ARMAND SEMPLE.†

This book is an abridgment of the British Pharmacopœia of 1885 with the Appendix of 1890, to which is added the therapeutical actions of the drugs and the natural orders and active principles of the vegetable substances contained therein.

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* Vienna: Moritz Perles. 1891. Small 8vo. Pp. 227. 2s.

† Bristol: John Wright and Co.; London: Simpkin, Marshall, and Co., pp. 232.

* Published by J. and A. Churchill.

† London: Baillière, Tindall and Cox.

The book is neatly and clearly printed and, from its size and the style of its binding, is admirably suitable for the pocket, and is thus always at hand when needed.

Sea Sickness. By Thomas Dutton.*

This useful little work is sure to be read by the majority of those who are victims to that distressing condition, sea-sickness. Apart from the admirable instructions it conveys for the benefit of those who are about to take a sea voyage, the work should be most certainly studied by all ship surgeons, as it is full of useful suggestions not found in text-books, either of surgery or medicine.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Assistants in Stores and Drug Companies.

Sir,—In your article "A Retrospect" occurs the following sentence, which I think is unjust to all who may be employed in stores or with drug companies: "The continuance of the practice of taking apprentices without any adequate test of their educational and general fitness for the occupation, the want of suitable provision for apprentices to study the various scientific subjects they require to be familiar with, and the custom of employing unqualified persons as assistants have all contributed to introduce into the body a large number of persons, who failing to pass the examination requisite for legal qualification become material for supplying stores, trading companies, and other irregular competitors of duly registered chemists and druggists with the means of carrying on business to the serious detriment of the latter."

Now, sir, as I have been employed in what is called a "drug stores" nearly five years, and am at present in the employ of a drug company, I perhaps may be allowed to have some idea of the men I have met. At the "drug stores" during the time I was there four young fellows went in for their Minor examination and in every case passed first time. Three of them went up from business, without any college "cram," and the other only had a very short time at the school, having studied very considerably before going there.

Now as to the drug company I am at present engaged with. They employ a great number of qualified men, men who I am proud to be in contact with, because of their business capabilities and knowledge of scientific subjects. I assure you the unqualified men on the premises are very few in number, which should—if it were well known—merit more support from the public than we even now get. Now, sir, in the face of these facts (and I can verify every statement), I think it is unjust, unfair and ungenerous, to say that men who are employed in "stores" and by "companies" are men who cannot pass their examinations. I am not ashamed to own that I am employed by a company, for I consider the companies offer every inducement to young men to accept situations with them. Some of the inducements I will briefly mention. Short hours, no Sunday duty and good salaries. I might mention others, but these are sufficient. In conclusion, I would ask that you should not rail at these men, who are only striving with the great body of registered chemists to earn a decent and honest livelihood.

H. H. Boor.

The Sale of "Weed-Killer."

Sir,—I hope I shall not be considered unnecessarily premature in submitting the following remarks to your notice respecting the case of poisoning recorded in a recent issue of the Journal, namely, that instead of the Society instituting legal proceedings, as suggested by the coroner at the inquest (whose timely advice I nevertheless respect by his referring the case to some legal authority to be inquired into), it would, I think, be more practicable and appear less vindictive on the part of the Society if when appealed to in the matter they first hand over the case to the local police authorities, who are fully invested with legal powers in dealing with such a case of infraction of the Poison Act. Especially in the present case of an unqualified person selling "so dangerous" a preparation as that containing arsenic, etc.

For I need scarcely remind your readers of the fact that in the event of a chemist having sold such an article under similar circumstances he would very soon have had a visit from the police authorities, making "grave" inquiries and insisting upon seeing the "Poison Book," which, if not duly conformed to, would, without little delay as possible, cause a summons to be issued against him for such an omission of duty. The Society should therefore lose no reasonable time in seeing that the proper authorities attend to this case of infraction, failing which, the Society could then legitimately interfere in the matter. By such *modus operandi*, the case would receive greater public notice and regard for the legal rights of chemists.

In the presence of such a "serious" case as the one in question, I venture to ask whether or not it is an additional proof of the "absolute" need of such preparations (including all proprietary articles which contain poison) being sold by qualified chemist only? Not simply for the reason which is too often and "unfairly" imputed to them, viz., for the purpose of monopoly, but more especially in the interest of public safety.

Frederick Ellis.

The Trade and the Society.

Sir,—The suggestion in last week's *Pharmaceutical Journal* is worthy of more than passing attention. Coming as it does after the legal report of several persons being successfully prosecuted for selling poisonous preparations, surely no outsider can say that the Pharmaceutical Society is doing nothing to protect the trade. The pity is that more of these prosecutions have not been instituted, for it is certain that very many identical cases do exist; and not only for the public safety—which is, of course, of the first importance—but in common fairness to those who have struggled so hard to conform with the law in becoming qualified should they be protected from unjust competition.

Until all, or at least a good majority of the trade belong to the Society, can more be done than enforcing the present Act. This has been in force twenty-three years, and I would suggest that strenuous efforts be made in the way proposed and by means of the local and divisional secretaries to secure at least a majority, that the Society may be said to really represent the trade before the twenty-fifth anniversary of the Act which gave it such, till last year unseen, defensive power, and that it may be most rigorously exercised wherever it can, that the trade may see how really anxious the Society is to protect it.

But what right have those outside the Society to complain that their interests are not protected, if they do not subscribe to its funds?

New Quay, Cornwall. C. E. Pickering.

A.P.S.—No. 1 is biborate of soda. No. 2 is not a commercial article. No. 3 appears to be a commercial article, the composition of which could be ascertained by analysis.

D. D.—*Œnanthe fistulosa* and *Œnanthe Phellandrium.*

B. J. Woodcock.—The formula was the subject of a correction after a certain number of copies of the Pharmacopœia had been printed. The quantity of carbonate of ammonium is now "15¼ ounces."

J. Edwards-Evans.—Before presenting himself for the Minor examination, the passing of which entitles to registration as a chemist and druggist, the candidate must have attained the full age of twenty-one years, must have passed the Preliminary examination or its equivalent, and produce a certified declaration that for three years he has been practically engaged in the translation and dispensing of prescriptions. The conditions of the veterinary examination might be obtained from the Secretary of the College of Veterinary Surgeons.

Communications, Letters, etc., have been received from Messrs. Lucas, Long, Farr, Billings, Evans, Pharmaceutical Chemist, D.D.

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* London: Baillière, Tindall and Cox.

"THE MONTH."

Dermatol. Under the name "dermatol," a basic gallate of bismuth is being put forward as a substitute for iodoform. It is described (*Pharm. Zeit.*, June 20, p. 386) as an extremely ine, non-hygroscopic, odourless, saffron yellow powder, stable towards air and light and insoluble n the ordinary solvents. On account of its insolubility its antibacterial action is limited to the part where it comes into direct contact with the pus microbes, resembling in this respect iodoform. In addition to the direct antiseptic action of dermatol it s claimed that dermatol has a desiccating influence, o that the development of the bacteria is inhibited by the drying up of their pabulum. The astringent action of the preparation is also said to influence he process of healing, whilst on the other hand it auses no irritation and is not absorbed. This preparation is further said to be valuable when adminis-ered internally in affections of the stomach and ntestines, and it is stated that, as it is non-poisonous, doses amounting to 2 grams daily are well supported. The question has been raised why the pharmacist should be perplexed with such an unmeaning name as "dermatol" for a salt of bismuth, but the choice of the designation has been probably more influenced by the prospective profit of a manufacturer than considerations of the convenience of pharmacists.

Bismuth Salicylate. Of the different methods of preparing a neutral alicylate of bismuth, that depending upon the double decomposition between a dissolved salt of bismuth and an alkaline salicylate would appear to present the most simple conditions, but in practice it proves efective, consequent upon the splitting up of bismuth salts in water, with the formation of insoluble asic compounds, and the fact that when acid is dded to effect solution it is liable also to liberate alicylic acid from its combination with bismuth. As consequence, an indefinite mixture is formed of salicylate and salicylic acid, to which are added he products of the action of water upon the bismuth salts. To obtain a salicylate of bismuth of egular composition, it is therefore necessary to perate in a chemically neutral liquid, and to avoid he dissociating action of water upon a bismuth lt. In experimenting to accomplish this end, M. Causse (*Compt. Rend.*, May 25, p. 1220) has made the observation that certain ammonium alts, and especially the chloride, are antagonistic o the dissociating action of water upon a salt f bismuth, and can advantageously replace he acid added to maintain the salt in solution. pplying his observation, M. Causse prepares a eutral salicylate of bismuth by dissolving 100 rams of subnitrate of bismuth with the aid of eat in concentrated hydrochloric acid, and after he liquid has stood until clear, adding it to a litre f solution of pure chloride of ammonium saturated t the ordinary temperature. In order now to get d of the free acid more subnitrate may be added owly as long as it is dissolved, or the liquid may e more quickly and completely neutralized by dding ammonia dissolved in saturated solution of loride of ammonium, as long as the precipitate hich is at first formed redissolves. A mixture of 20 grams of salicylate of sodium and 500 grams of turated solution of chloride of ammonium is then dded to the neutral liquid, and in a few seconds a voluminous crystallization of salicylate of bismuth is formed, which, after separation from the mother liquor, is washed to remove traces of chloride of ammonium, drained and dried at the ordinary temperature. Thus prepared, the salicylate of bismuth is described as crystallizing in colourless microscopic prisms, resembling in appearance dehydrated sulphate of quinine. It is insoluble in water, cold water having no perceptible effect upon it, whilst boiling water decomposes it, as also does absolute alcohol. From the result of analysis the compound appears to have the composition of a neutral salicylate of bismuth with four molecules of water of crystallization, represented by the formula $Bi(C_7H_5O_3)_3 \cdot 4H_2O$.

Antinervin. About two years since, under the descriptive name "antinervin," a preparation was introduced into medicine, which was understood to be salicylbromanilide, or bromacetanilide in which the acetyl radicle had been replaced by a salicyl group. Subsequently it was described as a combination of salicylanilide with bromacetanilide. This has led to an examination of the preparation by Dr. Reuter, with a view to determine its exact nature (*Pharm. Zeit.*, June 24, 303). From the results obtained in several analyses of old and new samples, Dr. Reuter has arrived at the conclusion that antinervin is neither salicylbromanilide nor a combination of bromacetanilide with salicylanilide, but a mixture having the average composition of 25 parts each of ammonium bromide and salicylic acid and 50 parts of acetanilide.

Naphthol Antipyrin. Several combinations of antipyrin with compounds of the phenol class have been described recently, and M. Patein has reported the preparation of such combinations with α- and β-naphthol, the former of which is a liquid and the latter crystalline. M. Patein now states (*Journ. Pharm. Chim.*, June 15, p. 585) that the β-naphthol compound can be made by dissolving 150 grams of naphthol in 90° alcohol, and adding to it gradually 190 grams of antipyrin dissolved in the smallest possible quantity of water, stirring continually with a glass rod. After a few minutes a viscous mass is formed, and then upon stirring more vigorously, so as to effect a thorough division, at the end of five or ten minutes the liquid clears and the β-naphthol-antipyrin is deposited in very small but pure crystals that can be collected on a filter. The yield is said to be theoretical and the whole operation requires not more than a quarter of an hour. If the small crystals be dissolved in hot 60° alcohol and the solution be allowed to cool slowly in a flask, fine colourless crystals can be obtained that melt at 82°–83° C., and are soluble in alcohol and in ether, but are decomposed by cold water into naphthol, which separates, and antipyrin, which remains dissolved. In order to prevent this decomposition a mixture of 25 parts by weight of 90° alcohol with 40 parts of water should be used. A nitrogen determination was considered to show that the product is a combination of antipyrin and naphthol, molecule for molecule, without elimination of water.

Manganese tetrachloride. The composition of the dark-brown coloured liquid resulting from the treatment of manganese dioxide with hydrochloric acid has been the subject of several investigations. This liquid evolves chlorine slowly at ordinary temperatures, but at higher temperatures evolution takes place much more rapidly, the solution becomes decolorized and only manganous chloride and hydrochloric acid remain. Upon diluting with a large quantity of water the solution becomes turbid and a mixture of oxides of manganese is precipitated. W. Fisher endeavoured to show that the dark-brown liquid contains manganese tetrachloride, but his experiments only demonstrated the existence of a higher chloride of the form Mn_nCl_{2n+2}. Pickering, on the other hand, argued from the increased precipitation of MnO_2 from the liquid by water when $MnCl_2$ was added, and the different amounts of MnO_2 precipitated at different temperatures, that the tetrachloride was non-existent, but a sesquichloride Mn_2Cl_6 was in the solution. Mr. H. M. Vernon has attacked the question by determining the amount of decomposition taking place in the dioxide solution and the rate of evolution of chlorine from the solution, and from his results concludes (*Phil. Mag.*, June, p. 469) that the only higher chloride formed by solution of any of the oxides of manganese, MnO_2, Mn_2O_3, Mn_3O_4, in hydrochloric acid is manganese tetrachloride, according to the equations:

$$MnO_2 + 4HCl = MnCl_4 + 2H_2O.$$
$$Mn_2O_3 + 6HCl = MnCl_4 + MnCl_2 + 3H_2O.$$
$$Mn_3O_4 + 8HCl = MnCl_4 + 2MnCl_2 + 4H_2O.$$

He also finds that this manganese tetrachloride solution is very stable at —26° C., and that it probably undergoes no decomposition at lower temperatures, whilst he considers that at present there is no evidence to show the existence of any other higher chloride of manganese than the tetrachloride.

Agaricic Acid in Night Sweats.

The white agaric (*Polyporus officinalis*, Fries) has long enjoyed a certain amount of reputation as an antihidriotic, but only about ten years have elapsed since the properties were connected with the action of agaricic acid, which had been separated from the fungus a few years previously. Dr. Hofmeister's results have already been quoted in this Journal (vol. xx., p. 168), and another series of seventeen cases of patients suffering from night sweats have been recently reported upon by Dr. Combemale (*Bul. Gén. Thérap.*, May 30, p. 433). The conclusion drawn from the results is that agaricic acid exercises with certainty a restraining action upon the sweats of pulmonary tuberculosis as well as those that accompany other forms of infection. The dose of two centigrams *pro die* was found sufficient to produce the desired effect, but it is recommended to make certain by commencing with the full dose of four centigrams daily. No serious or inconvenient symptom was observed in any case where the integrity of the intestinal canal was not affected. The antisudoral action commenced two hours after ingestion and lasted for six hours; no indications of accumulation or of the system becoming irresponsive to the remedy were observed to follow repetitions of the dose for several days. Agaricic acid occurs as a white, silky crystalline powder, without odour or taste, and melting at 138° to 139° C. It is soluble in alcohol, but very slightly soluble in ether, acetic acid and cold water. Its irritant action renders it unsuitable for subcutaneous injection, and Dr. Combemale considers the pilular form the most convenient for administration.

Toboshi.

Among the natives of the island of Yezo a fungus that grows upon the *Larix leptolepis* is used as a sacred medicine under the name "toboshi" or "eburiko." The natives highly prize it and use it as a remedy in various forms of disease. It is described as growing from the size of a fist to that of a man's head, and as being somewhat rounded in form, with uneven surface, and either yellowish-white or yellowish-brown in colour. The interior, which is solid and white and much resembles potter's clay, when chewed is at first tasteless, but afterwards becomes bitter. Although at present unidentified, there is little doubt that the fungus is a species of *Polyporus*. In a chemical examination Dr. Inoko has separated from it an organic acid and a resin, but any therapeutic properties the drug possesses is probably referable entirely to the former (*Sei-i-Kwai Med. Journ.*, April 25, p. 657). The acid appears to closely resemble in its characters, if indeed it is not identical with, agaricic acid. Like that acid, it was found to have a remarkable effect in inhibiting the secretion of the sweat glands.

Phytolacca acinosa.

In Japan a decoction prepared from the *Phytolacca acinosa* plant has a reputation as a diuretic and is said to be often used by the common people as a remedy in cases of dropsy. According to Dr. Kashimura (*Sei-i-Kwai Med. Journ.*, April 25, p. 67) the most active constituent appears to be a resin, soluble in alcohol and having a composition represented by the formula $C_{24}H_{38}O_8$. In physiological action the resin is said to agree entirely with picrotoxin and cicutoxin, and it has therefore been named "phytolaccotoxin." Dr. Kashimura reports that he has used an alcoholic extract and a decoction of the plant with good results in nephritis, pleurisy and ascites.

Picrasma eilantoides.

Another drug that has been the subject of chemical investigation in the laboratory of the University of Tokyo is the "nigaki," or "bitter wood," from *Picrasma ailantoides*, Planch. The wood is described (*Mitteilungen*, i., 357) as being yellow and derived from a tree growing to a height of ten metres, the bark in which the bitterness principally resides being relatively very thin, gray, and somewhat shiny. Messrs. Shimojama and Hirano obtained from a decoction of two kilograms of the finely powdered bark 0·24 gram of crystals that melted at 205° C. and otherwise corresponded in their characters with quassiin.

Pseudo-conhydrine.

Conjointly with G. Adam (*Berichte*, xxiv., 1671) Professor Ladenburg gives some further particulars concerning the new alkaloid, pseudo-conhydrine, discovered by E. Merck in *Conium maculatum* (*Pharm. Journ.* [3], xxi., 662). The base is readily soluble in water, alcohol, ether, and benzene, and the salts are also very soluble. The melting-point of pseudo-conhydrine is 100°–102° C., but it sublimes at a lower temperature in fine needles and boils at 229–231° C. The alkaloid is optically active, and like conhydrine, must be a secondary base, since it yields a nitrosamine upon warming its hydrochloride with sodium nitrite. The formation of an iodine derivative by treatment with hydriodic acid, in which an iodine atom replaces an hydroxyl group, also determines that, like conhydrine, it belongs to the class of bodies termed alkines. In all probability conhydrine is piperidylethylalkine, $C_5H_9(CHOH{\cdot}CH_2{\cdot}CH_3)NH$, whilst pseudoconhydrine is the analogous derivative from isopropyl-piperidine.

The Constitution of Cymene.

The unexpected results obtained by O. Widman in his re-investigation of cymene (*Pharm. Journ.*, [3], xxi., 879) were naturally received with some incredulity by many chemists, and Herr Töhl, of Rostock University, where O. Jacobsen had carried out his researches, repeated the experiments with the hope of finding some explanation of the differences in Jacobsen's and Widman's statements (*Berichte*, xxiv., 1649). Since Jacobsen in the synthesis of *p*-propyltoluene employed *p*-bromtoluene and normal propyl iodide, whilst Widman preferred normal propyl bromide, Töhl again prepared the hydrocarbon by both methods. Examination of the sulphonates and sulphamides of the normal and iso-propyl-toluenes furnished evidence of the correctness of Widman's statement that the normal propyl group occurs in cymene, and consequently, as before pointed out, also in carvacrol, carvol, and other derivatives of it.

Saponin.

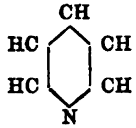
About six years ago Professor Kobert announced that contemporary commercial "saponin" was not a homogeneous compound, but, as a rule, consisted of at least four different bodies, two of which were inert while the other two were very poisonous (*Pharm. Journ.*, [3], xvi., 366). Since that time the investigation has been continued in the Pharmacological Institute at Dorpat, and the sixth part of the 'Arbeiten,' recently issued, contains two exhaustive papers, by Nicolai Kruskal, upon "Some Saponin Substances" and "*Agrostemma Githago*, L." As these papers will probably close the investigation for the present, Professor Kobert has taken the opportunity to summarize the conclusions to be drawn from the results as far as it has gone. In the first place he expresses the opinion that the idea of a saponin as described usually in the text books has no pharmacological foundation, and at most can only have a collective application. But in price lists it should be replaced by "quillaia sapotoxin," "quillaic acid," etc., or if the name "saponin" be retained, the drug from which it has been prepared and the method of preparation should be shortly indicated. In the so-called "saponins" the chemist apparently has to do with different series of bodies, the composition of each series being represented by a general formula. One of these formulæ, now published for the first time, is $C_nH_{2n-8}O_{10}$, and represents a series of which at least three members have been recognized. The best known of these is the "saponin" of Stutz, $C_{19}H_{30}O_{10}$. The lowest member of this series, which gave on analysis figures corresponding to $C_{17}H_{26}O_{10}$, shares this formula with the crystalline "syringin," which Körner identified as oxymethylconiferin hydrate. The amorphous substance of this composition prepared by Kruskal agrees with syringin in being a glucoside and giving a characteristic colour reaction with sulphuric acid, but whether other analogies between the two exist has not yet been determined. But one observation of the greatest interest is that it appears that several substances of this class exist which give the same results on analysis and behave similarly in all their chemical reactions, but which when tested pharmacologically show an enormous difference in the intensity of their toxic action. One of them, the "agrostemma sapotoxin," differs also physiologically from the other saponins in being absorbed by the subcutaneous tissue and by the larger intestines. This is considered to be of great hygienic importance in presence of the fact that in Russia the admixture of a certain proportion of corn cockle seed with corn is allowed upon the plea that when ground it improves the appearance of the flour. Professor Kobert considers that the continuance of this practice should be permitted only on condition of the previous removal as far as possible of the black husk and poisonous embryo.

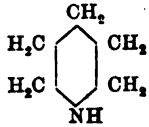
Taste and Chemical Constitution.

The peculiar sweet taste of *o*-benzoyl sulphoneimide $C_6H_4{<}\substack{CO\\SO_2}{>}NH$, commonly called saccharin, is a matter of common knowledge. In a recent paper on the sulphone-imides by Rudolf de Roode (*Am. Chem. Journ.*, xiii., 217), the author describes several derivatives of benzoyl sulphone-imide that affect the nerves in a similar manner. The *p*-fluorsulphone-imide is as sweet as the mother substance, with a slight bitter after-taste; *p*-chlorsulphone-imide possesses a bitter as well as a sweet taste, and in *p*-iodsulphone-imide only the bitter taste is observed. The corresponding bromine derivative has been previously prepared by Remsen and Bayley, and like the chlorine compound possesses a bitter-sweet taste, or rather, according to Howell and Kastle, it produces the sensation of sweetness on the nerves at the tip of the tongue, and a sensation of bitterness on the nerves at the base.

Pyridine and Piperidine.

The relation of chemical constitution to physiological action has been further illustrated by some researches of Herr Heinz upon pyridine, piperidine, quinoline and decahydroquinoline (*Nouv. Rêm.*, June 8, p. 267). It will be remembered that the chemical relation between the first two of these substances is that piperidine is the hexa-hydro derivative of pyridine, as shown in the formulæ—


Pyridine.


Piperidine.

Similarly, decaquinoline is a fully hydrogenized quinoline. Herr Heinz reports that he found pyridine to differ from piperidine in physiological effect only quantitatively, in that it was twice as energetic. Moreover, in poisoning by pyridine stoppage of the heart takes place simultaneously with complete paralysis, whilst in poisoning by piperidine the heart continues to act long after complete paralysis of the animal. On the other hand, piperidine causes more rapid alteration of the blood globules. Pyridine differs from quinoline only in manifesting more distinctly its curarizing action. Decahydroquinoline presents the same relation towards quinoline as piperidine towards pyridine.

Tartaric Acid from Phenol.

Some results obtained by Doebner in the study of the action of permanganate upon acids of the general formula $RCH = CH - CH = CH{\cdot}COOH$ are in accordance with the observations of Kekulé and Anschutz that fumaric and maleic acids yield respectively racemic and inactive tartaric acid upon oxidation with potassium permanganate. Acids of the above constitution, like piperic and sorbic acids, yield an aldehyde and racemic acid, so that there is evidently a strong tendency to oxidize the two terminal carbon atoms of the chain $=CH-CH=CH-CH=$ to carboxylic groups, whilst the intermediate atoms affix hydroxyl groups. This arrangement of carbon atoms obtains, however, in Kekulé's theoretical benzene molecule, and a fresh support for the latter theory is furnished by the fact that Doebner has identified the oxidation products of phenol in alkaline permanganate solution as oxalic and inactive tartaric acids (*Berichte*, xxiv., 1755).

Algarobilla and Myrobalans.

An investigation of the tanning constituents of "algarobilla," the fruit of *Cæsalpinia brevifolia*, Benth., and of myrobalans by G. Zölffel (*Archiv*, ccxxv., 123), shows that both products contain a mixture of a glucoside of gallic acid and ellagotannic acid. The glucoside which occurs to the smaller extent of about 8–10 per cent., yields dextroglucose and gallic acid upon hydrolysis. The non-saccharine tanning material, occurring in a far larger proportion, possesses the formula $C_{14}H_{10}O_{10}$, and is easily split up into ellagic acid and water. Since the molecule of ellagotannic acid contains five hydroxyl groups capable of being replaced by acetyl groups, the author considers its constitution to be represented by the formula—

$$C_6H_2(COOH)(OH)_2 \cdot O \cdot O \cdot OOC_6H_2(OH)_3$$

Essential Oil of Lemons.

A further contribution to our knowledge of the constituents of oil of lemons has been published by V. Oliveri (*Apot. Zeit.*, June 20, p. 341), who has examined three portions obtained by fractional distillation and boiling between 170° and 170·5° C., 176° and 178°, and 240° and 242°. The first was a colourless mobile liquid, sp. gr. 0·8867, with a very pure lemon oil odour, and consisted of limonen $C_{10}H_{16}$, forming the characteristic crystalline tetrabromide, $C_{10}H_{16}Br_4$, melting at 31°, and a dihydrochloride, $C_{10}H_{18}Cl_2$, melting at 50°. The second fraction, amounting to about nine-tenths of the whole distillate, had a sp. gr. of 0·899, and in respect to its formula and molecular weight was identical with limonen, but the rhomboid crystals of the tetrabromide melted first at 102° to 103°. The principal constituent of the third fraction was the sesquiterpene, $C_{15}H_{24}$, which is present in old oils in far larger proportion than in new oils; it has a sp. gr. of 0·9847, and does not form a crystalline tetrabromide or dihydrochloride. The first two fractions are optically active, but the third is inactive. According to the age of the oil the rotatory power of oil of lemon in a column 20 centimetres long varies between + 117 and + 123, and it is suggested that this character might be utilized to detect an adulteration with oil of turpentine.

Precipitation of Colloid Carbohydrates.

Like the albumenoids the colloid carbohydrates can be precipitated from their solutions in certain degrees of concentration by neutral salts. The precipitates are not chemical compounds, but mechanical mixtures; and according to Julius Pohl (*Zeit. für physiol. Chem.*, xiv., 151) may serve for the isolation and purification of the different components of mixtures of carbohydrates. He divides the colloids into four groups, in respect to their behaviour: (A) not precipitated by neutral salts: gum arabic, sodium arabinate; (B) precipitated upon saturation with ammonium sulphate: the mucilages of tragacanth, althæa, linseed and quince; (C) precipitated upon saturation with ammonium sulphate, ammonium phosphate and potassium acetate: mucilage of carrageen; (D) precipitated upon saturation with sulphates of sodium, magnesium and ammonium and ammonium phosphate: soluble starch, lichen starch, dextrin and salep mucilage. By fractional precipitation the author has obtained two carbohydrates from salep mucilage, and shown that the cydonia mucilage is not an ethereal body, but a mixture of a body resembling cellulose with a carbohydrate resembling that of tragacanth, and yielding arabinose upon hydrolysis.

Fermentation of Tobacco.

Bacteriological investigations in Professor Zopf's cryptogamic laboratory have shown that schizomycetes occur in fermented tobacco in large numbers, but that the number of species in very limited. The manufacturer has up to the present regarded the changes undergone in the tobacco during fermentation to be of a purely chemical nature, but recent observations tend to the view that the fermentative processes are due to the activity of schizomycetes. E. Suchsland (*Berichte d. deutsch. bot. Ges.*, ix., p. 79) has therefore undertaken a detailed examination of the subject with a view of a practical application to the improvement of German tobacco. Hitherto the greatest attention has been paid to the manuring of the soil and introduction of the best sorts of tobacco plant. E. Suchsland, however, thinks that the best ferments have not been introduced with the seeds, and that the inferiority of the German tobacco is due to the "wild" fermentation it has undergone. Trial experiments with foreign ferments upon Palatine tobacco leaves have yielded a tobacco that is said to be not recognizable as a home-grown product by the best judges.

Cotton Seed Fodder and Butter.

An investigation undertaken by Professor N. T. Lupton, at the Alabama Experiment Station, to determine the effect of cotton seed and cotton seed meal fodder upon the composition of butter fat, and especially upon the volatile acids, the melting point and the specific gravity of the butter, has yielded some interesting information (*Journ. Am. Chem. Soc.*, April, p. 134). It was found that feeding the cows on cotton seed and cotton seed meal increased in a marked degree the melting point of the butter yielded, the increase in the experiments reaching 8° or 9° C.; at the same time there was a corresponding diminution in the quantity of volatile acids. The specific gravity remained virtually the same and the colour of the butter was unaffected. It was incidentally stated that during the period that the cows were being gradually brought under the influence of the cotton-seed meal, there was a marked falling off in the quantity of milk and a corresponding increase in the amount of butter produced. But when the rations were confined to the cotton seed and meal, without reference to having them balanced as milk rations, the quantities of both milk and butter diminished.

An illustration of the new species *Eperua Jenmani*, Oliv., is given in Hooker's 'Icones Plantarum' (pl. 1955) for April. The scraped root

Eperua Jenmani, Oliv. is used by the natives of British Guiana for the cure of toothache, and the tree is known as the "Ituri-wallaba." It belongs to the natural order *Leguminosæ* and to the tribe *Eucæsalpinieæ*.

Larkspur and Grasshoppers. From the results of some experiments lasting over two years, Mr. Brett, an inspector of stock in Sydney, recommends the cultivation of the giant larkspur (*Delphinium peregrinum*) as a means of extirpating the grasshopper plague in the colony (*Pharm. Journ. Aust.*, April 25, p. 109). Mr. Brett states that the grasshoppers eat the plant in preference to anything else, but that the smallest quantity is fatal to them. To illustrate this he mentions that from around a small bed of the plant, three feet across, he has gathered up in two days two barrels of dead grasshoppers. This property of the larkspur is confirmed by a correspondent in the *Sydney Morning Herald*, who, however, gives the preference to the castor oil plant, the young plants of which, he says, "the locusts will fairly bury up, so thickly will the dead accumulate among them."

Allotropic Silver. A third communication from Mr. Carey Lea respecting allotropic silver appears in the *Philosophical Magazine* (June, p. 497), in which he describes the mode of preparation of several soluble and insoluble forms of blue silver. When dextrine is dissolved in a solution of potassium or sodium hydroxide and silver nitrate added, the silver first thrown down in the form of the well-known brown oxide presently assumes a reddish-chocolate shade and begins to dissolve. In a few minutes the whole has dissolved to a deep red colour, so intense as to appear almost black, but affording a splendid red transparent solution on dilution with water. Examination with the spectroscope leaves no doubt that a true solution is present. As in the first process published silver citrate was reduced by an acid or neutral mixture of sodic citrate and ferrous sulphate, it is evident that silver can be held in solution in neutral, acid or alkaline liquids, and although the form soluble in alkaline liquids is precipitated by dilute nitric or sulphuric acid, a large excess of strong acetic acid fails to throw down all the silver. The precipitate with acids appears almost insoluble, but when the mother liquor has been removed by filtration, the washings run through of a muddy red colour, and the filtrate, if allowed to stand, deposits an insoluble portion and has a fine rose-red colour, although it contains a mere trace of the metal. Disodic phosphate also precipitates all the silver from alkaline solutions in a ruby copper modification, which dries with a bright green metallic surface colour. Washing of this ruby-coloured precipitate converts it, however, into a deep Nile-green modification, that assumes a dark gold or copper colour when dried. These forms of allotropic silver have a great tendency to attach to themselves foreign matters. Although the dry substance has all the appearance of a pure metal, it may contain as much as 8 or 10 per cent. of organic matter, which it is utterly impossible to detach, but which affords evidence of its presence when heated by the formation of vapours with empyreumatic odour that condense into small brownish drops. Other forms of blue allotropic silver are furnished by the reduction of silver nitrate with tannic acid (gallotannic acid) in alkaline solution, carbonates of the alkalies and alkaline earths being employed with advantage. The varieties seem endless, as slight differences in the conditions under which the solutions are formed, or in the mode of precipitation, give products that differ in their behaviour towards reagents. An accidental observation tends, however, to throw some light upon the so-called "intermediate form." Some films spread upon paper had been exposed to the action of a very dilute solution of ferric chloride, and it chanced that one of these films had undergone partial change into the intermediate form; the unchanged portion was darkened by the ferric solution, while the portion that had passed into the intermediate form retained its bright gold yellow colour and lustre and exhibited distinctly crystalline figures, so that the nature of the change is evidently a passage into a crystalline form. In conclusion Mr. Lea refers to the pyrophoric forms of lead, iron, nickel and cobalt, obtained by the reduction of their oxides in closed tubes, and also to the pyrophoric powder left by distillation of amalgams of iron, manganese and chromium. These he considers to be not metals in a fine state of division, but in the atomic form, drawing a broad distinction between chemical and mechanical division. Allotropic silver may present another instance of a metal in the atomic form, but as it has a low affinity for oxygen, it does not show the same inflammability as more oxidizable metals.

Sodium and Sodium Amalgam. In a recent communication (*Berichte*, xxiv., 1658), Herr Max Rosenfeld gives several practical hints concerning the storage of sodium and the preparation of sodium amalgam. He recommends the removal of the unsightly incrustation that accumulates on the surface of the metal when stored under naphtha, and gives it a non-metallic appearance, by immersion in a mixture of 1 part amyl alcohol and 8 parts petroleum. Gentle friction soon restores the silver white metallic glance without loss of the metal, and if then soaked a short time in petroleum containing 5 per cent. amyl alcohol and finally washed with pure petroleum, its fine appearance can be preserved by storage in petroleum containing 0·5 to 1 per cent. amyl alcohol. Only after a very long period a yellowish translucent film of sodium amylate is observed, and this can be easily removed with filter paper. Potassium and lithium also retain their metallic glance for a long time after similar purification and storage. For the preparation of sodium amalgam Rosenfeld employs a crucible with a lid to which a pointed wire reaching to the bottom of the crucible is fixed. The mercury is placed in the crucible and the whole of the sodium to be introduced is fastened in the end of the wire, then dipped in a mixture of 1 part amyl alcohol and 9 parts of petroleum until the surface is bright, and at once plunged into the mercury. In this way the operation is finished rapidly with very little spurting, and the crucible lid prevents the escape of any mercury vapours. The fluid compound of sodium and potassium discovered by William Hallock can be readily prepared by pressing equal parts of the two metals together under petroleum to which 10 per cent. amyl alcohol has been added. The formation of the flesh-coloured sodium monosulphide, from sodium sulphur, which the violent combination of the two elements renders a difficult operation, can be readily shown as a lecture experiment, if the sodium is first rubbed into a fine powder with three times its weight of sodium chloride.

Painting of Majolica Ware.

A patent has been recently taken out in Germany by A. v. Pereira for a new basis for the application of colours to majolica ware. The present method of employing oil colours with siccative, asphalte and similar ingredients is depreciated in value by the subsequent darkening and cracking of the paintings. The improvement consists in rubbing the paints together with glycerine, honey and isinglass dissolved in dilute acetic acid, whereby a lake is formed upon desiccation.

THE BORDERLAND BETWEEN PHYSICS AND CHEMISTRY.*

BY GEORGE F. BARKER.

(*Concluded from page* 1156.)

A like richness of results seems likely to follow the application of the kinetic theory to solutions. Van t'Hoff supposes "a solution contained in a vessel of semi-permeable material, that is to say, material permeable only by water molecules but not by the molecules of the dissolved substance, and that this vessel is immersed in water. Then owing to the attraction of the molecules of the dissolved substance water will enter the vessel, thus causing an increase of pressure, and this will continue until the pressure with the vessel is sufficient to counterbalance the attraction exercised by the molecules of the dissolved substance. Equilibrium being thus established the pressure within the vessel is equal to the osmotic pressure and may be taken as a measure of it." Evidently by providing the vessel with a piston the pressure may be varied so that water may be made to flow out of the vessel or into it, at will. Hence in this way it becomes possible to produce a reversible cycle of changes like that of Carnot, to which the second law of thermodynamics may be applied. Thus by decreasing the pressure water enters, and then by increasing it again water issues; so that the liquid may be brought back to its original state, the sum of the positive and negative work done upon and by it being zero. Now Van t'Hoff has experimentally shown that in isotonic solutions, *i.e.*, solutions for which the osmotic pressure is the same, the pressure is directly proportional to the concentration. But as the concentration is proportional to the density, this is evidently equivalent to the statement that the osmotic pressure of a solution is directly proportional to its density, which is Boyle's law applied to liquids. Moreover, "if we consider the entrance of the water and subsequent increase of pressure to be proportional to the number of molecules which come into contact with the walls of the cell in a given space of time, the argument is similar to that by which Boyle's law is looked upon as due to molecular bombardment" in the case of gases. The same result has been obtained by Duhem by applying the law of the thermodynamic potential to osmotic relations, as a purely theoretical deduction. Again, it has been experimentally shown that the theoretical conclusion deduced by the aid of one of the reversible changes just mentioned, to the effect that the osmotic pressure is proportional to the absolute temperature, is true for a variety of solutions. But this is the law of Gay Lussac applied to such solutions. A third theoretical deduction from the reversible cycle principle is that a gas when in solution has an osmotic pressure equal to the pressure of the same gas when in a free state. But this is simply an extension of the law of Avogadro to solutions; so that we may say "that for equal osmotic pressures and equal temperatures, equal volumes of different solutions contain the same number of molecules;" this number being the same as that which is contained in the same volume of a gas under the same conditions of pressure and temperature. In fact, Van t'Hoff has shown that the osmotic pressures of a 1 per cent. sugar solution at different temperatures agrees with the pressure exerted by hydrogen gas containing the same number of molecules at the same temperature. Further, Duhem has obtained an expression, as a deduction from thermodynamic theory, by means of which when the vapour-pressure of a solution is known, the law of compressibility of water vapour being also known, it becomes possible to calculate the vapour pressure of an isotonic solution. So that assuming the laws of Boyle and Gay Lussac to be applicable to water vapour, it follows that two isotonic solutions at the same temperature have approximately equal vapour pressures. Moreover, Duhem finds that theory proves the law of Van t'Hoff that two isotonic solutions have the same solidifying point at the pressure for which they are isotonic, to be rigorously true. From the simple conclusion, deducible as a corollary from these laws, that solutions in the same solvent which have equal maximum vapour pressures or equal freezing points, must be isotonic, the well known law of Raoult, connecting the molecular reduction of the freezing point and the vapour pressure with the molecular mass, may be readily obtained; provided always that Avogadro's law holds for solutions. The great value of this law of Raoult in fixing the molecular mass, especially of organic non-volatile solids, has been very generally recognized. It may be enunciated thus: A molecule of any compound substance when dissolved in 100 molecules of any liquid upon which it has no action reduces the freezing point of this liquid by a quantity which is very nearly constant and which closely approximates to 0·62. As an example of the method of applying the law, the following experiment may here be cited. A solution of dextrose containing 8·3704 grams in 94·86 grams of water was observed to freeze at —0·94° C. Hence its molecular mass is—

$$\mathrm{M}=\mathrm{T}\frac{\mathrm{P}}{\mathrm{C}}=\mathrm{T}\,\frac{100x}{\mathrm{CF}}=19\,\frac{100\times 8{\cdot}3704}{0{\cdot}94\times 94{\cdot}86}=179$$

In this equation M is the molecular mass, T the molecular depression, C the observed depression, x the grams of the substance, and F the grams of water in 100 grams of the solution. Since this value is practically the same as 180, the value calculated from $C_6H_{12}O_6$, it follows that the formula ordinarily given for dextrose represents correctly its molecular mass. The results obtained by this method for colloids are extraordinary. Thus Sabanéeff finds for the molecular mass of colloidal tungstic acid values from 679 to 995, for molybdic acid 608–631, for glycogen 1545–1625, for silicic acid 800 to 1600, and for egg-albumen 15,000.

A second subject of recent interest lying in the borderland between physics and chemistry, to which I would ask your attention, is that of electrolysis, a phenomenon now regarded as a true electrical convection of atoms; "a procession of positively charged atoms travelling one way and a corresponding procession of negatively charged atoms the other way," as Lodge tells us. The charges thus carried are all precisely the same for atoms of the same valence; and they have therefore a minimum value for monads, twice this value for dyads, three times this for triads, etc. This minimum value is the smallest quantity of electricity that is known to take part in any physical or chemical change, and has been called, therefore, a natural unit of electricity. If we may assume the data given by the kinetic theory, this monad charge may be calculated. Since, according to Lodge, to decompose 1 gram of water $1{\cdot}5\times 10^{13}$ electrostatic positive

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[*] An address delivered on assuming the chair as President of the American Chemical Society for 1891. From the *Journal of the Society*, January.

units must be expended in charging the two hydrogen atoms in each molecule; and since in 1 gram of water there are 10^{25} molecules, the charge upon the hydrogen of each molecule will be $1{\cdot}5 \times 1^{-12}$ electrostatic unit; or nearly 10^{-12} electrostatic unit on each hydrogen atom. This is about the 400 trillionth of a coulomb. Since the potential of a charged sphere is the ratio of its charge to its radius, the potential of the electrified hydrogen atom would be $10^{-12}/10^{-10}$ or 10^{-2} electrostatic unit; about 3 volts. The attraction between two atoms, say of hydrogen and chlorine thus charged, being proportional to Q^2/d^2 is $10^{-24}/10^{-20}$ or 10^{-4}; about one ten thousandth of a dyne only. Owing to its small mass, however, even this force is sufficient to impress upon it an acceleration nearly a trillion times greater than that produced by the attraction of gravity. Helmholtz, in his Faraday lecture, has calculated the attraction exerted by these atomic charges, and finds that the charges on the atoms in 1 milligram of water, if these could be separated and distributed upon two spheres a kilometre distant from each other, would produce a force of attraction equal to the weight of 26,800 kilograms. This electric force, he calculates, is 71,000 billion times greater than the gravitative attraction of the hydrogen and oxygen atoms. "Although, therefore," he says, "the attracting forces exerted by the poles of a little battery able to decompose water, on such electric charges as we can produce with our electric machines, are very moderate, the forces exerted by the same little apparatus on the enormous charges of the atoms in 1 milligram of water may very well compete with the mightiest chemical affinity." "I think," he concludes, "the facts leave no doubt that the very mightiest among the chemical forces are of electric origin."

One of the most noteworthy of the phenomena of electrolysis is the fact that the ions set free by the action of the current appear only at the electrodes; and this, although there is a continuous procession of these electrically charged ions travelling in each direction. The hypothesis of Grotthuss, that a series of decompositions and recompositions occurs along the line of molecules between the electrodes, although suggestive, is defective in that the molecules are assumed to be at rest; and, moreover, it requires the expenditure of some energy within the electrolyte itself: "and no hypothesis which involves a tearing asunder of molecules in the interior of a homogeneous electrolyte can be permitted." As early as 1851, Williamson, in his classic paper on etherification, had suggested the idea that in the collisions between molecules, atomic exchanges were continually effected. In 1857 Clausius applied this hypothesis to electrolysis. In his view "the separation of the ions is due to the active movements of the particles, molecules as well as atoms, which tend to bring about the dissociation of the compound, so that only bodies capable of dissociation can act as electrolytes. For the purpose of electrolysis it is not necessary that this dissociation should proceed as far as the complete separation and isolation of the constituents, but it is sufficient that there should be a frequent exchange of their constituents when two particles collide, so that each constituent can for a very short time move apart from the others before it again finds an opportunity of uniting with another isolated particle. This sporadic occurrence of isolated molecular fractions is not perceptible to our senses, so long as they are uniformly distributed throughout the whole mass of the electrolyte, but it is only perceptible when some external action collects large quantities of one class of particles at one place and of the others at another." This view of continual decomposition and re-formation of molecules has a certain analogy with the theory of exchanges in heat. It "forms the basis of the kinetic theory of chemical changes now universally adopted." "In order to explain electrolysis it is necessary to assume that as each molecule decomposes, one portion of it carries off a definite fixed amount of positive electricity and the other an equivalent quantity of negative electricity. The electricity is either attached to each particle before the separation or else it is produced at the moment of decomposition. Clausius regards the movement of the charged ions in opposite directions as due to the free electricity present upon the electrodes. Here the ions receive from the electrodes an equal quantity of the opposite electricity and so become neutral. Evidently the vast majority of molecules in an electrolyte are quite insusceptible to the influence of the electrodes. It is only the small number of these molecules which are dissociated by collision or otherwise and whose atoms are set free each with its appropriate charge that respond each to the directive tendency of the electrodes. Hence the electrolytic conductivity of a solution depends not only upon the mobility of the molecules within it but also upon the number of such molecules dissociated. Researches by Wiedemann and others upon the relation existing between the internal friction or viscosity of liquids and their electrolytic conductivity have shown the close connection between this conductivity and the mobility of the molecules, and have proved resistance to conductivity to be a constant of the same order as resistance to friction. Moreover, Long has observed that liquid conductivity and diffusion run parallel under similar external conditions; that a substance which diffuses rapidly, is, as a rule, a good conductor. This close connection between speed of diffusion and conducting power is evidence in favour of the view that it is only the movement of the ions and not their separation which is the work of the electricity. When a weak solution is made stronger, the increase of conductivity is due to increased dissociation. When a cold solution is made hotter, the increase is probably due to the diminished viscosity of the liquid.

This movement of the ions, the anion toward the anode and the kation toward the kathode has been called by Hittorf the migration of the ions; and he has shown that the speed of travel of the ions is not the same for them all. Thus for example, if a dilute solution of copper sulphate be electrolysed with copper electrodes, the solution at the kathode becomes weaker, while that at the anode becomes stronger. Evidently the explanation of this result is to be found in the fact that the anion SO_4 travels faster than the kation Cu. This subject has been further investigated by Kohlrausch, who adopts the view that electrolytic conduction is performed by dissociated atoms, each of which carries the same numerical charge of electricity, one set of these atoms being positive and the other negative. The speed of the ionic motion, he agrees with Quincke in believing to be proportional to the slope of potential through the liquid. But he maintains that every ion has a specific speed of its own in a given liquid and when urged by a given slope of potential; this speed being wholly independent of all other conditions. In proof of this position he has shown how to calculate this specific ionic velocity in absolute measure, from data founded on conductivity, concentration and migration. Hydrogen travels faster than any other kind of atom. And therefore since the conductivity of a liquid depends on the sum of the speeds of the two opposite atoms of the dissolved substance, acids are in general better conductors than their salts. The rates at which the following atoms can make their way through nearly pure water, when urged by a slope of potential of one volt per linear centimetre, are given by Kohlrausch as follows, in centimetres per hour: Hydrogen 1·08, potassium 0·205, sodium 0·126, lithium 0·094, silver 0·166, chlorine 0·213, iodine 0·216, and NO_3 0·174

It would be interesting, did time permit, to consider the more recent progress made by spectrum analysis in its relation to chemical questions. The investigations of Auer, of Krüss and Nilson, of Boisbaudran and of Crookes have gone far to unsettle completely our previous conception of elementary matter. In place of atoms having identical masses, the new theory offers us a collection of variable masses, grouped about a definite mean position, representing the atomic mass. By the ordinary operations of chemistry groups only can be distinguished; these operations being far too coarse to discriminate between the variable masses of a group. But the application of more refined processes, especially when long continued and made cumulative, readily effects this differentiation, and resolves matter hitherto considered elementary into sub-groups of substances to which Crookes has given provisionally the name "meta-elements." The oscillations of the mighty electric pendulum which he supposes distributed the primordial matter on alternate sides of a median line as the all-pervading "protyle" or "urstoff" periodically condensed into atomic groups under the influence of the slowly decreasing temperature, is a conception of the genesis of the elements worthy in every way of its distinguished author. "Swinging to and fro to points equidistant from a neutral centre; the divergence from neutrality conferring atomicity (valence) of one, two, three and four degrees as the distance from the centre is one, two, three or four divisions; the approach to or retreat from the neutral line deciding the electronegative or electropositive character of the element, all on the retreating half of the swing being positive and all on the approaching half negative," the oscillations gradually decreasing in amplitude and the masses of the atomic groups continually increasing as the temperature falls, "this oscillating force must be intimately connected with the imponderable matter, essence or source of energy we call electricity." "The pendulum begins its swing from the electro-positive side; lithium next to hydrogen in simplicity of atomic weight is now formed; then glucinum, boron and carbon. Definite quantities of electricity are bestowed on each element at the moment of birth, on these quantities its atomicity (valence) depends, and the types of monatomic, diatomic, triatomic and tetratomic elements are fixed. The electronegative part of the swing now commences; nitrogen appears, and notice how curiously position governs the mean dominant atomicity. Nitrogen occupies the position below boron, a triatomic element, therefore nitrogen is triatomic. But nitrogen also follows carbon, a tetratomic body, and occupies the fifth position, counting from the place of origin. How beautifully these opposing tendencies are harmonized by the endowment of nitrogen with at least a double atomicity, and making its atom capable of acting as tri- and pentatomic. With oxygen (di- and hexatomic) and fluorine (mon- and heptatomic) the same law holds, and one-half an oscillation of the pendulum is completed. Again, passing the neutral line, the electropositive elements sodium (monatomic), magnesium (diatomic), aluminium (triatomic) and silicon (tetratomic) are successively formed, and the first complete oscillation of the pendulum is finished by the birth of the electronegative elements phosphorus, sulphur and chlorine. These three, like the corresponding elements formed on the opposite homeward swing, having each at least a double atomicity depending on position." The significance of this hypothesis, however, lies in the experimental data obtained by Crookes himself, upon which it is based. By fractional precipitation with ammonia, repeated many thousand times, he established the fact that the element called yttrium consists certainly of five and probably of eight constituents; these constituents being characterized by special spectrum bands. A similar research on didymium led Krüss and Nilson to conclude that this element may be split into nine distinct components. Other elements, examined likewise by fractional methods, give signs of breaking down and affording "meta-elements." But here the importance of the spectrum method appears. It is solely by the character of the spectrum, obtained either by emission, by phosphorescence, or by absorption, that these constituents can be satisfactorily distinguished; and the pertinent question at once arises, is the presence of a single spectrum line of definite wave-frequency, characteristic of a meta-element? or, in other words, has the meta-elemental atom only a single rate of vibration, so that in a group of such atoms, constituting what we now term an element, we may reason to the elemental complexity from the number of such meta-elemental spectrum lines?

Such facts as these it is which the chemist of to-day is called upon to correlate with his older knowledge. Do they not indicate most clearly a tendency toward a true statics and dynamics of atoms; toward a condition of exact science which will confer upon chemistry the power of prediction? The future of such a chemistry will be glorious. It will become the grandest of the sciences, and its phenomena will task the highest powers of intellectual activity. It is to the advancement of such a science, fellow members of the American Chemical Society, that we are privileged to devote our energies. May we each contribute something to hasten its progress.

A RAPID METHOD OF ESTIMATING NITRATES IN POTABLE WATERS.*

BY GEORGE HARROW, PH.D., F.I.C.

The usual methods of estimating nitrates in potable waters, the mercury method of Crum, as modified by Frankland and Armstrong, though yielding accurate results, requires a very considerable time for its performance. It frequently happens that an analyst desires to form an opinion as to the purity of a water in a short space of time, and so far as the estimations of ammonia and "albumenoid" ammonia, examination by means of the Forchammer process, and estimation of chlorine are concerned, results are easily and rapidly obtained; it is only the determination of nitrogen as nitrates and nitrites that materially prolongs the analysis, so that a process which would give the nitrogen as nitrates and nitrites as accurately as the mercury process and as rapidly as the determination of ammonia by Nessler's test appears to be wanted.

The method which I have devised for this purpose is founded on Griess' extremely sensitive nitrite test (α-naphthylamine and sulphanilic acid), and depends on the conversion of nitric acid into nitrous acid by means of zinc-dust; that this conversion is a partial one, and that other products, ammonia and hydroxylamine, are formed, does not affect the delicacy of the test or the accuracy of the determination.

The test solution used consists of

α-Naphthylamine	1 gram.
Sulphanilic acid	1 „
Ordinary strong hydrochloric acid .	25 c.c.

dissolved in about 200 c.c. of distilled water, boiled with a small quantity of animal charcoal, filtered, and made up to 500 c.c.

Standard solutions containing

1·0	part N as nitrates per 100,000.
0·1	part N as nitrates per 100,000.
0·01	part N as nitrates per 100,000.

To prepare these solutions, 0·721 gram of pure and dry potassium nitrate is dissolved in 1 litre of water; the resulting solution contains 10·0 parts of N per 100,000, and may be readily diluted to the strength required. If many water analyses are to be made, it is as well to make up a Winchester quart of each of the standards.

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* From the *Journal of the Chemical Society*, June.

A small quantity of zinc-dust is also required, contained in a wide-mouthed bottle, into the cork of which a miniature spatula, constructed of brass or platinum foil, should be fixed.

The process is conducted as follows:—50 c.c. of each water to be tested, and as many as four estimations may readily be conducted at the same time, are placed in beakers (100 c.c. contents) side by side on a sheet of white paper, and with them, in three similar beakers, 50 c.c. of each of the standard nitrate solutions; to each beaker is now added 10 c.c. of the test solution,* and afterwards a very small quantity of zinc-dust (7 to 8 milligrams) by means of the miniature spatula; the quantity added should be approximately the same in each case, and I find that there is no difficulty in effecting this. If nitrates be present in the waters, a more or less intense pink colour will make its appearance, and this colour may be compared with that produced in the three standard nitrate solutions, after the lapse of fifteen minutes; a rough approximation to the truth is obtained in this first experiment.

To get an accurate result, the water must be diluted until the colour produced is very nearly like that given by one of the standards; perhaps the greatest accuracy may be obtained with the most dilute standard, and, if it be used, a hundredfold dilution of the water to be tested is frequently advisable; the necessary dilution is, of course, indicated by the first experiment.

The diluted waters are again tested against standards 0·1 or 0·01, and, after fifteen minutes, the colours carefully compared in Nesslerizing cylinders of equal calibre, which may be conveniently graduated at the side. The standard solution occupying 60 c.c. in one cylinder, the water tested is run into the other until the depth of colour appears to be equal; a reading is then made of the quantity necessary, say 45 c.c. were employed. Then $45 : 60 : : 0·1 : x$ $(=0·133)$, and supposing the water to have been ten times diluted it would contain 1·33 parts nitrogen as nitrates and nitrites.

The advantages of the process are its rapidity, simplicity, and ease of execution, and the small quantity of water required for analysis. Twenty c.c. is sufficient for the purpose, and enables one to make several determinations.

The only precaution necessary, so far as I have observed, is to avoid the addition of large quantities of zinc-dust, which would decolorize the solution.

ASSAY OF FERRIC HYPOPHOSPHITE.†

BY FRANK X. MOERK, PH.G.

In previous papers (*Amer. Journ. Pharm.*, 1889, 326 and 386) on "The examination of officinal hypophosphites," several methods for estimating these salts were described: (1) With potassium permanganate; (2) with mercuric chloride and (3) with sodium hydrate, after oxidation with bromine; 1 and 3 are volumetric methods, while 2 is a gravimetric method. Of these methods the second one was stated to be the more likely one to be used in stores, although requiring much more time than the other methods.

In the examination of ferric hypophosphite it was found at that time that correct results were not obtainable, working under the same conditions as with the other hypophosphites, and for this salt the third method was recommended. The difficulty explained already at that time was due to the oxidation of the hypophosphite (with reduction of the ferric salt) in obtaining the salt in solution.

Recently I have made some further experiments with this method, with the result that I was able to successfully estimate this hypophosphite with mercuric chloride; the details are as follows:—

0·2 finely powdered ferric hypophosphite, 1·0 citric acid and 25 c.c. water, are placed in a beaker and stirred for several minutes until the acid dissolves; then ammonia water is added slowly until the liquid smells strongly of it (this has for its object the decomposition of the ferric hypophosphite, the ferric hydrate entering largely into solution through the agency of the ammonium citrate present); after allowing to stand for ten minutes with frequent stirring to completely decompose the iron salt, 75 c.c. of a cold saturated solution of mercuric chloride are added, and then hydrochloric acid, drop by drop, stirring constantly until an almost colourless solution results and the calomel commences to precipitate (before the addition of the mercuric chloride the solution is of a brownish colour, generally containing a little ferric hydrate suspended; the mercuric chloride solution causes a heavy white precipitate, which by the addition of a few drops of hydrochloric acid dissolves again, forming a brownish or greenish solution; the addition of more acid gradually produces decoloration; as soon as the liquid becomes colourless separation of calomel commences), allow to stand for one-half hour and then place for a further half-hour in a water-bath at 100° C. Collect the precipitate upon a weighed filter, wash with boiling water, dry at 100° C. and weigh. The weight of the calomel multiplied by ·088934 gives the weight of the ferric hopophosphite. With the same sample, after the details were ascertained, the following percentage figures were obtained: 97·56, 97·73 and 97·73.

With this sample similar results were arrived at in the following manner: 0·2 gm. ferric hypophosphite was dissolved in 3–5 c.c. concentrated hydrochloric acid, 50 c.c. water added, and heated in a water-bath for one-half hour; then add 75 c.c. cold saturated solution of mercuric chloride and place in the water bath for a further half-hour, etc., as in the previous description.

$Fe_2(H_2PO_2)_6$ requires for complete oxidation twelve oxygen atoms; one molecule of any ferric salt in its reduction to ferrous salt gives up one oxygen atom:

$$Fe_2(H_2PO_2)_6 + H_2O = 2Fe(H_2PO_2)_2 + 2H_3PO_2 + O.$$

This oxygen, of course, is taken up by the hypophosphorous acid, rendering it necessary to take up only eleven from the mercuric chloride; hence the weight of mercurous chloride obtained in this method must be increased by one-eleventh, so as to express the hypophosphite present.

The results by this method will be high if the ferric salt be not completely reduced to ferrous salt. Working by the above directions the following percentage figures were obtained: 97·45, 97·60 and 97·56.

An estimation of the phosphoric acid yielded by oxidation with bromine (*Amer. Journ. Pharm.*, 1889, 330) and calculating to ferric hypophosphite indicated 97·73 per cent. of the latter in the salt examined.

From these determinations it appears that the alkaline citrate prevents the hypophosphorous acid from exerting any reducing action upon the ferric salt in the time necessary for making the assay; the important point to be observed is to first allow the greater part of the reduction to take place in the cold and then to finish by application of heat. The filtrate should always be tested by heating to the boiling point, to see if the reduction is complete.

In the *Journal of the Society of Chemical Industries*, 1891, 68, is an abstracted article by L. Amat (from *Compt. Rend.*, xci., 676–679) on the estimation of the acids of phosphorus; the methods used are oxidation with potassium permanganate (agreeing with the one proposed by me excepting a slightly lower temperature) and the mercuric chloride method, in which he recommends digestion at 80° C. for 12 hours; this method as described by me gives better results by digesting for one hour, or even less, at 100° C.; a decided saving of time with complete precipitation.

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* If *nitrites* are present the pink colour will, of course, appear without the addition of zinc-dust; Griess' test.

† From the *Amer. Journ. Pharm.*, June.

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THE MEDICAL PRELIMINARY EXAMINATION.

THOUGH the subject of Preliminary examination has long been recognized as one of considerable importance in regard to the scientific education and technical training of pharmaceutical students, it is only within a comparatively recent period that it has received the general attention that it demands. Whenever it has been referred to in discussions there has been a more or less decided admission that the Preliminary examination ought invariably to be passed before a lad is received as an apprentice by a chemist and druggist. Considering the nature of the examination, and that of the business to which it relates, it would be scarcely possible to form a different estimate of the desirability of that course, and it is satisfactory to note that there is among chemists and druggists a very general concurrence of opinion on this point. But it is to be feared that this agreement of opinion does not ensure the requisite uniformity of practice. Some stronger influence is needed for the attainment of that end. Under present conditions it is not absolutely necessary that a lad must have passed the Preliminary examination, before he can be taken as apprentice by a chemist and druggist. So long as that continues to be the case it is scarcely to be expected that the full benefit of a recognition of the principle involved will be realized in practice. The Society is not in a position with its present powers to make the passing of the Preliminary examination an obligatory condition of apprenticeship. When that was attempted some years ago by means of a bye-law which would have had the effect desired, the sanction of the Privy Council was withheld on the ground that the step proposed to be taken was *ultra vires.* At the same time it must be understood that the department is in full sympathy with the Council as to the desirability of making the passing of the Preliminary examination necessary before apprenticeship. The only obstacle is the want of power to establish the system as compulsory. It is from this point of view that the provisions sought for by the Bill now before the House of Commons recommend themselves as likely to prove beneficial. By the division of the qualifying examination into parts, a very considerable advance would be made towards rendering the passing of the Preliminary examination before apprenticeship a matter of necessity. The prospect of effecting that object seems to have been interfered with by the introduction into the Bill of matters which it was supposed would have insured the support of the trade, but which have in reality given rise to opposition. If that be continued, the only course will be to revert to the original project of a purely educational Bill.

Some useful support is now being given to the attempt to provide for a proper placing of the Prelimininary examination of pharmaceutical students by the proceedings of the General Medical Council in regard to the Preliminary examination of medical students. A communication has been addressed to that body from the War Office, calling attention to the fact that among the young medical officers of the Army there is a manifest deficiency in orthography which indicates defective acquaintance with the English language, and a corresponding deficiency in the Preliminary examination of candidates. The Committee of the General Medical Council, to which this communication was referred, has had the subject under consideration and has reported that looking to the terms of the communication from the War Office, it must be regarded as a matter of grave import that there should be ground for such a complaint by a department of the Government. It is admitted that the occurrence of such defects of general education, even when associated with considerable ability in other respects, tends to lower the status of the medical profession, and to lay the Medical Council open to the reproach that it has failed in its duty. Hence it is considered requisite to take steps for insuring the greater efficiency of the Preliminary examination. It is also added that if the Preliminary examination specified by the Council were required to be passed previous to the commencement of medical study, and if it were efficiently carried out in all its parts, defects such as those complained of could not occur. Here the necessity of a sufficiently thorough Preliminary examination, and also the equally important necessity of its being passed before the period of special study is commenced, receive full recognition, and as these conditions are just what the Council of the Pharmaceutical Society is endeavouring to secure the action taken by the Medical Council is an encouragement to persevere in the attempt to bring about this much needed reform.

One of the most important decisions of the Medical Council in regard to the Preliminary examination is that of doing away with the dispensing power under which students have been allowed under various circumstances to pass the

Preliminary examination piecemeal and after being registered. It is considered that the reasons which existed for allowing such latitude have now passed away and that now the only effect of the dispensing power is to encourage those who fail in passing part of the Preliminary examination to enter upon their professional studies notwithstanding, that failure. This is very much the same as the case of pharmaceutical students who enter into the position of apprentices without having passed the Preliminary examination, trusting to the future for being able to do so, as they hope, more conveniently. That hope, however, is a misplaced and delusive one in most instances; and if it were not so, there is the serious objection that the thoughts and attention of pharmaceutical apprentices require to be turned in another direction than that of preparing for the passing of a scholastic examination. From a general consideration of the matter, it is scarcely possible to avoid agreement with the view put forward by the Medical Council, that the soundness of the principle that examination in general education must be passed before professional education is entered is evident. It cannot be regarded as a kindness to the student to allow him to get into the embarrassing position of having to carry on both general and professional education at the same time, and up to the period of entering for his qualifying examination.

We understand that the executors of the late Mr. Henry Bowman Brady have transmitted to the Secretary of the Society a cheque for five hundred pounds, as a bequest to the Benevolent Fund, free of legacy duty.

* * *

We have received a letter from Mr. Holding, the Divisional Secretary for West Islington, in which he states that through the solicitation of himself and his co-divisional secretary for South Islington, a very large number of the chemists in Islington have agreed to close their establishments every Thursday evening at eight o'clock. They hope in the course of a week or ten days, by the assistance of Mr. Howard Hall and Mr. Ralph Hall, to augment the list very considerably by obtaining the concurrence of chemists in East Islington and Kingsland in the scheme of early closing. In speaking of the need of such an arrangement for the preservation of health Mr. Holding states that many of the chemists in the district mentioned are engaged in their shops for fifteen hours or more daily, and that many of them have no assistants. We heartily wish that this movement to reduce the hours of labour may be attended with the success it deserves, and Mr. Holding and his colleagues may be rewarded for their praiseworthy exertions by the establishment of a more rational system than that which has hitherto prevailed.

* * *

A correspondent inquires whether the use of chloroform prepared from methylated spirit, but answering all the tests of the British Pharmacopœia, would be illegal, and whether the sellers of such chloroform would be liable to prosecution by the Board of Inland Revenue. The Spirits Act, 1880, contains a special exception in reference to chloroform and sulphuric ether, permitting either to be prepared from methylated spirit; and the ground for this exemption is that after the completion of the process of manufacture neither chloroform nor ether so prepared will contain any residual spirit. A partially etherized methylated spirit would no doubt be regarded as an article that did not come within the exemption, and it seems probable that the ether drinking in Ireland, of which so much has been heard lately, may have been in reality the use of such a product. It is considered by some that chloroform made from methylated spirit is quite as good as that made from rectified spirit, but that is not the case with ether; and in regard to both these preparations it must be remembered that in addition to considering what is legal in regard to the excise regulations, there is a further question as to what is permissible according to the British Pharmacopœia. Independently of any excise regulation, the Pharmacopœia directs that both chloroform and ether shall be made from rectified spirit.

* * *

The method of purifying chloroform proposed by M. Raoul Pictet, and described in 'The Month' of 30th of May last, is attracting attention with manufacturers. According to a Reuter's telegram from Berlin, which appeared in the *Times* of Thursday, negotiations are in progress in virtue of which Berlin will obtain the monopoly of this method. No information is furnished as to the effects of the chloroform purified by M. Pictet's process as compared with those of chloroform not so treated, but it is obvious that if the dangerous properties of chloroform, and the uncertainty of its action in certain cases can be done away with by the new method of purification, such a result will be of the greatest value.

* * *

The prosecution instituted by the police authorities at Hyde, and reported in last week's Journal, illustrates the difficulties that may arise from diverse interpretations of the regulation that in the supply of certain kinds of poison the purchaser must be known to the seller or introduced by some person known to the seller. So far as can be gathered from the report of the case, the formalities of entry in the poison book were complied with, and the only question raised was whether the purchaser was known to either of the persons concerned in the sale. If he was not known the sale of strychnine would of course have been illegal. But on that point the evidence of the purchaser as to whether he was known or unknown to the seller could be of little value, and as it would appear the case was very properly dismissed. It may, however, serve to show the necessity of caution in order to avoid the inconvenience of having to appear in court in answer to a prosecution.

* * *

One of the advantages of local associations of chemists and druggists is the opportunity they afford for promoting friendly social intercourse, which is calculated to effect an immense amount of good. The Midland Counties Chemists' Association has of late been especially active in this direction, and we have just received from the Honorary Secretary, Mr. Charles Thompson, a list of the fixtures of the cricket and lawn tennis club connected with that Association, which have been arranged for the next three months.

Transactions of the Pharmaceutical Society.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A Meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, June 24, at 1 p.m.

Present, Messrs. Boa, Ewing, Gibson, Gilmour, and Stephenson, Edinburgh; Jack, Arbroath; Maben, Hawick; McAdam, Glasgow; Nesbit, Portobello; Strachan, Aberdeen; Storrar, Kirkcaldy; and Watt, Haddington.

Apologies for absence were received from Messrs. Hardie and Kerr, Dundee; and Kinninmont, Glasgow.

Mr. Gilmour having taken the chair the minutes of last meeting were read and approved.

The Chairman having intimated that the first business was the election of a Chairman,

Mr. Stephenson said he thought they ought in the first place to express their indebtedness to Mr. Gilmour for his services during the two years and a half he had occupied the position of Chairman. They would have been pleased to see him occupy the same position for another year, but he understood such was not Mr. Gilmour's desire. It had been stated last year that it was desirable they should appoint to this office some of the younger men. They were, of course, restricted in their choice by the fact that by general agreement it was considered necessary that the Chairman should be resident in Edinburgh. On thinking over the matter, and on consulting with such of his colleagues as he had had opportunity of meeting, he found there was a general opinion that Mr. Ewing was the most eligible, and they had had an opportunity of judging as to his capacity for the position when he presided at the recent meeting in Edinburgh at the time of the President's visit. It was the general opinion that he discharged the duties of the chair on that important and critical occasion remarkably well. He would, therefore, move that Mr. Ewing be elected Chairman for the ensuing year.

Mr. Boa seconded the motion, which was unanimously agreed to.

Mr. Gilmour said he had great pleasure in vacating the chair to Mr. Ewing, and in doing so he could only say how pleased he was with their expression of thanks. He had still the interests of the Society as much as ever at heart, and he hoped to take as much interest as ever in their proceedings. He could assure his successor that he would have the cordial sympathy and support of his colleagues in all his duties as well as the ready help of the Assistant Secretary.

Mr. Ewing having taken the chair, said this honour came upon him very much as a surprise. He cordially thanked his colleagues for this mark of their confidence. He must confess that his first inclination was to shrink from undertaking such duties, but, on consideration, he felt it was due to them, and to his loyalty to the Pharmaceutical Society, that he should set aside merely personal considerations. He would do his best to fill the office with honour to the Executive and with credit to himself. He could not forget that he was following one who was very highly esteemed and had occupied the position with honour. He was very doubtful as to his own ability to do so with so much acceptance. He knew that he would receive the cordial support of his colleagues, and having had to meet the Assistant Secretary in many business matters, he was able to testify that he was an invaluable servant to the Pharmaceutical Society.

Mr. Storrar, Kirkcaldy, in proposing the Vice-Chairman, said he desired to congratulate the Executive on the appointment which had just been made. By general consent the Chairman was an Edinburgh man, and as a kind of *quid pro quo* it had been customary to appoint one from the country as Vice-Chairman. He had himself been honoured to fill the office for two years, and now he thought there ought to be a change. He therefore moved that Mr. Maben, Hawick, be elected Vice-Chairman. It was expected that the Pharmaceutical Conference would meet in Edinburgh next year, and it was well known that Mr. Maben took an active part in the work of that body. He therefore thought it was appropriate that he should be appointed to this office at this time.

Mr. Strachan, Aberdeen, seconded the motion, which was unanimously agreed to.

Mr. Maben said this proposal took him so much by surprise that he hardly knew what to say. As it seemed to be the evident wish of the Executive, however, he had much pleasure in accepting.

The Chairman, Vice-Chairman, and resident members were appointed a General Purposes Committee, to take charge of any business arising between meetings.

The arrangements for evening meetings were remitted to the General Purposes Committee.

The Executive then proceeded to consider the remit from the General Meeting as to the question of increasing the membership of the Society in Scotland.

Mr. Storrar said this was a matter of very great importance. Their failure to obtain legislation was largely due to the fact that so many registered chemists were outside the Society. It did not follow that the legislation proposed by the Society was the right thing, but if they were to have any legislation at all the Society must represent the whole trade. Their great object ought to be to get the whole trade included in the Society. He was not quite clear as to what would be the best way to accomplish this, whether by publishing a circular or making a recommendation to Local Secretaries. Perhaps the best plan would be to refer the matter to the General Purposes Committee and ask for a report to be brought up at next meeting of the Executive.

Mr. Stephenson said he had no objection to remitting the subject, but it would be better that the Executive should discuss it freely first.

Mr. Maben, Hawick: When will the new bye-laws come into operation, or are they likely to be passed?

Mr. Storrar: They will come into operation as soon as they receive the sanction of the Privy Council. Of course it is not possible to be sure that they will be approved.

Mr. Maben said this was of considerable importance, because, according to the new bye-laws, those whose subscription had lapsed were to be restored on payment of a nominal fine of one shilling. At present these parties could not be induced to rejoin, because they had to pay a fine of half-a-year's subscription.

Mr. Jack, Arbroath, said he thought a special appeal should be addressed to those outside the Society. During several years, when he was apart from the Society, he had never been appealed to, and the Local Secretary had never called upon him for a subscription. A written or printed appeal or a personal call would go a long way to induce registered chemists to join.

Mr. Storrar said a question for consideration was whether a personal call or a printed circular would be the most effectual plan.

Mr. Nesbit said he thought they should send a printed circular to every registed chemist in Scotland who was not connected with the Society. He thought that would be the better way.

Mr. Strachan, Aberdeen, said it was easy enough to make a personal call in a large town, but they could not expect Local Secretaries to make such calls throughout a whole county within a radius of 20 or 30 miles.

Mr. Gibson said it would perhaps be best to have one gentleman who would go from town to town all over the country. It would not take very long to do it once a year.

Mr. Boa said it would perhaps be necessary to defer any plan until they learned the decision of the Privy Council as to the Bye-laws.

Mr. Nesbit said Mr. Strachan had raised an important question with regard to Local Secretaries. They could not expect the Secretary in Edinburgh, for instance, to go to all the towns in the district around, and he thought they ought to divide the counties into districts, and appoint a much larger number of Local Secretaries, so that all these places might be thoroughly overtaken. He did not think they should limit themselves to places where there were three members of the Society. If there was only one man connected with the Society he might be appointed, and then he would try to induce others to join.

Mr. Strachan said at one time they had in London a paid collector. He did not know why that plan had been given up, but he thought it was a method which, though it would cost a good deal of money, would pay very well.

Mr. Maben said in a limited area like London such a plan might pay, but where the chemists were scattered over a wide area, as in Scotland, he did not think it would work satisfactorily.

Mr. Watt said he did not recollect the precise reason why the method of having a paid collector in London was given up. They had now adopted as a much better plan the system of honorary divisional secretaries.

Mr. Stephenson said his recollection was that there were serious objections to having a paid collector; it did not work satisfactorily and was therefore abandoned.

Mr. Storrar said what they wanted was not so much a collector of subscriptions as some one to canvas for new members.

Mr. McAdam, Glasgow, in reply to the Chairman, said that in Glasgow they were rather cold on the subject of the Pharmaceutical Society.

Mr. Stephenson said they were not only cold, but a considerable number appeared to be positively hostile.

On the motion of Mr. Maben, Vice-Chairman, the following resolution was then unanimously agreed to:

"That it be remitted to the General Purposes Committee, with the addition of Messrs. Kinninmont, Storrar and Watt, to consider the question of increasing the membership of the Society in Scotland, and report to the next meeting of Executive."

The Assistant Secretary reported that he had received a letter from the Secretary of the Edinburgh Chemists' Assistants' and Apprentices' Association, expressing the thanks of the Association to the Executive for the privilege of holding their meetings in the Board Room during last session.

The meeting then closed.

Proceedings of Societies in London.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

Elimination and its Uses in Preventing and Curing Disease.*

BY T. LAUDER BRUNTON, M.D., ETC.

It seems to me that one of the most marvellous definitions ever given is that of dirt as "matter in the wrong place." The matter need not be in itself objectionable. It may be, on the contrary, exceedingly valuable and useful, provided it be in its proper place and fulfilling its proper function, and yet it becomes dirt at once when put in the wrong place. The pipeclay which is used to keep the soldier's belt clean becomes dirt when it gets upon his uniform, and the blacking which lends lustre to our boots and is used to keep them clean, as it is termed, at once assumes the character of dirt, and exceedingly objectionable dirt, if we put up those boots on a chintz-covered sofa, leaving a black smudge on the fair surface of the fabric.

The utility of things which most people would agree to call dirt, is shown by the care employed in sifting cinders, and in separating rags and bones from the contents of our dustbins. But the dust contained in these bins is a most unmitigated nuisance to the unfortunate householder who cannot get it removed.

The dustbins are the receptacles for the solid refuse of our houses—the dust, the ashes, the cinders, the odds and ends of dry material—which, accumulating in our rooms, would render them dirty and disagreeable; but the drain-pipes are the channel by which the soluble and liquid refuse of our houses is carried away, and any interference with them is still more serious than the non-removal of our dust.

But in large towns the whole refuse of a house does not at once find its way into the dust-bin or the sink. The worn-out furniture, the cast-off clothes and disused utensils which are lumber and rubbish in the houses of the rich, find their way as useful articles into those of the poor, and after a further period of service, descend still lower in the scale of society, passing perhaps through many grades before they are thrown away as absolutely worthless. Even after their fragments have found their way into the dust heap they are again picked up by scavengers, conveyed to mills or factories and, after being there transformed into a different shape, are again employed for other purposes.

Now there is a wondrous unity in life and living beings, and the same process which we find going on in towns and villages occurs also in the living beings which compose their population. Nay more, it exists in the tissues and cells of which these living bodies are composed, and even in the unicellular organisms which constitute the simplest forms of life on the surface of this globe. These unicellular organisms are now attracting much attention, for they are the earth's scavengers who tear up the old clothes, crush up the old bones and burn off the ashes of the world which would otherwise accumulate and render life impossible. But these lowly organisms are not content with breaking up dead matter; they magnify their office and, by attacking living beings, they produce diseases which may lead to the death, dissolution, and ultimately to the complete disappearance of the man or beast they attack. Such unicellular organisms, as a rule, have no difficulty in getting rid of the products of waste which are formed by them as well as by the higher animals. As a rule they live and grow in some fluid, and their own movement through the fluid brings them into contact with fresh layers of it from which they obtain new nutriment and which also washes away their refuse. Should this refuse accumulate to too great an extent, as it does when the fluid is too crowded by the presence of an enormous number of microbes, the refuse products will kill these microbes, just as the unfortunate persons confined in the Black Hole of Calcutta were suffocated by the products of their own respiration.

But just as the broken victuals and old clothes of the rich, regarded by them as simple rubbish, can be utilised by their poorer neighbours, so the fluid in which one class of microbes can no longer grow forms a most suitable soil for others. Thus the liquid in which yeast can no longer grow forms a most suitable soil for the acetic bacillus, and when this in turn has ceased to grow, its place is taken by putrefactive bacilli, and these in their turn are succeeded by moulds.

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* Abstract from the Cavendish lecture delivered before the West London Medico-Chirurgical Society. From the *British Medical Journal*, June 20.

When unicellular organisms become agglomerated together, as in sponges, the difficulty which each organism has in getting rid of its waste material, and in obtaining new nutriment is increased, and those cells which are unfavourably placed would probably die very quickly, either from lack of nutriment or from suffocation by their own waste, were it not that this untoward issue is provided against by a peculiar arrangement. Some of the cells become furnished with cilia, which keep up a constant current of water through the interstices of the sponge, and thus bring the fixed cells into a similarly favourable condition as their free swimming congeners, with this difference: that, in the case of the free swimming cell, it moves through the fluid in which it lives, while in the case of the fixed cell the fluid flows over it.

This latter arrangement is the one which exists in most of the cells of the higher organisms such as man. Although some cells, like the leucocytes of the blood, swim freely through the fluid which nourishes them, all the fixed cells of which the tissues are formed are nourished by the lymph which flows around them or between them. A constant current is kept up in this lymph by the mere pressure due to exudation from the capillaries on the one hand, and to absorption by the veins and lymphatics on the other, aided by pressure on the tissues caused by movements. Only in one place, the central canal of the spinal cord, where the delicacy of the tissues requires a constant flow of nutrient fluid, and yet demands an absence of pressure which might injure the nervous structures, is the current of lymph kept up by ciliary motion, as it is in sponges.

But the fluid medium or lymph very quickly becomes altered by the living cells, which drain it of its oxygen and pour into it their waste products, and in the course of a few minutes it would become quite unable to support their life, were it not gaining supplies from without of oxygen and nutriment, and eliminating or destroying the waste products poured into it. I say destroying, because when the lymph passes into the blood the waste products appear, to a certain extent, at least, to undergo oxidation, just as the sewage of villages high up the Thames becomes oxidized or destroyed before it reaches the mouth of the river or the open sea. But various conditions may tend to interfere more or less with the discharge of the sewage from the cells, as well as with their supply of nutriment and oxygen, and it is with this discharge of sewage or elimination of waste products from the cells which compose our tissues into the blood and its excretion from the body as a whole that we have particularly to do to-day.

It is not merely the elimination of the natural waste products of our tissues that we have to consider, but the elimination of waste products formed within our bodies by disease germs which have entered them. These disease germs, consisting as they do chiefly of bacilli or micrococci, resemble the cells of our bodies in the fact that they also may be destroyed by their own waste products, but when they enter our bodies the substances they produce—harmful though they might be, if in excess, to the bacilli themselves—are usually still more harmful to the cells of the tissues, and so weaken them as to give the microbes a better chance of success in the struggle between them and the organism into which they have entered. Though opinions may differ as to the exact mode in which the organism destroys intruding microbes, or intruding microbes destroy the organism, there is no doubt about the fact that a struggle does exist between them, and the recent experiments which have been made on such a large scale with Koch's tuberculin have shown that this fluid, although sometimes useful and productive of benefit to patients, not infrequently has an opposite action, and appears to assist the development and growth of the tubercle bacilli already present in the lungs or elsewhere. The apparently contradictory results obtained by the use of tuberculin seem to be explained by the observations of Brieger and Fraenkel in regard to diphtheria. These observers have discovered that the diphtheritic bacilli produce two substances, one of which is toxic to an animal, and the other of which is protective. These substances differ in their power of resisting heat, the toxic substance being destroyed at a temperature of 55° C. to 60° C., while the protective resists a temperature not much below the boiling point. These substances appear closely allied, and it is just possible that one may be transformable into the other. What their relationship to one another is we do not at present know, but if we look at the vegetable kingdom, we find that in numerous instances poisons closely allied chemically to one another are present in the same plant, but have an antagonistic action to one another. Thus in calabar bean we have physostigmine and calabarin, of which the latter stimulates and the former depresses the spinal cord; and jaborandi contains two alkaloids, pilocarpine and jaborine, having entirely different actions, and, indeed, jaborine antagonises the action of pilocarpine. Many alkaloids contained in the same plant seem to have a simple relation to one another; either the one contains the elements of water more or less than the other, or an atom of hydrogen in the one is replaced by a molecule of methyl in the other. Whether some such simple relationship as this exists also in the products of bacteria we do not yet know, but there is little doubt that further researches will soon throw much light on the chemical nature of bacterial poisons. One noticeable point in regard to the resistance of animals to such poisons is that an abundance of glycogen in the liver increases its power to destroy the action of such poisons as pass through it. This power diminishes as the glycogen disappears, and what is true for the liver is probably true for other parts of the body. At any rate, we know that when animals are starved the glycogen disappears both from the liver and the tissues, and starvation greatly increases the liability of an animal to succumb to infection. But putting aside the question of neutralization of bacterial poisons by the lymph or tissues, it is evident that if the toxic products of any bacillus can be washed out of the organism, that organism will have a better chance, and experience confirms the theoretical view that free elimination, both by the kidneys and the bowels, is useful treatment in infective diseases.

Turning again to the normal products of tissue change, we note that probably the most important parts of a cell are its nitrogenous components or proteids. The chief products of nitrogenous waste are urea and uric acid, and the relative quantity of each varies in different classes of animals. The urea forms the chief product of waste in the amphibia, but in the reptilia and in birds the waste appears almost entirely in the form of uric acid combined with bases. In man we have a mixed condition, as the waste occurs partly in the form of urea and partly in the form of uric acid, the proportion of acid to that of urea being about 1 to 33. It is usually supposed that there is a greater tendency in some persons to the formation of uric acid than in others, and that this tendency is associated with a gouty or rheumatic diathesis. In a number of exceedingly interesting and valuable papers Dr. Haig has shown that the excretion of uric acid is greatly influenced by the comparative alkalinity or acidity[*] of the blood, and that the amount of acidity may be made to vary within very considerable limits by the kind of food, by the process of digestion, and by the use of various drugs.

There are certain parts of the body more especially in which the uric acid, wherever it may be generated, has a tendency to get stored up, and this is especially the case in the spleen and the joints, which may be compared to dustbins. Whenever the blood becomes more strongly alkaline than usual it tends, like an active housemaid, to sweep up the uric acid dust out of these bins, with the result of causing great discomfort to the organism generally, for the uric acid, thus sent on its travels, attacks the nerve centres and the vessels, producing headache and depression of spirits, so that gouty people will frequently object to the use of alkalies because, as they say, they are very lowering. Acids, on the contrary, prevent the blood from taking up the uric acid, and lead to its being concentrated in the dustbins already referred to, so that acids relieve the depression, remove the headache, but, at the same time, tend to cause pain in the joints and accumulation of uric acid in the spleen. Here it lies without producing any inconvenience for the time, but it may possibly be stored up to such an extent as to cause great discomfort or even danger when this large dustbin comes to be cleared out.

The alkaline constituents in the blood are the natural solvents of uric acid, and anything that increases their proportion in the blood renders the uric acid more soluble, so that it is more readily removed from its place of storage and brought into the general circulation, where it produces manifold discomforts. Thus it is that alkaline remedies in gouty patients are so apt to give rise at once to the complaint of their being lowering, not because they have a depressant action of their own, but because they withdraw the uric acid from its lurking place, and allow it to act upon the nervous system.

The alkalinity of the blood is increased when the materials of gastric juice are withdrawn from it during digestion, and at this time not only is the urine frequently neutral or alkaline, but the gouty man may suffer from the discomfort due to the circulating uric acid, and fall asleep over his paper after breakfast, or feel stupid and drowsy after lunch.

On the other hand, anything that diminishes the alkalinity of the blood—such as acids or wines, and condiments containing acid, nux vomica, opium, and iron—tends to drive the uric acid out of the blood into its storehouses, and so produces a feeling of well-being, which may, however, be only temporary and illusory, as the uric acid is not eliminated from the body but only stored away within it, and when the blood becomes alkaline after another meal or after a dose of soda, all the uncomfortable feelings produced by uric acid may again torment the patient.

Again returning to our illustration. If the contents of our dustbin were carried through our passages, they would be flying about and great discomfort would ensue; but if we took care to wet each bucketful with a deodorizing solution there would be neither flying dust nor disagreeable smell, and the clearing out would be done with a minimum of trouble. In the gouty man's body salicylic acid seems to have a similar effect to wetting the dust; it accelerates the elimination of uric acid while preventing its disagreeable action.

It is hard to say at present what the natural solvent of uric acid is in the body, for it is quite clear that people generally have not got salicylic acid regularly circulating in their blood. Sir William Roberts considers that the pigmentary substances which one finds in the urine probably have a solvent action, and it has occurred to me that possibly a pyrocatechin, which is almost constantly present in the urine, and is nearly related chemically to salicylic acid, may be one of the natural solvents.

Besides the salicylate of soda, we find that gouty people are accustomed to trust to baths and watering places of all sorts for relief, and no doubt a visit to Homburg, Aix-les-Bains, Carlsbad, Marienbad, Brides-les-Bains, Baden-Baden, Wiesbaden, Harrogate, Bath, or Strathpeffer will all greatly improve the health and often protect patients from gouty symptoms for many months, or even years, afterwards.

In visiting all these watering-places one is struck by the diversity of the constituents of all those world-famed springs and the constancy of one ingredient, namely, water. In watching the patients one sees that people who at home never touch a drop of water pure and simple from year's end to year's end, taking it only in the form of wine, beer, tea or coffee, will, at at a spring, drink tumbler after tumbler of water containing common salt with minute traces of other things—as at Wiesbaden or Baden-Baden—or the same constituent with rather more lime-salts at Homburg, sulphate of soda and carbonate of soda at Carlsbad or Marienbad, or sulphuretted hydrogen—as in Aix-les-Bains, Harrogate, or Strathpeffer. I do not mean to say that the saline or gaseous ingredients of these springs are without effect upon the organism —far from it—but at the same time I feel quite convinced that very many people would never require to go to watering-places if they would drink more water at home.

Water is the most universal solvent in the world. It is not only useful to wash out our closets and flush our drains, it has a similar effect in our bodies and tends to wash away the waste products from the cells of which our organs are composed, to clear out the uric acid, urea and phosphates through our kidneys, and thus prevent renal and vesical calculi, and also to wash out our liver and prevent gall stones, while it helps to keep the bowels in action. The liver, especially, is an organ which suffers much from want of water, and I never see a gall stone without asking the patient, "How much water do you drink?" Almost invariably the answer is "I hardly ever touch water. I am not a thirsty person," and on one occasion a lady called for a particular teacup, which held little more than a thimbleful, in order to show me how much she drank. On reckoning how much water she took in the 24 hours it came, as nearly as I could calculate, to 16 fluid ounces. What wonder, then, that she had a gall stone. The poor liver had not a chance to make decently fluid bile, and naturally there was a deposit. By making such people drink a big tumbler of water, and especially hot water every morning with or without some Carlsbad salts added to it, and, if necessary, repeating the hot water once or twice more in the day, the renewed formation of gall stones may frequently be averted, and symptoms of biliary colic, to say nothing of so-called biliousness, may be prevented for many years or perhaps entirely. But some patients will not do this at home, and if you were to tell a fashionable lady to get up at 6 o'clock in the morning and walk round Grosvenor Square with a tumbler of hot water in her hand, taking a sip at it every three steps, to go on doing this for an hour together, then to buy at a confectioner's a penny roll and eat this without butter for her breakfast, with a small cup of coffee and nothing more, she would probably laugh in your face or apply to some one else for advice. But all this and more you secure by simply advising her to go to Carlsbad. There she finds everybody else doing the same thing, and instead of marching round and round all by herself, or accompanied only by little boys, who might point the finger of scorn at her, she finds herself in the company of all the fashionable visitors to the bath, and marches to the music of a brass band. The company of others enables her to carry through the tiresome process and to comply with the troublesome restrictions, while the benefit she is sure to derive from it probably makes her feel so strong and happy that she swears by the place ever after, and returns to it again and again. For people who can afford it a visit to such places supplies the best means of cure, but for those who cannot an excellent substitute may be found in the daily consumption of hot water, if they will only have patience and perseverance in its use.

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[*] The blood is never acid, but diminished alkalinity may, for the sake of convenience, be spoken of as comparative acidity.

There are several other methods of cure which I believe owe their virtues to the fact that they produce pretty complete elimination of waste products by causing the patient unconsciously to imbibe a large quantity of water. These methods are the grape cure, the whey cure and the milk cure. For the grape cure the patient resorts to some warm, sunny place, where the grapes grow well, and there eats many pounds in the course of the day, while other articles of diet are correspondingly diminished. The ripe grapes contain an enormous proportion of water and very little solid matter, so that the grape cure really comes to be a combination of water drinking and semi-starvation, greatly resembling the Carlsbad cure, to which an additional likeness is given by the laxative effects of the alkaline tartrates contained in the grape juice. The whey cure is very much the same, with the exception that, instead of eating grapes, people drink whey, and that the climate where the cure is carried out is usually a high and bracing sub-alpine one, instead of being soft and sunny. The milk cure is one frequently used in this country with great advantage, more especially in cases of typhoid fever, in chronic diarrhœa occurring in persons who have come from tropical climates, in glycosuria, albuminuria and some cases of heart disease. Its advantage in typhoid fever is so universally acknowledged that one needly hardly say anything about it, but I think it is possible that its efficacy may not be due merely, as is usually supposed, to the milk supplying a bland and non-irritating diet, but may possibly be due also to the waste products of the organism being washed out by the large amount of water which is either contained in the milk itself or added in the form of lime water or soda water to it.

But we must turn now to another channel of elimination, namely, the bowels; and this channel is little, if at all, less important than the kidneys; and, indeed, in the popular mind, it is more important. There is a great deal of truth in the two rules of long life: "Keep your mind easy and your bowels open," and, indeed, easiness of mind depends very much upon the state of the bowels. There is hardly a room in the house but will become dirtier if you cannot get your dustbin emptied, and there is hardly an organ in the body that does not suffer if the bowels become constipated. Not only the brain, but the heart, liver, lungs, stomarch, and kidneys have their functions impaired when the bowels cease to do their duty.

Like all good plans, that of purgation has been carried to great excesses, and its use has frequently degenerated into its abuse, so much that it has fallen into neglect, and been replaced by the feeding-up system. This, too, is good in its way; but we must always remember that if we want a fire to burn brightly we must not only pile on the coals but also ply the poker to remove the ash. Neither the coals nor the poker alone will do—we must combine them; and neither the feeding-up system nor the purging system alone will do, but we must combine them in such measure as is necessary for the welfare of our patients. Now, Nature has herself provided a certain regulating mechanism to attain this end; for, as my friend Dr. Cash has shown, each time that food enters the stomach the bowels receive a certain impetus which is sufficient in healthy people to carry the refuse out and produce an evacuation once a day, the final impetus being usually given by the breakfast, which is sometimes followed by a cigar. In some people, however, the stimulus given by the food is not sufficient, and in these people it may be necessary to give a laxative daily. It is no doubt better to do without this, if possible, and by strict attention to regularity and soliciting Nature at a regular hour every day, whether there be any desire to defæcate or not, the bowels may at length become quite regular.

Exercise in many cases is an adjunct, and the mechanical compression which the intestines undergo from the action of the abdominal walls stimulates them to increased contraction. More especially is this the case if the exercise be of the nature of climbing or riding, for in both of these the abdominal muscles contract with considerable power, while in an ordinary constitutional walk along the level road the bowels receive hardly any compression whatever. Where exercise cannot be obtained, abdominal massage, either by rubbing with the hand or by rolling a cannon ball, covered with chamois leather, over the abdomen, may be useful. A draught of cold or hot water in the morning, or before going to bed at night, by supplying moisture to the contents of the intestines, may have the desired effect. The hard, indigestible residue of food supplies a healthy mechanical stimulus to the bowels, and I think that in our efforts to save the stomach we sometimes disregard this need of the bowels, and give food which is too soft, too mucilaginous, and too unirritating. Stewed prunes, or stewed pears, by the indigestible cellulose which is present in them in the form of skins and gritty grains, figs either raw or stewed, raspberry or strawberry jam by the indigestible seeds which they contain, and marmalade by its orange peel, as well as brown or bran bread by its indigestible husks, all supply a mechanical stimulus to the bowels. But even these sometimes fail, or we find that the stomach objects to them, although the bowels may need them, and we must have recourse to the so-called aperients. Frequently when I prescribe a dinner pill, patients say to me: "But, doctor, it is not natural that I should take medicine every day." I say to that: "Quite true. Nor is it natural that you should keep a cook; and if your cook removes from your food everything that is stimulating to the intestines, you must take something to replace what your cook has taken away. If you will go back to the manners and customs of the ancient Britons, live in the green wood and eat acorns and pignuts, you will not want any dinner pills."

Now the dinner pill supplies a very useful stimulus, and I know a man who has taken one every day of his life for forty years, apparently with great benefit to himself. But there are some people who do not seem to thrive on dinner pills, and they either do not get any action at all, or they get too much. In such cases, instead of giving the intestines one great push once a day by the dinner pill, one may give them a series of gentle jogs by adding to each meal a minute quantity of a purgative; and I find one-tenth of a grain of aloin, given with each meal, sometimes succeeds when other measures fail, and even these small doses appear sometimes to be too much.

Now our bodies are like houses in more than one respect, and it is usually found that although each house may be dusted out once a day, there is a regular cleaning up with extra sweeping once a week; and, in addition to this, there is the spring and autumn cleaning of the whole house. Dinner pills and stimulating diet are like the ordinary daily dusting, and while they may answer for some persons, others find that in addition they require a weekly clear out, and if this be not given to them by means of a cholagogue purgative, they have a regular sweep out about once a month by getting a violent migraine with bilious vomiting, and generally they are obliged to fast for at least one day during the continuance of the headache. Besides this, our forefathers used to have a regular clearing out in the spring and autumn, not from the bowels but from the blood vessels directly, and they were accustomed, as they said, "to be let blood" in the spring and autumn.

The effect of a cholagogue purgative such as a mild mercurial, as for example, a small dose of calomel, of blue pill or of grey powder, followed by some saline, is sometimes very remarkable. I have seen a quarter of a grain of calomel, with a seidlitz powder next morning, change as naughty a little girl as you would not wish to see into a perfect little angel, and I well remember a little experience which I had some years ago at a friend's house. One morning at breakfast a little boy was very troublesome, and, instead of taking his oatmeal porridge as he ought to have done, he was nudging and bothering his little sister, who was sitting beside him. I said to my friend, "I think your boy's digestion is out of order." "Oh, no," he said, "it is only naughtiness;" but the naughtiness increased so much that the little boy had to be forcibly removed from the table. As soon as the expulsion was effected my friend said, "You are quite right; his breath does not smell right." In such cases as this I do not know any medicine that is better than some Gregory's powder, because it has both a moral effect and a physical action. Its nasty taste when administered as a punishment is wholesome morally, while its action upon the liver and digestion is most useful physically.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the meeting held on the 9th inst., at the Society's rooms, 50, Great Russell Street, Mr. J. Glaisher, F.R.S., President, being in the chair, Captain W. de W. Abney, F.R.S., read a paper on "An Undiscussed Point in the Illumination of the Dark Room." In this paper the author showed that the law of inverse squares does not hold good when lights equal to the one-millionth of a candle are used, and he said that with lights of the following intensities a white screen one foot distant from that source of light would be invisible:—

Red	$\frac{3500}{10000000}$	of a candle.
Orange	$\frac{1000}{10000000}$	„
Yellow	$\frac{600}{10000000}$	„
Green	$\frac{10}{10000000}$	„
Blue.	$\frac{5}{10000000}$	„
Violet	$\frac{20}{10000000}$	„

He said the reason why the dark corners of a room lighted by canary medium are better illuminated than when the illumination is that of ruby glass is that the former has five times better penetrating power than the latter.

Mr. J. Spiller inquired whether it would not be better to use green, as the danger signal on our railway lines.

Captain Abney said these experiments did not apply to signal lights, and in foggy weather the green light appeared white to the eye, owing to the blue rays being cut off.

Two letters from Mons. Vidal were read, and in the discussion that ensued Captain Abney expressed his opinion that very much better results would be obtained by dots lying side by side than by colours superposed one on the other, and that five colours at least would be required to give really satisfactory results.

Mr. Spurge showed some results he had obtained with his sensitometer.

The Secretary drew attention to the holiday candle lamp, kindly presented to the Society by Messrs. Benham and Froud.

A vote of thanks to them and to the donors of books to the library concluded the proceedings.

Provincial Transactions.

DUNDEE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual excursion took place last Wednesday afternoon, 17th inst., about twenty members attending, this being the second of the session's half-holiday excursions. The place selected was Linlathen, near Broughty Ferry, the gardens and grounds being kindly thrown open to the visitors by the proprietor, Colonel Erskine. After a pleasant drive the destination was reached shortly after 4 p.m. The time was pleasantly spent in a tour of the extensive gardens under the guidance of the head gardener, who pointed out many objects of interest. A prominent feature of the gardens is the rich herbaceous border, which at the time of the visit showed a striking display of bloom. Among medicinal plants or their allies the following were seen to advantage:—*Podophyllum Emodi*, *Polygonatum officinalis*, *Scilla nutans*, *Valeriana Phu*, *Orchis mascula* (in a high state of cultivation) *Ranunculus gramineus*, *Iris florentina*, *Papaver Rhœas*, etc. Refreshments having been served and a photograph taken, votes of thanks were passed to Mr. T. H. Miln, the head gardener, for his courtesy, and to Colonel Erskine for the privilege. The weather was delightful and all enjoyed the afternoon's outing, the only regret being that the time was so limited, precluding the possibility of exploring many places which stood temptingly open. The party returned to town about 7 o'clock.

NEWCASTLE-ON-TYNE CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The members of the above Association met on Wednesday, June 17, at 6 a.m., for the purpose of making a second visit to Messrs. Sowerby and Co.'s, Ellison Glass Works, Gateshead.

There was a very large attendance of members and their friends, Mr. Hind again acting as conductor.

The visit was quite as instructive and interesting as on the former occasion, the engraving room especially coming in for a large share of attention. After being taken all over the works the members congregated in the showroom, where Mr. G. F. Merson, the President, in the name of the Association, thanked Messrs. Sowerby, and particularly Mr. Hind, for the pleasure which the members had derived from the visits.

Mr. Hind, having suitably replied, the company separated to commence the business of the day.

American Pharmaceutical Association.

CAFFEINE SALTS—THEIR PREPARATION AND COMPOSITION.*

BY H. W. SNOW, PH.C.

The question of the existence or non-existence of salts of caffeine has been studied before this time. It was once held that the alkaloid did not form true salts, and that this was especially true of the weaker organic vegetable acids. This opinion seems to be still held by many American pharmacists, who do not seem to be familiar with the most recent affirmative studies made in this line, and it was with a view of bringing the results of some experiments of my own, as well as the experiments of others, before American pharmacists, that this paper was prepared. Before I was myself fully aware of the published works of others, I was convinced of the existence of at least some salts of caffeine, more especially the hydrobromide, by having examined some commercial brands. The requirements of my own work led me to experiment on the manufacture of the hydrobromide for myself, which experiments were successful, and this success led to further work. Afterwards a consultation of chemical literature revealed the fact that other contributions had been made to the subject before I began my studies; therefore I shall pass in review the chief experiments which have been performed before my own. Hager long ago affirmed that there was no such a combination as citrate of caffeine, but that the powder usually sold as such was nothing but a mechanical mixture of citric acid and caffeine, and H. J. Haarman[*] supported this assertion, also claiming that the valerianate had no existence.

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* Read at the Annual Meeting held in New Orleans.

In 1881 J. U. Lloyd,[†] at the request of Charles Rice, performed some experiments on the citrate, as a result of which he announced that it has an existence, though it is readily decomposed. All experiments to make the acid and alkaloid combine in aqueous and alcoholic solutions resulted in failure, and he therefore concluded that caffeine will not combine with citric acid in the presence of any solvent that dissolves the acid freely and caffeine sparingly, and consequently to make caffeine and citric acid combine it is necessary to use a fluid having about equal solvent power over both. The solvent chosen was chloroform 2 volumes, and alcohol (specific gravity 0·835) 1 volume, which was to be applied as follows:[‡]—Caffeine (30 grains) was dissolved in 1 fluid ounce of chloroform, and citric acid (30 grains) in ½ fluid ounce of alcohol; mix and filter, and evaporate the filtrate to a syrupy consistence over the water bath. Remove the dish and cool to 50° F., and stir with a spatula until a dry powder results. Commenting on this product, Lloyd says it "is mostly citrate of caffeine, though both the free acid and free alkaloid undoubtedly exist in it to some extent." It is permanent in the air, but is instantly decomposed by contact with water, the caffeine separating in feathery crystals if the water present is insufficient in quantity to dissolve it. Alcohol also dissolves it. It is practically insoluble in chloroform. He further concludes that if the proportion of acid be increased, it is still doubtful whether the whole of the caffeine may be made to enter into combination.

About the same time Schmidt,[§] in connection with his work on the constitution of caffeine, was led to examine the salts of the alkaloid. The abstract I have says he found that the citrate and formate could not be formed, but mentions the acetate as forming colourless needles, which yield up their acid very readily on exposure to the air, even at ordinary temperatures. The normal butyrate and the isovalerate were also mentioned as having been obtained in distinct crystalline form. C. Tanret,[*] in studying Schmidt's work, endeavours to show that caffeine does not form salts with organic acids. He mentions acetic, valeric, lactic, and citric acids, saying they cannot be made to combine with caffeine. He says that hydrochloric, hydrobromic, and sulphuric acids form salts, the latter crystallizing with difficulty, but the hydrochloride and hydrobromide crystallizing with ease. Having his results thus questioned, Schmidt requested H. Biedermann to re-investigate the whole subject, which he accordingly did in a very thorough manner,[†] reporting the analyses of a number of definite salts, including the formate, acetate, butyrate and valerianate, as well as the hydrochloride, hydrobromide, nitrate, and some others. He gives the following:

Aurochloride, $C_8H_{10}N_4O_2HClAuCl_3 \cdot 2H_2O$.
Platinochloride, $(C_8H_{10}N_4O_2)_2H_2Pt_2Cl_6$.
Hydrochloride, $C_8H_{10}N_4O_2HCl \cdot 2H_2O$.
Hydrobromide, $C_8H_{10}N_4O_2HBr \cdot 2H_2O$.
Nitrate, $C_8H_{10}N_4O_2HNO_3 \cdot H_2O$.
Sulphate (acid), $C_8H_{10}N_4O_2 \cdot H_2SO_4$.
Sulphate (normal), $(C_8H_{10}N_4O_2)_2H_2SO_4 \cdot H_2O$.
Formate, $C_8H_{10}N_4O_2 \cdot H_2CO_2$.
Acetate, $C_8H_{10}N_4O_2 \cdot HC_2H_3O_2$.
Butyrate, $C_8H_{10}N_4O_2 \cdot HC_4H_7O_2$.
Valerate, $C_8H_{10}N_4O_2 \cdot HC_5H_9O_2$.

He also obtained anhydrous hydrochlorides by the action of hydrochloric acid gas on the alkaloid. These had the composition $C_8H_{10}N_4O_2 \cdot HCl$ and $C_8H_{10}N_4O_2 \cdot 4HCl$. He also adds that all of these salts are decomposed wholly or partially at a temperature of 100° C.

The oxalate has been mentioned by Dr. Leipen[‡] as a very stable compound, and as not being decomposed by water, even on repeated crystallization. In the short abstract consulted by me, no quotation is made of the results of analyses of the oxalate, and we are only led to infer that such were made. A "phenate" has been mentioned as having been produced by Petit[§] by mixing solutions of equal parts of caffeine and phenol. It is said to be a definite crystalline compound, very soluble in water. This, with the exception of the double salts of caffeine with sodium and benzoic, salicylic and cinnamic acids, comprises the literature with which I am familiar on the subject of the salts of caffeine. Regarding these double salts, it may be said that they were first announced by Tanret,[‖] and further particulars on them may be found by consulting the papers by Merck[¶] and Schwarz.[**]

Experiments.—These were confined to a study of the hydrobromide, hydrochloride, sulphate, nitrate, salicylate, benzoate, oxalate, citrate, and valerianate. Of these, all but the last two were prepared by crystallization from water. The valerianate was prepared by crystallization from chloroform, as was also a sample of the salicylate. The experiments grew out of a necessity for the preparation of the hydrobromide, and were first begun some three or four years ago. When molecular equivalents of the alkaloid and an inorganic acid are mixed together in the presence of excess of water, it is very evident that no change takes place. If the water is insufficient to dissolve the alkaloid, this latter remains suspended through the liquid without any change of appearance or alteration of any kind. However, if the mixture is set aside for spontaneous evaporation, a time is reached when the acid becomes sufficiently concentrated to lead to the formation of a true salt, which crystallizes out. These crystals of true salt are interspersed with the crystals of unaltered alkaloid. The change is progressive and continuous, alkaloid passing into the solution to replace the salt of the alkaloid which crystallizes out, so that, until the very last of the operation, crystals of uncombined alkaloid can be seen mixed with the growing crop of crystals of the true salt. It is probable that, as the acid is weakened by a portion of it entering into combination with the alkaloid, a time must elapse for further spontaneous concentration; that is to say, that the rapidity of crystallization (when this once begins) is dependent on the rate of evaporation. From the foregoing it would seem to naturally follow that better results will be obtained when more acid is added than is required for entering into combination. Experience demonstrates the truth of this supposition. It also follows from this that if the ratio of water to acid is not too great, the salt of the alkaloid can exist in the presence of water, and can consequently be prepared in the presence of water. It was in this manner that the hydrobromide, hydrochloride, nitrate, and sulphate were prepared. Further, it was noticed that if excess of acid is used and of sufficient degree of concentration, the alkaloid, upon being stirred into it, will at first all dissolve and then almost immediately recrystallize as salt. This was first noted in connection with the hydrochloride, and later with the nitrate and hydrobromide. In order to prepare the salts economically by spontaneous evaporation and without waste of time, it becomes necessary to fix the point of dilution of the acid at which crystals will begin to form within a few hours after the addition of alkaloid. This will depend upon the amount of acid that is to be used; that is, whether just enough is to be used to wholly combine with the alkaloid, or whether an excess is to be employed. Also good results can be obtained by only diluting a part way, and then dissolving the alkaloid with the aid of a little heat and setting aside for spontaneous evaporation. In the case of the oxalate and salicylate, it was noted that they crystallized easily from *dilute* solutions, and that neither of the two salts is easily soluble. They can be prepared readily by dissolving the alkaloid and acid separately in sufficient water, mixing the two solutions, and setting aside to crystallize. The salt crystallizes out and may be freed from the mother liquor by filtration, and then dried, first between blotting paper and then in the air.

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[*] 'Year-Book of Pharmacy,' 1878, 91, from *Repert. de Pharm.*, 1877, 142.

[†] 'New Remedies,' 1881, 31.

[‡] Prof. Lloyd here assumes that caffeine is trivalent. The British Pharmacopœia of 1885 makes a like assumption, but the results of other work, including my own, show it to be univalent.

[§] 'Proc. Am. Pharm. Assoc.,' 1881, 344 (*Chem. and Drug.*, 1881, 213, from *Ber. d. Deutsch. Chem. Gesellschaft*, 1881, 814), and *Journ. Chem. Soc. Abst.*, 1881, 746, from same source.

[*] *Journ. de Pharm. et de Chim.*, [5] v., 591–595. Translations in *Drug. Circ.*, 1882, 156, and *Amer. Journ. Pharm.*, 1882, 494, Abs. in 'Year-Book,' 1883, 94, and *Pharm. Journ. and Trans.* [3] xiii., 101.

[†] *Amer. Journ. Pharm.*, 1883, 398, and 'Year-Book of Pharm.,' 1883, 94-95, and 1884, 59, from *Archiv der Pharm.* [3] xxi., 175 to 186.

[‡] *Pharm. Journ. and Trans.*, June 8, 1889, p. 996, from *Pharm. Zeit.*, April 17, 1889.

[§] *Amer. Journ. Pharm.*, 1889, 288 ('Proc. Amer. Pharm. Assoc.,' 1889, 208), both from *Journ. de Pharm. et de Chim.*, April 1, 1889.

[‖] Where last cited.

[¶] *Amer. Drug.*, 1884, 143.

[**] *Amer. Drug.*, 1885, 195 ('Proc. Amer. Assoc.,' 1885, 625), from *Pharm. Zeitung.*

While my experiments have not been sufficiently exhaustive to generalize with safety, it would seem justifiable to point out that in both these cases the resulting salts are rather more difficultly soluble than usual; further, that the acids are not easily soluble, the salicylic acid especially. It would seem then that when these conditions obtain the caffeine salt will be reasonably stable in the presence of water. In preparing by the chloroform process it is simply necessary to dissolve the acid and the alkaloid separately in chloroform, mix the two solutions, filter, and set aside to crystallize. The salts prepared as above were analysed, the acid being determined by titration with standard alkali, using phenolphthalein as indicator; the alkaloid being estimated by washing out with chloroform. The water of crystallization was estimated by difference. In the case of the salts of the volatile acids, direct determination of the water of crystallization by drying and weighing is impossible, as the salts are more or less decomposed by the action of heat. Titrations before and after heating showed that the hydrochloride is wholly decomposed at a temperature below 75° C., while at from 75° to 80° the hydrobromide and nitrate suffer partial decomposition; but the sulphate is stable at 100° C., and probably considerably above this temperature, perhaps as high as the subliming point of the alkaloid. No experiments were performed for the others. Results of the analyses were as follows:

Caffeine Hydrochloride.

	1st Det. Per cent.	2nd Det. Per cent.	Av. Per cent.
Alkaloid	72·09	71·95	72·02
Acid.	13·72	13·84	13·78
Water	14·19	14·21	14·20

With two molecules of water of crystallization, the composition is by calculation:

	Per cent.
Alkaloid	72·79
Acid.	13·69
Water	13·52

Caffeine Hydrobromide.

	1st Det. Per cent.	2nd Det. Per cent.	Av. Per cent.
Alkaloid	62·39	62·33	62·36
Acid.	27·08	27·27	27·18
Water	10·53	10·40	10·46

With two molecules of water of crystallization, the composition is by calculation:

	Per cent.
Alkaloid	62·38
Acid.	26·05
Water	11·57

Caffeine Nitrate.

	1st Det. Per cent.	2nd Det. Per cent.	Av. Per cent.
Alkaloid	74·7	74·86	74·78
Acid.	24·09	23·79	23·94
Water	1·21	1·35	1·28

With five molecules of salt to one molecule of water of crystallization, the composition would be:

	Per cent.
Alkaloid	74·45
Acid.	24·17
Water	1·38

This, it will be seen, is a somewhat unusual composition, but it seems the only conclusion to draw. Biedermann gives the salt as having one molecule of water of crystallization.

Caffeine Sulphate.

	Found. Per cent.	Theory requires. Per cent.
Alkaloid	82·1	79·9
Acid	17·8	20·1
	99·9	100·0

The salt evidently contains some excess of alkaloid, but it was not thought necessary to make a second trial, as the difficulty seemed to be in not having used quite enough acid, the acid possibly being a little under strength, it having been assumed to be 100 per cent. strong. The salt crystallizes without water of crystallization.

Caffeine Salicylate (from Water).

	Found. Per cent.	Theory requires Per cent.
Acid	41·44	41·57
Alkaloid	58·39	58·43
	99·83	100·0

The salt crystallizes without water of crystallization

Caffeine Salicylate (from Chloroform).

	Found. Per cent.	Theory requires. Per cent.
Acid	41·73	41·57
Alkaloid	58·49	58·43
	100·22	100·00

Caffeine Benzoate.

No full analysis was made of this. It is evidently not so easily prepared as the salicylate, the first small crop of crystals obtained containing excess of acid.

Caffeine Oxalate.

	Found. Per cent.	Theory requires. Per cent.
Alkaloid	81·4	81·2
Acid	18·8	18·8
	100·2	100·0

The salt crystallizes without water of crystallization.

Caffeine Valerianate.

	Found. Per cent.	Theory requires. Per cent.
Alkaloid	72·2	65·54
Acid	27·75	34·46
	99·95	100·00

The salt evidently contains some unaltered alkaloid.

Summary.—From these experiments it appears that in the case of the stronger inorganic acids it is a simple matter to prepare salts with caffeine. In case of the organic acids it is otherwise. Some of them, namely, the salicylate, benzoate, and oxalate, are prepared with the greatest ease, but others are much less easily prepared. In the case of those with the volatile acids, the combinations are very unstable and are easily decomposed. In regard to the existence of a *normal* citrate, I am not yet fully determined in my own mind, but am inclined to believe that it can be prepared by appropriate means. The hydrobromide and hydrochloride crystallise with great ease; the nitrate is somewhat difficult to crystallize, and the sulphate still more so.

The composition of the salts as determined by these experiments is as follows:

Hydrochloride, $C_8H_{10}N_4O_2 \cdot HCl \cdot 2H_2O$.
Hydrobromide, $C_8H_{10}N_4O_2HBr \cdot 2H_2O$.
Nitrate, $(C_8H_{10}N_4O_2HNO_3)_5H_2O$.
Sulphate (normal), $(C_8H_{10}N_4O_2)H_2SO_4$.
Oxalate, $(C_8H_{10}N_4O_2)_2H_2C_2O_4$.
Salicylate, $C_8H_{10}N_4O_2 \cdot HC_7H_5O_3$.

Obituary.

Notice has been received of the death of the following:—

On the 14th of May, Mr. Thomas Fuller, Chemist and Druggist, Didsbury, Manchester. Aged 39 years.

On the 27th of May, of confluent smallpox, in the European Hospital, Bombay, Mr. William Douglas (Treacher and Co., Limited), formerly with Messrs. Glaisyer and Kemp, Brighton. Aged 27 years.

On the 8th of June, Mr. Allan Richardson, Pharmaceutical Chemist, Didsbury, Manchester. Aged 74 years. Mr. Richardson had been a member of the Pharmaceutical Society since 1853.

On the 11th of June, Mr. Richard Walters, Chemist and Druggist, Hooley Hill, Lancs. Aged 47 years.

On the 13th of June, Mr. Samuel Barrett, Chemist and Druggist, Rupert Street, Bradford. Aged 53 years.

On the 15th of June, Mr. Thomas Scott, Chemist and Druggist, Attercliffe Road, Sheffield. Aged 5 years.

On the 17th of June, Mr. Edward Thomas Lee, Pharmaceutical Chemist, Queen Street, Rhyl. Aged [illegible] years.

On the 21st of June, Mr. John Woolstencroft, Chemist and Druggist, Carnforth, Lancs. Aged 50 years. Mr. Woolstencroft had been a member of the Pharmaceutical Society since 1873.

On the 21st of June, Mr. Edward Berry, Chemist and Druggist, The Cross, Gloucester. Aged 73 years.

On the 22nd of June, Mr. Edward Fenton Atkinson, Chemist and Druggist, Pateley Bridge. Aged 50 years.

BOOKS RECEIVED.

KEMP AND CO.'S PRESCRIBERS' PHARMACOPŒIA. A Synopsis of the More Recent Remedies, Official and Non-Official, with a Therapeutic Index and a Résumé of the B.P. Additions. Second Edition. Bombay: Kemp and Co., 1891.

HOW DO I STAND? By GEORGE WEDDELL. Newcastle-on-Tyne: Mawson, Swan and Weddell, 1891.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PRELIMINARY EXAMINATION.

Sir,—With regard to this subject considerable correspondence took place a few weeks ago, and the general tendency of the writers seemed to be in favour of making this examination more thorough on the one hand and also on the other to lead the embryo chemist through the elementary portions of his qualifying examinations, but it appears that nothing definite was produced by the discussion.

It is daily becoming more necessary to have a good groundwork of education in the beginning of one's career, as it opens out the way for future work, and makes progress easier. by what one reads and is taught being better understood and assimilated. I would suggest as an extended syllabus:—Latin Author, two fresh books each year, one prose the other poetry; choice of one for each candidate; books selected, De Senectute, De Amicitia; Æneid, any book; Georgics, any book; Cæsar, De Bello Gallico, any book; grammar and prose, as before; English grammar, as before; geography; arithmetic, as before; algebra up to simple equations, or Euclid, first book; elementary chemistry; one optional subject, French, Greek, German, physics, botany; French grammar and easy translation; Greek grammar and portions of Iliad or Anabasis; German grammar and easy translation; physics, heat and light, or magnetism and electricity treated elementarily; botany, elementary.

The examination should be passed before apprenticeship, in fact, it should be made compulsory, as an apprentice is very heavily handicapped who has to do it during his pupilage, in most cases, passing after several attempts. It would be beneficial to the pupil as well as his master that it should be compulsory, and it is pretty well understood now that the Preliminary has been passed before any negotiations take place for the purpose, so that no hardship would be felt if compulsion was applied.

Aberystwyth. E. J. EVANS.

Jesse Boot.—Your letter is evidently written under a misunderstanding and its publication is therefore unnecessary.

Carduus.—Bentley's 'Text-Book of Organic Materia Medica' (Longman's, 7*s.* 6*d.*), or Maisch's 'Manual of Organic Materia Medica' (Hirschfield Bros., 15*s.*).

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Kemp, Barron, Independent, Conference.

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